Health Psychology in a Digital Age

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Table of Contents

List of Tables and Figures

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THE FOLLOWING PART OF THIS THESIS HAS BEEN REDACTED TO REMOVE SENSITIVE INFORMATION:

pp. 130-157

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The journey from start to completion at times felt like the near impossible, on reflection I have learnt that none of this would have been possible without the people who have helped and supported me along the way.

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I would also like to thank all the participants, students and those I have met along the way for offering your time, invaluable advice and support over the course of my research, thank you.

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Declaration

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Section A: PREFACE

This portfolio of competence is an example of the research and professional experience I have gained over the duration of my professional doctorate in health psychology training. The main theme of my portfolio represents my developing interest in the emerging digital mobile health movement, and in its application to health psychology. My initial interest in this area developed from my desire to understand this phenomenon and how digital delivery can impact the individual's health and well-being status. My journey over the years has been unique, and I will expand upon and outline it through my core competencies.

Professional Practice

Consultancy

The consultancy project presented within this portfolio was initiated by SanoSync, a private mobile health company. The main aim of this project was to understand the journey of a smoker, from experiencing to engaging with a smoking cessation smartphone application. SanoSync had invested in developing a mobile app targeted at those trying to quit smoking but had not yet decided what content was needed within the app, nor did they have any experience in carrying out research to determine the unmet needs of a smoker. My role as a consultant was to develop a solution based on research outputs. I was tasked with completing a literature review, developing a discussion guide/interview schedule, facilitating research groups, and advising the company of the best possible solution on completion of the research. The consultancy competency taught me about the dynamics of working within a multi-disciplinary team. The experience also allowed me to assume the role of a consultant, as well as teaching me how to project manage and highlight the benefits of integrating the theories of health psychology within the development of a mobile app used for a health intervention.

Teaching and training

The training case study presented within the portfolio involved delivering a one-hour workshop on behalf of AgeWatch, a registered charity. The charity had recently recruited a range of volunteers from different professional backgrounds, and asked me to deliver a session on how to use behaviour change techniques when writing online articles. The majority of the work carried out by this charity relies on volunteers writing health related articles which are then published on the website; therefore, the need to ensure that everyone is confident in using theoretical models of behaviour change was imperative. The training was delivered in the form of a lecture, but included practical exercises for the attendees to complete. Feedback suggested that the training was successful and that further training on topics was needed by participants.

The teaching component of this competency took the form of an hour-long lecture delivered to MSc Health Psychology students attending City, University of London. This session is described in the case study for the purposes of this portfolio, but my experiences of teaching goes beyond what is presented. I taught ten three-hour long lectures to MSc health psychology students at City, University of London for the *Professional Contextual Issues in Health Psychology* module. Alongside this module, I taught another ten three-hour long lectures to undergraduate psychology students at Florida State University in London.

Throughout these experiences, I understood the importance of incorporating feedback in my planning and therefore collated student feedback at the end of each term. This feedback was invaluable, and subsequently helped shape my lectures for future lectures and student input.

Implementing interventions to change health related behaviour

The first behaviour change intervention described within this portfolio took place on behalf of Teens and Toddlers, a registered charity. I co-facilitated a sixteen-week programme based

within a secondary school. Teens and Toddlers work with challenging teenagers at risk of becoming young parents, and pairs them with challenging toddlers in a nursery. The programme is designed to help teenagers learn key interpersonal skills through psycho-education and practical experience. Each session was structured and comprised one hour of classroom teaching and one hour of practical experience working within a nursery. Since completing this programme, I have co-facilitated three more projects. All of these projects have taught me vital skills in working with teenagers and toddlers; the change has been evident in the teenagers' behaviour and approach to life, which has been really rewarding.

The second behaviour change intervention was an alternative to face-to-face intervention and was offered via a CD-ROM. The purpose of this intervention was to educate patients diagnosed with coronary heart disease (CHD). The objective of the programme was to assess patients' needs and to offer interactive educational material in order to change the way CHD patients manage their condition. Informing patients about their condition, along with treatment and psychological support, empowered them to manage their CHD more effectively.

Research

As a trainee health psychologist, I have learnt that digital intervention methods (i.e. text messaging, smartphone apps, or online computerised support) have precipitated a change in how patients self-manage their condition, but that they also serve to educate and change pre-existing illness and medication beliefs. The main research within this portfolio is an example of how text messaging interventions can elicit change in patients diagnosed with inflammatory bowel disease (IBD). In general, patients with IBD are adherent to their medication, but adherence decreases once in remission (Broide, Dor, Ruhimovitch, Shitrit, Sklerovsk, et al., 2017). Beliefs about illness and medication held by IBD patients can contribute to our understanding as to why patients become non-adherent (Leventhal, Diefenbach & Leventhal,

1992). Furthermore, healthcare professionals do not always understand what these pre-existing beliefs are, and so these beliefs generally persist and adherence continues to skew negatively (Hornes, Parham, Driscoll & Robinson, 2008).

Intentional and unintentional medication non-adherence is a particular challenge for patients with inflammatory bowel disease (IBD). Non-adherence can effect patients' quality of life, which could result in unfavourable treatment outcomes, more hospitalisations, and higher healthcare-related costs (DiMatteo, Giordani, Lepper & Crogan, 2002). The aim of this pilot study was to assess whether a tailored text message intervention designed to modify illness and medication adherence beliefs in patients with IBD would increase treatment compliance and change patients' illness perceptions and medication concerns. Following the methodological principles from a successful study with asthma patients by Petrie, et al. (2013), this pilot study hypothesised a similar positive trend in medication adherence once participants' illness perceptions and medication concerns were understood and targeted. This study validated the benefits of text messages, and highlighted the importance of addressing these beliefs in order to understand the reasons for non-adherence more fully. The implications of this finding can help researchers and clinicians offer alternative support to patients away from the traditional clinical setting.

Systematic Review

The systematic review aimed to uncover the literature related to mobile health apps further, and to investigate what this platform offers and the current research applied to test the implications of these apps. There was a need to complete a systematic review of the current literature and interventions for apps developed for obesity and smoking cessation. Seven studies out of forty were shortlisted and reviewed, four related to obesity and three related to smoking cessation. Understanding what these apps offer and how they compare to traditional

support or online interventions helped us to outline the benefits of apps and the behaviour change techniques applied within them. On completion, the systematic review was accepted and published in the *Journal of Health and Technology*.

Conclusion

The aim of this portfolio was to introduce an alternative to traditional health psychology interventions and to move towards a more digitalised approach. Interestingly, I am currently working for a patient engagement health technology company as a behaviour change specialist. I have been able to transfer my learning and to help develop patient-centric apps for those diagnosed with a range of different chronic conditions. My doctorate has enabled me to position myself for roles such as this, and I plan to continue this journey once the work is completed.

References

Broide, E., Dor, A. E., Ruhimovitch, N., Shitrit, A. B., Sklerovsky, F., Benjaminov, S. M., ... & Naftali, T. (2017). Can we Predict Adherence to Treatment in IBD Patients? Gastroenterology, 152(5), S852.

DiMatteo, M., Giordani, P., Lepper, H., & Croghan, T. (2002). Patient Adherence and Medical Treatment Outcomes A Meta-Analysis. Medical Care, 40(9), 794-811..

Horne, R, Weinman, J, Barber, N, Elliott, R, & Morgan, M. (2005) Concordance, adherence and compliance in medicine taking. *Report for the National Co-ordinating Centre for NHS Service Delivery and Organisation R & D* (NCCSDO).

Leventhal, H., Diefenbach, M., & Leventhal, E. A. (1992). Illness cognition: using common sense to understand treatment adherence and affect cognition interactions. Cognitive therapy and research, 16(2), 143-163

Petrie, JK, Perry K, Broadbent E & Weinman J. (2001) A text messaging programme designed to modify patient illness and treatment beliefs improves self-reported adherence to asthma preventer medication. British Journal of Health Psychology, BPS, published online February DOI:10.1111/j.2044-8287.2011.02033

Section B: PROFESSIONAL PRACTICE

1 Generic Professional Practice – A Reflective Report

Introduction

My five-year journey of becoming an applied psychologist has been overwhelming yet exciting. This reflective report aims to outline these experiences by detailing my journey from a novice to an expert within this field. As this process unfolds, I describe my experience of developing relationships with a diverse set of professionals, who empowered me to introduce the field of Health Psychology to private businesses and other settings alike. I will detail my personal experiences, obstacles, techniques, and the developmental milestones that have helped me to become a professional, and will conclude by sharing my thoughts and future projections.

My initial experience of completing my Masters (MSc) in Health Psychology at City University of London triggered my decision to pursue a career in Health Psychology. On completion of the MSc, I enrolled onto the professional doctorate, and during this transitional stage I soon realised that my journey towards becoming an expert health psychologist was just beginning. Using the conscious competence learning model (Burch, 1970) and the cognitive apprenticeship model (Brown, Collins and Newman, 1989) I will describe my experience in growing from a trainee to an expert.

When initially introduced to the folder of core competences, I struggled to understand how I would be able to complete what was expected of me. Although I had some key foundations, I needed to manage and structure my plan for the following two years. Burch, (1970) describes stage 1 as 'I don't know what I don't know', and suggests that at this stage a learner unconsciously struggles to develop skills required to commence work they have not done before.

The core expectations for the DPsych were such that I was unsure which competency to begin with. I began feeling overwhelmed and hesitant, and I did not know how and where

to start. I quickly adapted, however, by organising my work expectations and decided to take things one step at a time. My initial focus was the systematic review, something which I had control over, instead of beginning with a competency where I would require external input.

I learnt to construct and manage my competencies by attending the core workshops offered at City University London (see Appendix 1). Burch (1970) describes this stage as the 'consciously incompetent': knowing what is required but still feeling incapable of completing the task required. I was aware of how to implement and complete the case studies, but I needed more guidance. I believe what inspired and supported me to move to Burch's stage 3, 'consciously competent', was my supervisor and my work experience.

My Experience – A Teaching Example

One of the key areas in which I have progressed is my ability to teach and present. This experience has been pivotal for my professional development, and I would like to take the opportunity to detail this experience further within the following case study.

I was first introduced to teaching during my first year. I was always reluctant to teach; my lack of confidence and nerves were discouraging. I was invited to observe a lecture, as by doing this I could visually identify the different skills required when teaching, and decide what I needed to work on. This included speaking, presenting, being patient and confident, and many more, and allowed me to 'see the processes at work' (Collins, Brown & Holum, 1991). Conceptual learning through modelling supports the learner in constructing a model of the task before attempting it (Brown, Collins, & Duguid, 1989). I envisioned what I wanted from a teacher from the perspective of a learner, and was left with a list of skills I needed to work on further.

The Cognitive Apprenticeship Model (1989) suggests that the learner develops through four significant stages: modelling, scaffolding, fading, and coaching. During my DPsych I

transitioned through these four stages, which helped me to reach my potential. By observing a lecture, my supervisor modelled and demonstrated teaching in a realistic setting. Whilst observing, I started to develop ideas for teaching. I was offered a one-hour slot within an already existing lecture and felt overwhelmed and very nervous, but my supervisor was very supportive and reassured me that these feelings were very normal. At this stage I had moved on to the 'scaffolding phase', and although I was going to teach an hour's lecture, my supervisor would remain within the classroom observing my teaching. At the end of the hour those present completed a student evaluation form followed by formal feedback from my supervisor. This stage is described as the 'coaching stage'. My supervisor played a key role in offering constructive feedback in areas I needed to improve and where I performed well. I was pleased with the outcome and my confidence continued to increase.

I learnt the importance of planning and presenting. Planning the flow and approach indicates that the presenter is confident with the information he/she is presenting. Similarly, transferring this information to the audience naturally is also important. Looking and feeling confident reflects well on the presenter and instills trust in the students, encouraging them to want to learn and engage more in the teaching.

The next stage of the Cognitive Apprenticeship Model moves to encourage the learner to develop and practice the skills further, away from being an apprentice and taking on more responsibility. Equipped with the advice from my supervisor and my prior experiences, I was offered the opportunity to teach the 'Introduction to Health Psychology' module for Florida State University in London. The offer to teach my own class over three months was very exciting, but overwhelming. This role involved many different responsibilities: I was tasked to develop the course syllabus, lectures, educational excursions, and course material, and I was responsible for the end of term exam. As I had no prior experience of developing such material I decided to take this opportunity and embark on this challenge.

My Reflection

Teaching and empowering students is rewarding, but at times I felt that my appearance and age affected how the students respected my teaching. While this should not have been an issue, it remained a barrier which needed to be addressed. I projected confidence in my teaching, however, and remained professional throughout the term. Addressing these concerns professionally and experiencing the positive response from the students furthered my passion to teach.

Following this, I was offered the opportunity to lead a module for the Masters in Health Psychology course at City University London. Again, I took on board my prior experiences and challenges, using techniques I had adopted along the way. How I managed this opportunity differed to my prior experiences as my confidence, teaching style, relationship with students, and approach had changed significantly. To me, this indicated that I had learnt and developed in comparison to how I originally felt about teaching: this change was positive. Interestingly, this change was noticeable when I was asked to present a stress management module to a team of professionals at Hive Healthcare. Although this audience was different to university students, I felt confident and competent whilst presenting through reflecting on the feedback from my previous experience.

My journey in perfecting my teaching ability began as an inexperienced learner; I strove to do better and pushed myself to take on new challenges, which I believe has played an important role in helping me to develop as an applied psychologist.

1.4 Implementing and maintaining systems for legal ethical and professional standards

Whilst training in any profession it is important to consider and adhere to the legal, ethical, and professional standards required. As a trainee health psychologist working in a host of different work placements, there was a real need for me to ensure that I was up to date with the current policies and regulations. Leading research away from a traditional university setting and

managing this independently required me to instigate specific responsibilities, which I will discuss further.

A researcher is required to follow the confidentiality policies and guidelines required to protect the participants and the authenticity of the research. I learnt the importance of record keeping and data protection, which ensured the anonymity of the participants. In order to protect the participants from being identified by others outside of the research, I replaced their names with identification numbers. Similarly, I ensured that all files were saved with a protected password file identification code, which kept the participants' personal details secure within the excel sheet. I utilised City University's research database Qualtric Survey Software, which supported me in collating participants' questionnaires in a confidential manner. I approached my work with the underpinnings of the Code of Ethics and Conduct (BPS), Human Research Ethics (BPS), and the Health and Care Professions Council's Standards of Conduct (HCPC). I referred to these regulations when working as a researcher in projects based within an academic institution and for private healthcare companies. Both experiences differed significantly, and the expectations of me have varied in both settings. Private organisations work within a different framework and agenda, where time is precious and results are expected efficiently, whilst academic settings have more time in which to fulfil the research requirements.

Whilst working for a private weight loss organisation, I came across different obstacles in comparison to doing research in an academic setting. The company director wanted to be very involved with the process, and did not always understand why things (including ethical protocol, recruitment, and data collection) needed to take longer than they should. I spent time going through the process of research, and at times repeated these requirements which eventually became an obstacle when I was asked to hurry the process along.

Consequently, I managed this obstacle and acknowledged it as a learning milestone. I learnt to be patient and confident in maintaining my professional and ethical beliefs, and was able to inform the organisation about the research protocols and competently follow the research guidelines expected from a health professional. I followed the four principles of respect, competence, responsibility, and integrity (BPS, 2009). I respected their point of view and offered confidential advice without affecting the data collection. I ensured that there was no breach of confidentiality by anonymising participants' details. I clarified this in supervision and discussed my experienced with my supervisor, who confirmed that I was acting in accordance with the regulations. This experience has taught me to set guidelines and develop professional boundaries competently, and I can now transfer this learning to future work.

Practice As An Autonomous Professional, And Providing Advice And Guidance Based On Concepts And Evidence Derived From Health Psychology.

Through working in different settings and managing an array of work demands, I became self-sufficient and self-reliant during my training journey. Although there are many advantages in being self-sufficient, there are also benefits in working and collaborating with other professionals. Over the course of the DPsych I have been involved in the following different research projects:

- **HealthValue Project**: I took the lead in managing this qualitative research project. This involved recruitment, telephone interviews, transcribing and analysing data, and producing a report which was presented at the BPS health psychology conference in 2013 (appendix for report 3).

- **Healthy Weight Achievement Project**: This involved co-facilitating two focus groups, attending public event days in order to complete 100 questionnaires, completing the data analysis, and co-writing for publication. The pre-results were presented at the Midland Health Psychology conference in 2015.

For this project, I worked in collaboration with City, University of London's Department of Psychology. Over the year, my role within this project transitioned from research assistant to research associate. I have listed my initial duties above, but as is common with research, many factors can influence the progression and outcome. The methodology and participatory action research chosen for this study was different to what I had worked with before, but what I liked about this methodological approach was the chance to work in partnership with participants, as opposed to defining the intervention prior to implementation. Working in a collaborative way can be beneficial to the researcher and participants, as it ensures that you develop a successful intervention which will work for the chosen group. Although this study is still ongoing, I am very excited to see the outcome. Aside from the actual research, I developed a good rapport and working relationship with my fellow research colleagues, which allowed us to work effectively during events and resulted in our successfully collecting and analysing 100 questionnaires, as well as running two focus groups with community lay members.

I learnt that when working alongside respected peers, it is important to accept constructive criticism, to be flexible with your time, and to take as many opportunities to learn where relevant. Appreciating your colleagues' skills and differences is what makes a project successful. Davies (2000) outlined the importance of focusing not only on the similarities we hold as a group, but also on the differences, as this makes collaborative work more powerful than working independently. I believe that it is very important to form such relationships with co-workers; unhealthy relationships can really impact the overall research outcome and impact the teams' mental health and wellbeing.

This was similarly the case for my supervision, as I was supported throughout my doctorate and many of my work experiences were initiated by my supervisor. I developed a 'can do' attitude, and accepted any forms of support or research experience offered to me.

Burch (1970) describes this stage as the point in learning where a conscious individual dedicates themselves to improving. In supervision, I learnt how to manage my workload, how to prioritise, and how to balance my workplace expectations with my DPsych expectations. My time in supervision was utilised wisely as I ensured that I was meeting my supervision goals, which in turn encouraged me to meet my personal deadlines. I believe this process developed into a partnership, as I was able to work effectively with my supervisor as we developed a mutual understanding. This experience has taught me to appreciate the benefits of working in a team – although working independently is also important – and of seeking advice and support from your supervisor, which is particularly necessary as a psychologist.

Contribute to and Engage in Continuing Professional Development

Over the years, I have actively searched for ongoing opportunities which can help further my skills and learning. I have attended conferences and one-day training events, and have become a member of organisations such as the British Psychological Division of Health Psychologists (DHP) and the European Health Psychology Society (EHPS). I was approached by the EHPS to write a short paper on developing digital interventions, which was published within the Health Psychology Bulletin in 2016.

I was successful in publishing my systematic review within the *Journal of Health and Technology*. Although the publication process and experience has been challenging but rewarding, I have learnt the protocols and expectations of publishing and observed the many obstacles that can delay the pathway to publications. I am now confident in repeating this process in the near future.

My current publications are as follows:

1. Riaz, S. (2016) Using technological interventions to elicit behaviour change: the development of a text message intervention. *The European Health Psychology Bulletin*.

2. Riaz, S. and Sykes, C. (2015). Are Smartphone Health Applications Effective in Modifying Obesity and Smoking Behaviours? A Systematic Review, *Journal of Health and Technology*.

3. Caskey, F., Hole, B., Riaz, S., Weinman, J. and Turner, N. (2015) What I tell my patients about self-management. *British Journal of Renal Medicine*.

4. Sykes, C. and Riaz, S. (2013) The Effectiveness of Interactive Coronary Heart Disease Patient Education: a multi-perspective participatory approach. *Journal of Health and Technology*. DOI: 10.1007/s12553-013-0071-6

I presented my research at the European Health Psychology Conference in Aberdeen in 2016, which I defined as an exceptional experience. I plan to continue to engage with the wider psychological society and to expand my professional network. Over the course of my first year I attended all the core workshops offered at City, University of London, including *Ethical Issues, Supervising Others, Consultancy, Teaching and Training, Cognitive Behaviour Skills for Health Psychologists, Research Methods, and the Protocols of a Systematic Review*. All of these have been beneficial for my learning. I have always had a keen interest in cognitive behavioural therapy, which is why I have enrolled onto an external two-year CBT training course that underpins the theory of rational emotive therapy. I believe that these key clinical skills are important to have as a health psychologist, and that they will strengthen my ability to support and guide clients and research in the future.

My Work Experience Journey

My work experiences differed from the normal path many trainees follow. Instead of focusing my attention on completing my core competencies within one organisation, I chose to expand my horizons and work with different organisations. Table 1.1 illustrates the number of experiences I have attained over the years.

Table 1.1: Roles as a Trainee Health Psychologist

Organisations	Role	Core Competencies
Weight Concern (UCL)	Trainee Health Psychologist	
Age Watch (Health Charity)	Health Psychology Research Officer/Advisory Board	Training
Teens and Toddlers	Pregnancy Prevention Programme Facilitator	Behaviour Change
SanoSync (mobile tech company)	Trainee Health Psychologist	Consultancy
HealthValue Project at City	Research Assistant	
Florida State University in London	Health Psychologist Lecturer	Teaching
CHD project	Researcher	Behaviour change
Healthy Achievement Project at City	Research Assistant	
City, University of London	Module Leader and Lecturer	Teaching

Overall Reflection

Throughout my DPsych, my experiences have been unique and have taught me transferrable skills for any future role. I have worked with a mixture of professionals who have all offered something different. I am grateful for all the support I have received, and I believe I have progressed exceptionally well. I have been able to produce outcomes I never thought possible, which has helped me to become a holistic health psychologist. I have learnt so much about myself, and believe that staying determined and visualising the overall outcome has helped me to work hard in completing my doctorate. Although I have had many challenges over the years, including calibrating my own expectations of the doctorate, managing my workload, and setting personal deadlines, I have been able to manage these and find ways to overcome my shortfalls.

My research and professional experience to date has positioned me to be driven and has helped me become an independent researcher. I am competent in taking the lead in developing research plans, data collecting in both qualitative and quantitative methods, and analysing the data outcomes. I have learnt that I am very passionate about research and therapy, both of

which I am inspired to pursue further. Teaching is also something that I enjoy and that I will continue to develop in the future. My journey has been a learning milestone, and I plan to continue with my learning.

References

Brown, J.S., Collins, A., and Duguid, P (1989). 'Situated Cognition and the Culture of Learning.' Educational Researcher, 18(l), 32-42

Burch, N, (1970). 'Learning a New Skill is Easier Said than Done'. Gordon Training International.

British Psychological Society (2009). Code of Conduct, Ethical Principles and Guidelines. BPS Publication. Available at: http://www.bps.org.uk/document-download-area/document-download$.cfm?file_uuid=6D0645CC-7E96-C67F-D75E2648E5580115&ext=pdf

Collins, A., Brown, J. S. & Holum, A. (1991). Cognitive apprenticeship making thinking visible. American Educator, 15 (3), 6-11, 38-39.

Davies, C, (2000). Getting health professionals to work together. There's more to collaboration than simply working side by side. BMJ. 2000 Apr 15; 320(7241): 1021–1022.

Pham, LB and Taylor, SE, (1999). From Thought to Action: Effects of Process-Versus Outcome-Based Mental Simulations on Performance. Pers Soc Psychol Bull February 1999 vol. 25 no. 2 250-260.

Appendix 1- Core CPD Workshops

City, University of London

- Professional skills and ethics
- Consultancy
- Quantitative and qualitative research methods in health psychology
- Motivational interviewing
- Systematic review
- CBT skills for Health Psychology
- Teaching and training

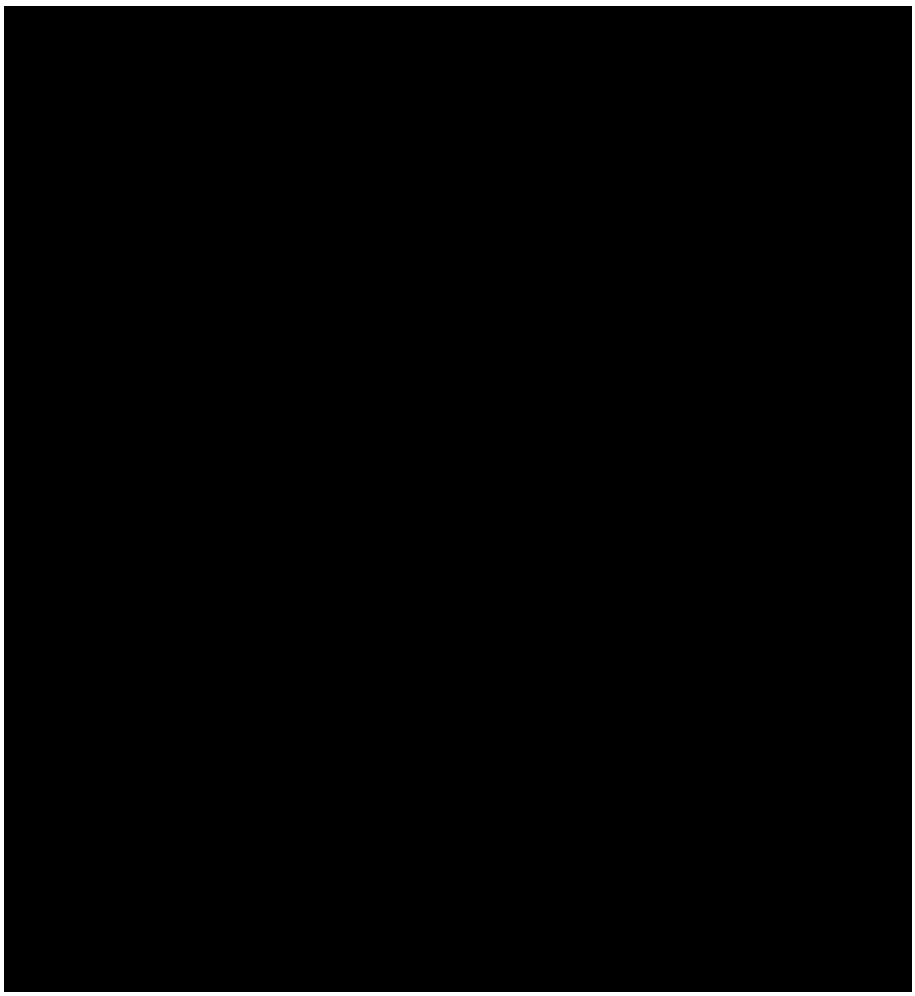
Other CPD training and conferences

- Diet group at University College London training day
- Teens and toddlers- 18-week training programme
- Introduction to Psychodrama
- Obesity conference 2012
- Clinical Trial Research Conference 2013
- Postgraduate conference 2014
- Midlands Health Psychology conference 2015 (see appendix)
- European Health Psychology Conference in Aberdeen 2016

Cognitive Behavioural therapy

- Diploma in CBT/REBT
- Advance diploma in CBT/REBT
- Integrative diploma in hypnosis and CBT

Appendix 2- Evidence: Poster Presentation at the Postgraduate Conference 2014



2 Service User Involvement Report

Recent research evidence has outlined the increasing significance and importance of patient and public involvement (PPI) in the quality and delivery of research and programme development (Dudley, Gamble, Preston, Buck, Hanley, Williamson, et al., 2015; Brett, Staniszewska, Mockford, Herron-Marx, & Hughes, 2014). In response to continued calls to involve service users and carers specifically, the Professional Doctorate in Health Psychology (DPsych) at City, University of London encouraged our consideration of service users' involvement throughout our training. The core foundation of the DPsych programme is the emphasis on research skills and on involving service users and carers in research and education. As a result, I have incorporated the involvement of patients and public throughout my training with regards to research and practice, as well as to my own consultation, at every opportunity. The outcome of this experience has improved my development as a health psychology trainee over the years and has offered me personal insight, detailed understanding, and critical evaluative skills in order to ensure that I meet the standards of proficiency approved and published by the Health and Care Professions Council (HCPC). Moreover, the involvement of PPIs throughout the research development stages has helped me to shape and inform coherent and feasible research questions that have greater potential in fulfilling the research aims and objectives of my affiliated projects.

Over the years, I have worked in agencies which offer patient-centred programmes and support. Through these agencies, I have been exposed to their central mission of involving patients from the start and encouraging collaborative working relationships with other professionals when developing research and patient support programmes. Moreover, these organisations also consider the importance of personalised care and approaches that meet patients' needs. Similarly, I have co-led participatory research based on the methodological importance of ensuring PPI, and on the importance of this on all levels of decision-making.

From this research I was able to evaluate the benefits of PPI involvement and found that this type of partnership empowered patients to be part of the process, as they were engaged and understood that their feedback was valued. Following on from this, we were able to produce something that was validated by both research and participants. Validating is significant as it strengthens the rationale of the research and programme development.

The following is an outline of some of the projects which have had PP involvement, in order to illustrate my experience:

Coronary Heart Disease (CHD) Programme

The Coronary Heart Disease (CHD) programme was based on participatory action research and included patients diagnosed with CHD and healthcare professionals offering advice and services to those patients. The programme had two objectives. The first stage included the development of an advisory board of relevant healthcare professionals to determine the feasibility of such a programme and the practicality of offering this during patient consultation. The second stage was to enrol CHD patients and to develop a focus group/advisory board where potential options were discussed in order to identify the need in such a programme. The process was very helpful as it enabled us to produce something beneficial and refer back to both groups in order to validate the programme structure before developing the CD prototype. This process was extremely helpful for me as a researcher on this project and for the participants, as it ensured that there was a level of integration as the research progressed.

Healthy Weight Programme

I was involved in the development of a healthy weight initiative for Black and Ethnic Minority (BAME) women. The purpose of the project was to engage with women who were struggling with generic weight loss programmes. Although there are several weight loss support programmes, the purpose of the research programme was to investigate the feasibility of developing culturally appropriate weight loss intervention, which included cultural foods and

discussion around acceptance of fuller-bodied women. This process involved focus groups, which took place prior to developing such intervention components. The focus group allowed me to witness the cultural values of weight and what they meant to this specific group of women. The added value of this approach enabled us to rethink the beliefs associated with weight loss for BAME women. We found that a fuller-bodied image was socially and culturally acceptable amongst this group, and that losing weight meant that friends and family would think that they were 'unwell'. Without involving 'real' women at this stage, it would not have been possible to validate this finding and drive the programme to meet these culturally-specific needs, as opposed to developing another generic weight loss programme which may not have been helpful.

Patient Feedback Loop Programme for Asthma

Developing a patient programme for patients diagnosed with asthma required an exploratory process where we involved patients and healthcare professionals at the beginning of the development process. This enabled us, as researchers, to understand why patients struggled to adhere to their inhalers and to explore their beliefs and experience associated with their chronic health condition. Instead of taking a top-down approach, this method allowed us first to understand the different patient perspectives through patient focus groups. The focus groups were semi-structured and interactive, and we asked those diagnosed with asthma their beliefs, perceptions, and condition-specific health medication experiences. Then, working alongside patients, we developed a potential programme of support. This type of involvement encourages both researchers and participants to develop good communication skills with an ability to listen to others and to constructively express a lay view beyond their own personal experience (Ziebland, Locock, Fitzpatrick, Stokes, Robert, O'Flynn & Martin, 2014).

My Learning

The government initiative to promote PPI was based on growing frustration at national policies not being implemented on a local level, and resources not being fairly distributed (Boivin, Currie, Fervers, Gracia, James, Marshall & Weijden, 2010). The rationale behind introducing PPI was based on giving service users a voice, which may help shift the attitudes and beliefs of professionals who may otherwise find it difficult to accept or implement change. From my experiences, I have learnt that although there are numerous evidenced benefits of PPI, the process itself can be time-consuming. Developing an advisory board or arranging focus groups can be difficult if you do not have a set of processes in place with an agenda. If you are conducting exploratory research this process may differ; however, if you are in partnership with service users, the involvement will be a long-term commitment throughout the duration of the project. From my experiences, I have found that this type of engagement and shared understanding helps to build supportive research programmes that are not based on assumptions, but on 'real' experiences that work and are sustained and accepted in the wider community.

References

Boivin, A., Currie, K., Fervers, B., Gracia, J., James, M., Marshall, C., & van der Weijden, T. (2010). Patient and public involvement in clinical guidelines: international experiences and future perspectives. *Quality and Safety in Health Care*, 19(5), 1-4.

Brett, J., Staniszewska, S., Mockford, C., Herron-Marx, S., Hughes, J., Tysall, C., & Suleman, R. (2014). A systematic review of the impact of patient and public involvement on service users, researchers and communities. *The Patient-Patient-Centered Outcomes Research*, 7(4), 387-395.

Dudley, L., Gamble, C., Preston, J., Buck, D., Hanley, B., Williamson, P & EPIC Patient Advisory Group. (2015). What difference does patient and public involvement make and what are its pathways to impact? Qualitative study of patients and researchers from a cohort of randomised clinical trials. *PloS One*, 10(6), e0128817.

Ziebland, S., Locock, L., Fitzpatrick, R., Stokes, T., Robert, G., O'Flynn, N. & Martin, A. (2014). Patient and public involvement.

3 Consultancy Case Study

Understanding the Journey of a Smoker; From Experiencing to Engaging with a Smoking Cessation Smartphone Application

Setting: Private Company

Client: SanoSync

Target Group: General Public: Smokers

Aim of the Consultancy

The aim was to support SanoSync (hereafter referred to as 'the client') understand the process of evaluating and improving the usability of their new smoking cessation mobile app. As a consultant, my role was to develop a pilot study to test the app, whilst focusing on the user experience of the participants from seeing the product (experience) to engaging with the product (signing up and using the app over a duration of 3-4 days). The main objective of the project was to understand user engagement, measured at two levels as stipulated earlier.

Background to the consultancy request

SanoSync is a mobile health company that develops health applications (apps) for patients and the general public, and has been privately owned since its launch in 2011. Although this company is relatively new, their ethos is to *'enable the public to find ways to self-manage their health condition'* (SanoSync, 2012). SanoSync has constructed a viable team of individuals working on the developmental process of such applications.

The initial consultancy request originated from Dr Catherine Sykes. Dr Sykes was approached by the client who requested support in the development, testing, and launching of their smoking cessation app. At the time, they did not have a health psychologist representative within their team. Therefore, the client contacted Dr Sykes with a request to set up an initial

meeting to discuss the possibility of a health psychologist with knowledge within this field joining their project team. Dr Sykes approached me with this request as I had researched mobile health applications and had just published my systematic review on how behaviour change technique embedded within mobile apps can help elicit real change.

Reflection

I was intrigued when I first heard about this project, as although from the initial request the objectives for the project were not entirely clear, I knew there were other opportunities to ask questions. I was excited because the client was offering something unique: a mobile health app and a tool which people could use at their own leisure. Research has already highlighted the economic benefits of mobile apps (Noel, Vogel, Erdos, Comwall & Levin, 2004) and the positive effects of mobile technology within the healthcare domain (Blaya, Fraswe & Holt, 2010). I was thrilled and left feeling extremely fortunate to have the opportunity.

Assessment of Request For Consultancy

The scope meeting took place at City, University of London. I presented my experience and discussed my systematic review, titled 'Are smartphone health applications effective in modifying obesity and smoking behaviours?' This systematic review was related to smoking behaviours, an area the client was interested to learn more about as they were developing a smoking cessation app. These earlier discussions, I felt, developed my rapport with the client. The client trusted that I had the right skills and knowledge required for such a project, and based on my experience within this area, I too felt confident that I would be able to add value.

During the initial meeting, the client outlined their plans and objectives. From these discussions, Dr Sykes and I assumed that a smoking cessation app had already been developed and that the work which they required was based on launching the app over two phases. A range of ideas and expectations were discussed, and the company set out their plans as such.

The client wanted to pilot two health applications. The first app was targeted at smokers, and the second app was for patients with coronary heart disease, with a particular focus on adherence to medication. For the purposes of this case study, the focus will remain on the first app, smoking cessation.

Their outlined objectives were to plan and deliver:

1. Three focus groups: the aim of these focus groups was to test the app for usefulness, feedback on appearance, ease of access, and user satisfaction.
2. To test the smoking cessation app with the general population without defining the specific sample, i.e. by age group or gender.
3. Using a qualitative methodology and using semi-structured interviews with the aim of writing up the results for publication.
4. Recommend ideas for testing, costing, recruiting, and techniques to introduce the app to the public.

I identified the process model of consultancy (PC) as a reference for delivering this project. Schein (1999) recommends that the client and consultant work in collaboration throughout the duration of the project to find achievable solutions. The client did not fully understand the process of developing research and which research techniques were useful, but the timeframe they had set to complete this phase of the work was three weeks.

Although their ideas were feasible, it became clear that the timeframe was unrealistic. A constructive discussion and negotiation took place between the consultant and the client, and together we set realistic objectives within the given timeframe. I did this by asking the client specific questions in order to narrow down the actual needs of the company, and to obtain a coherent understanding of what they really wanted from this consultancy request. Probing questions were asked, such as '*what is the most important outcome you would be happy with*

after three weeks?' and *'are focus groups the ideal method of obtaining concrete finding which will support the development of these health applications?'*

Schein (1999) describes this interaction as *'constructively opportunistic with confronted interventions.'* It is a time when the client is open to new information and ideas. From earlier discussions, it was clear that the timeframes the client had outlined were unrealistic, but through working together and seizing the moment, I was able to move the clients to rethink their priority needs.

After narrowing down the client's requests, it was agreed that the priority outcome the client wanted was to understand user experience from seeing the app (experience), engaging with the app (signing up to use it for 3-4 days), and additional feedback, including why and what about the app appealed to the participants.

Methodology Agreed

1. A sample of adults aged between 25 to 30 years was agreed. The client was keen to target this age because they felt that people within this age range are most likely to be attracted to mobile health apps. Smokers who are already contemplating quitting and are taking nicotine replacement medication were targeted.

2. Participant recruitment: social media advertisement and stalls within London.

3. Method: three arms of research; (1) ***just a glance***: open ended questions asking participants about their first impressions of the app (2) ***test flight***: sign up immediately and use the app for 3-4 days and obtain follow-up feedback (3) ***the journey***: what specific elements of the app encouraged them to sign up.

4. Consultant to produce a qualitative report of the findings for the client's mobile development team, outlining recommendations.

Reflection

My initial thoughts reverted back to the first consultancy scope meeting: although the ideas and discussions were constructive, my worries lay within conceptualising the different aspects of my expectations. My role as a trainee health psychologist within SanoSync was to provide an alternative perspective as a health professional. As it is a private business orientated organisation, however, I learnt that I needed to explain my role as a health psychologist. The client appeared to have a confident approach; however, with their lack of experience within research I feared that it would take a lot to construct an effective plan to launch the product to the best of my ability. I did enjoy the challenge, however, and wanted to make this project successful.

2.3 Planning the consultancy

The first step was to develop a consultancy contract for the client which highlighted the main points from the initial request. It was agreed by both parties that a consultancy fee would not be paid for this work. At the start of building the consultancy relationship, the PC model (Schein, 1999) is usually appropriate to begin with as it allows a mutual relationship between the client and the consultant. Launching an app requires both parties to interact and exchange ideas, instead of one leading the process, thereby fostering a mutual understanding and respect for each other.

A meeting was arranged between the commercial manager and the managing director, the aim of which was to discuss the methodological aspect of the research. I facilitated the discussion by talking through the different options available for launching the app. From the initial scope meeting, it had been suggested that they wanted to understand users' experience of seeing the product, engaging with it, and downloading the app. I segmented the aim into

meaningful measureable outcomes, and was thus able to develop feasible research stages and interpretations of why a smoker would decide to use the app, and of their thoughts about content.

Taking the lead in this almost confirmed why the client required a consultant. Schein (1999) interprets this form of delivery as *'What exactly do I have that they assume they do not have?'* In my opinion, I was able to offer a coherent action plan, which was imperative for the client to move forward at this point.

The discussion led to the client clarifying that they would like to pilot their smoking cessation app in three different stages.

The stages consisted of:

Stage 1: Wireframe/video tool tested amongst two sample groups.

Stage 2: A downloadable version of the smoking cessation app tested with participants over a duration of 2-4 days.

Stage 3: Full smoking cessation app version 2 (updated) and tested in a longitudinal study.

Once agreed, I asked the client if I could see how far along they were with developing the app, but during the meeting it was confirmed that the app I had originally assumed had been developed had not yet been completed. In fact, it became evident from this methodological meeting that the content of the app was still undecided, and that no protocol had yet been constructed. The PC model suggests that '*it is the client who owns the problem and the solution*'; since the app was not at the stage I imagined it to be, I concluded that the work I was going to lead would have to be put on hold, and the focus then shifted to prioritising the wireframes (screenshots) of the app content. In order to do this, it was agreed that a literature review was required, which would provide evidence-based research to support the contents of the app.

Revised Consultancy Objectives

Following on from this meeting, I revised the original consultancy objectives. Although they were still relevant, due to the circumstances of the app we decided to discuss the next steps for developing the wireframes. It was vital to have the wireframes to test with suitable participants.

With these changes made, the first step was to transfer the screenshots onto an iPad, with a brief demographic questionnaire at the start and then a questionnaire at the end. Collective feedback from the participants was used to influence the content of the app for future development.

As a group, we considered the different potential samples of participants, but the client was firm that the sample had to be either willing to quit or thinking about quitting smoking before they could use the app. We spoke about the original idea of targeting city workers aged around 25-35 years, but the client preferred that we targeted two groups instead of just one. It was agreed that the two sample populations would be university students aged between 18-25 years, and city workers aged between 25-35 years. This contrast would enable the research to compare suggestions from two very different populations.

The proposed objectives and plan of action were transferred into a formal consultancy contact, which was shared with the client.

Reflection

At this point I began to worry slightly about the outcome of this project. Given what I originally expected, I was surprised that the app had not even been developed. This new information meant that my original plans highlighted in the consultancy agreement had changed. With the app not yet being developed, however, it meant that I was able to offer more insight into the contents based on research. I believe that this influence did *offer a positive contribution, despite the challenges. Schein (1999) suggests that, at times, a consultant needs to 'go with the*

flow'. Despite the challenges, accepting the client's reality is imperative, instead of imposing my own reality or expectations. Consequently, I felt that through working with an attitude of helping the client, the changes in my objectives were manageable.

Establish, Develop and Maintain Working Relations with the Clients

The main source of client contact was via telephone calls, emails, and office visits, including pre-arranged meetings. This method of contact worked for the client, and it was also something I found useful. The method encouraged independence, particularly in regards to managing my workload. According to Townsend, DeMarie and Hendrickson (1998), virtual working is preferred in many businesses as it enables organisations to access different skill sets, while encouraging independence. I was aware, however, that building a relationship with the client was essential: Schein (1999) suggests that *'in any relationship, a novice with the right chemistry could do as well or better than an experienced consultant with the wrong chemistry.'* Rapport and chemistry is built through interactions with the client through meetings, calls, and email contact. Therefore, I ensured that my tone was professional yet friendly, as I wanted the client to feel that they could approach me when needed. I ensured that after every meeting, minutes were compiled and sent to the client to confirm the actions agreed. This offered clarity on what was expected from me, and the client appreciated this summary.

Reflection

Working independently was something I did often, and meant that the client trusted that I was able to work away from the traditional office environment and still deliver what I had outlined. At times, however, I did feel isolated, and contact was regular, but unstructured. I was left to write up the minutes for each meeting and align the objectives, which was time consuming and resulted in my doing a lot of the project management. Schein (1999) recommends that a consultant should 'always try to be careful', *indicating that being helpful develops good mutual*

relationships with the client, particularly if the intention is there. My intention was to be helpful, and therefore I believe that the extra expectations of work helped to build my relationship with the client.

Conduct Consultancy

My initial contribution to the project was to develop a methodological process. By defining this process, I was able to develop the relevant questions for the questionnaire. I arrived at these four factors by summarising the client's research objectives:

1. Appearance: *attractiveness, layout, fonts, colour*.
2. Accessibility and usefulness: *user-friendly, practical, easily navigable*.
3. Appealing: *likable, engaging, and supportive.*
4. Adaption: *'what modules are effective or ineffective?' and participants' recommendations*.

Based on these four factors, I developed a pilot version of a questionnaire. I shared this questionnaire with the client and took them through my rationale behind the specific questions included. I also wanted to show the client how a questionnaire should be constructed, with particular focus on the layout, as this was something the client was unsure about.

I was shown a mock version of the wireframe during a meeting with the client and the user experience lead (KC). KC was going to take the lead in developing the wireframes and incorporating the questionnaires into an interactive iPad version for phase 1. During this meeting, I presented the pilot questionnaire and the method process, which was agreed by the client and KC. The next step was to develop this into a practical tool which would then be used with the participants. KC and the client also requested that I complete a literature review relating to the research outcomes, of no more than two A4 pages, as this was something I was originally going to do *(see literature review, Appendix 9).*

Once the literature review had been completed, the third element of the project was for me to discuss the storyboards with the client. I met with the client at their head office, aiming to extract suitable questions from the storyboards which would relate to the ease of use of app content. Each storyboard linked to an element of the application. The client explained that he and his team had rated the importance of each user task, and asked if I could spend some time doing the same. The purpose of this task was to see if we identified the same priorities.

During this meeting, we discussed the pre-assessment questionnaire and how this was going to work. Again, I explained that it would be more effective if the screenshots of the app were downloaded onto an iPad with the questionnaire embedded, in order to facilitate the participants' experience. This would then enable a better process of collecting data whilst the participants was interacting with the iPad. The client agreed and asked me if I could develop a tool linking the questions to the modules within the app *(see sample questionnaire 4).*

I developed a sample questionnaire which linked the storyboard statements with the modules of the app. The purpose of this questionnaire was to measure participants' perceptions of which content was relevant for such an app.

The client was eager to go ahead with the first stage of the research, despite the fact that everything was not yet in place: the questionnaire had not been finalised, nor had the wireframes been incorporated into an interactive version for the iPad. In any case, I was assured that this would be ready, and my fourth task was to establish a research sample with which to test this. Unfortunately, the sample which had originally been agreed had changed, meaning that the client did not require a specific age remit, and so they insisted that it could relate to any smoker wanting to quit. Although changes within a consultancy are expected, finding ways to manage these changes within the allocated time was a skill I had to adopt within this project.

Schein (1999) describes this experience: *'everything you do is an intervention.'* My aim as a consultant was to offer a helpful relationship, maintaining my role while changing pace with the client. Therefore, I established a link with a local children's centre which offered parent groups to local residents. I approached the centre manager with this request and asked her if I could visit the sessions and ask parents who smoked questions, which would therefore align with the first steps of the research. The manager was willing and agreed that we could visit.

Once a date was confirmed, the client and I visited the children's centre. Unfortunately, I assumed that the iPad content would be developed for this visit, but this was not ready and instead the client opted to use the sample paper version of the questionnaires which I had developed. The client assured me that they were going to follow that route in order to get things moving, and that this was the option they needed to take.

Following on from this, drastic organisational changes occurred within the company, and the commercial manager was asked to leave. This meant that the work was put on hold until his replacement could be found. Nevertheless, original objectives and additional tasks which were incorporated over the course of this consultancy project had been met.

Reflection

There were many challenges throughout this consultancy project. At the end of the project, it became clear that the company had an idea but had not thought about the processes involved in implementing this idea in practice. I found out afterwards that other partners were involved with developing this app, including a paid health psychology consultant. Although I was aware that she was working on the product, her role was ambiguous, despite numerous attempts to clarify her involvement. This made it very difficult for me, as I believed at times that I was duplicating work, or working on a project where I was not appreciated as much. The transparent and inclusive nature of this work meant that I was delivering as expected, but that

the client was holding back. Similarly, promises of work were not being supplied via the client, as on numerous occasions the method process was discussed but it became evident that agreed work was not being delivered by them. This method of working was disorganised, but I continued to deliver the work which I agreed I would. The outcome of this was that once the commercial manager was dismissed, the ownership of the work was disputed within the team. If this had originally been made evident and fluid, and everyone's roles made less ambiguous, then conflict within the team may not have occurred. I learnt that as a consultant, however, situations such as this will occur, and so becoming adaptable and flexible in my approach allowed me to experience the journey alongside the client and not in opposition to them. I was always constructive, and worked with what I had.

Monitor the Implementation of Consultancy

Schein (1999) defines monitoring from a PC perspective as *'measuring success in every contact by whether or not I felt the relationship has been helpful and whether or not the client feels helped.'* At every client meeting, I discussed the project timeline and what stage I was at with the research. These discussions took place fairly regularly throughout the process of the project. The relationship I developed with the client was of a professional nature; we all worked well together. Maintaining this relationship was vital for this consultancy to work, and so the meetings we had were transparent and collaborative. Similarly, maintaining contact with the client's team offered time to discuss potential ideas and feedback around what was being delivered. Developing agendas for meetings and summarising the actions gave us all something to lead on, and also acted as a way of measuring what was expected of one another.

Evaluating the Impact of Consultancy

Within a business-orientated environment, outcomes and reaching targets are essential, and therefore evaluating the success or failures of a project is important. Sometimes the processes and pathways in obtaining these targets are unclear, however, and divert in various different

directions along the way. During this consultancy project, I witnessed changes. As a consultant my role was to offer 'help'; this did not always go smoothly, particularly when the company had existing structural dilemmas within their team.

Although the project changed dramatically, the indirect outcome of the consultancy was still successful. The decision behind the commercial manager leaving was in fact aided by this consultancy process, and it enabled the company to revaluate their organisational team and to make much-needed changes within their team structure. Accepting and implementing these changes offered the client a chance to start again, and to change their way of working. Witnessing these significant organisational changes taught me how important a consultant is within a company, as observing from an objective perspective allows a consultant to visualise areas of change that a manager working within the team may not notice.

Evaluating the impact of the work I delivered was unfortunately not possible because of these structural changes and the work being put on hold. I did receive ongoing feedback at the time of delivery, however, which was positive and constructive. I was assured that once the team was ready to move forward with the app, the work I developed would be implemented as promised.

Overall reflection

This exciting but demanding consultancy project was an experience I will never forget. I learnt a considerable amount of transferable skills from this project and believe that using the process model of consultancy was appropriate. My experience of this unpredictable nature of work, although very different to what I had expected, was enjoyable and helpful in shaping my health psychology consultancy skills.

References

Blaya, J.A., Fraser, H.S., Holt, B. (2010). E-health technologies show promise in developing countries. Health Affairs, 29:244-251.

Noel, H.C., Vogel, D.C., Erdos, J.J., Cornwall, D., Levin, F. (2004). Home telehealth reduces healthcare costs, Telemed J E Health, 10(2):170-183.

Schein, E.H. (1999). Process consultation revisited. Building the helping relationship. Addison Wesley.

SanoSync Website, (2012) Available of the internet: http://www.sanosync.com. Accessed on 27/08/2012.

Townsend, A.M., DeMarie, S.M. and Hendrickson, A.R. (1998) Virtual teams: Technology and the workplace of the future ACAD MANAGE PERSPECT 12:3 17-29.

2- A Consultancy Project- agreement

Understanding the Journey of a Smoker; From Experiencing to Engaging with a Smoking Cessation Smartphone Application.

This Consulting Agreement is effective as of **7th May 2012** and is valid until the completion of the project; it is between the following parties:

Client
SanoSync
18 Charlotte Road
Islington
EC2A 3PB

Consultant
Sumira Riaz- Trainee Health Psychologist
City University London
Northampton Square
London
EC1V 0HB

Both parties have agreed the following;

Service: The consultant will support the client to understand how to improve the userabilty of their new and innovative smartphone health applications specifically for, smoking cessation. The consultant will do this by developing a pilot study which will test the product, specifically focusing on the journey of the participants from seeing the product (experience) to engaging with the product (signing up to use it for 3-4 days). The aim of the study is to understand what variables are involved in engagement. Engagement will be measured at 2 levels:

1) Signing up to using the app

2) Using the app for 3-4 days.

Example variables to measure will be agreed between the consultant and the client. Some example variables discussed to date include:

1. Positive first impression of the app – (positive will not be pre-defined but obtained from open-ended questions to understand how the user defines positive)

2. Intention to use (e.g. a scale asking about the likelihood of use)

3. Estimate of time to use

4. Previous quit attempts

5. Motivation to quit

6. Number of 'apps' used on a regular basis

7. General impression of smartphones

Deliverables

1. A methodology for the study described above

2. Participation in data collection

3. Data analysis

4. A report describing the findings

5. Submission of the findings to academic journal, the client will be included in the authorship.

Consultancy model: the service will be based on the process model, the relationship between client and consultant will be collaborative, giving the client responsibility to provide input throughout the process. The client will be active in the consultancy process.

Timeframe:

- Agree methodology - **2 weeks**
- Data collection – **4-6 weeks**
- Data analysis – **4 weeks**
- Report writing – **1 week**
- Submission to academic journal – **ongoing**

Sample: A sample of adults in the community aged between 25 to 30 years, smokers who are already contemplating to quit or are using nicotine replacement therapy (NRT).

Consultant's Obligations: The consultant will perform the services in a competent and professional manner. The consultant represents that she has the skills and qualifications necessary to perform the services. The consultant will adhere to the British Psychological Society's (BPS) code of conduct in carrying out this consultancy research.

Requirements from the client: A named contact to liaise with during this project

Working environment: The client will give access to a work space one afternoon to 1 day a week.

Fee: The consultant will not charge the client a fee for her service.

Budget: The client will be responsible for all costs related to carrying out the research (e.g. recruitment, incentives etc).

Intellectual properties; The anonymity of the raw data will be the responsibility of the consultant and owned by the consultant who will ultimately hands over ownership to City University London. The ownership of the analysed results will be jointly shared amongst the client and the consultant.

Signed and Agreed:

Client: …….

Consultant; ……

Date: ……

3- Information and Consent Form [Research]

Information and Consent Form

SanoSync is a private company which aims to develop health products which are suitable for everyday use. This short questionnaire will ask you some information about your smoking experience and the barriers which stop you from quitting smoking.

Please read through all the questions and answer them as honestly as possible, this will give us an understanding as to why it is so difficult to stop smoking or reduce your smoking intake.

SanoSync will not use your personal information for any marketing purpose as all the questionnaires will be made anonymous.

SanoSync will use this information to determine the likelihood of developing a stop smoking smartphone application and what you would like to see within an 'app'.

If you're happy to continue, please can you sign and date the consent form below and do feel free to ask us to clarify any questions.

Thank you for completing this short questionnaire, your time and input is significantly appreciated.

Signature…….

Date:……

4- Questionnaire

SmokeFreeMe Questionnaire ID:

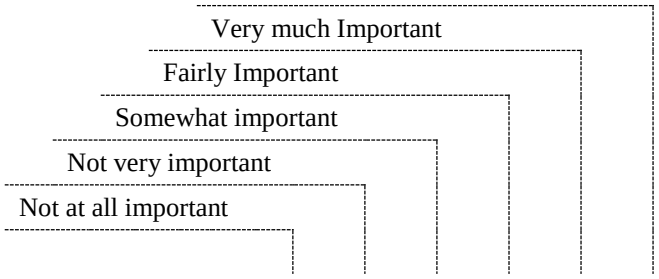
1. Have you previously used a smoking smartphone application to support you to quit or reduce your smoking intake? If Yes please state;

   Yes: …….
   No……..

2. Do you think the SmokeFreeMe application is user friendly? If yes why and if no why not?

   Yes:……..
   No……..

3. Which sections of the SmokeFreeMe application do you think are important?

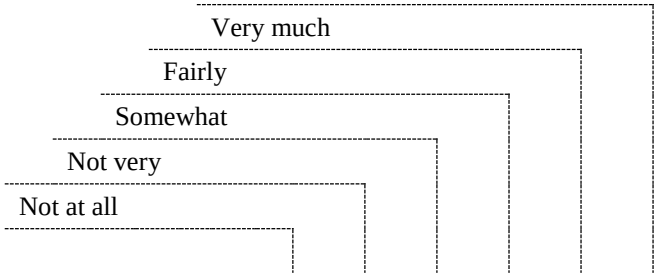


Financial Rewards	1	2	3	4	5
Smoking Information	1	2	3	4	5
Check In	1	2	3	4	5
Kick the Craving	1	2	3	4	5
Occupied Mind (games)	1	2	3	4	5
Craving Tips	1	2	3	4	5
Fitness Focus		2	3	4	5
Slip Up Help		2	3	4	5

4. If you could add a section to the SmokeFreeMe application what would it be?
   ……
   ……
   ……...
5. What has worked for you previously when you have attempted to quit or reduce your daily intake?

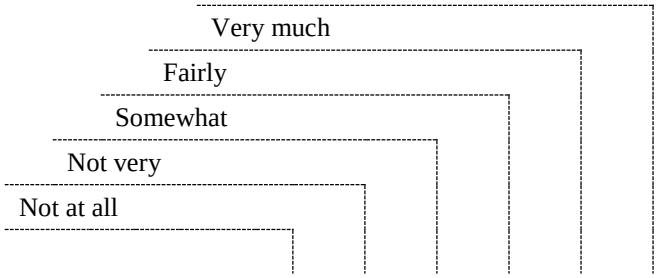
……
……

6. How would you rate the SmokeFreeMe application is the following areas:



	1	2	3	4	5
Attractiveness	1	2	3	4	5
Supportive	1	2	3	4	5
Useful	1	2	3	4	5
Informative	1	2	3	4	5
Layout					

7. How useful would the following units be when attempting to quit or reduce your daily smoking intake?



	1	2	3	4	5
Social Support/Friends	1	2	3	4	5
Closed Facebook Page	1	2	3	4	5
Automatic Daily Alerts	1	2	3	4	5
Fitness Alerts	1	2	3	4	5
Smokers Diary					

8. Would you recommend the SmokeFreeMe application to a friend or relative? If Yes why and if No why not?

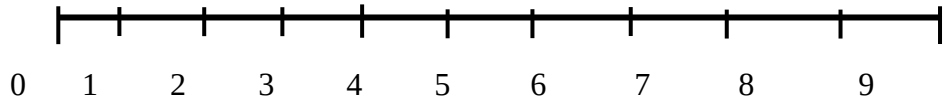
9.

Yes:……
No:……

10. Would you consider downloading the SmokeFreeMe application to support you to quit or reduce your daily smoking intake?

Yes:…….
No:……..

11. Please rate the SmokeFreeMe application on a scale of 1-10, 1 being Poor and 10 being Excellent



Thank you for completing this short questionnaire, your feedback in highly appreciated.

9- Literature Overview Associated with the Research Objectives

Understand behaviours associated with quitting smoking, the duration of abstinence and unsuccessful quit attempts.

Research suggests that a smoker needs to be at a stage where they are self-motivated and willing to quit. Once they have a readiness to quit a personalised and cohesive package of support will enhance their chances of successfully making this change.

When a smoker is able to understand their behavioural and social trigger and begin to gradually make small but effective alterations, these positive changes will increase their self-efficacy and belief in themselves- therefore encouraging them to continue their journey to abstinence (Hughes, 2003)

Gender differences: NRT with psychological support: Men benefit more from NRT than woman over a period of 12 months-however high intensity psychological support with NRT was more important for woman than men (Benito et al, 2004)

Understand behaviours associated with the uptake of mobiles and smartphone applications to support quit attempts

Numerous studies have analysed internet delivered smoking interventions, none have focused on evaluating cessation support via mobile technology (apps).

Technology is the new method of health promotion and services offered via this manner are likely to be effective.

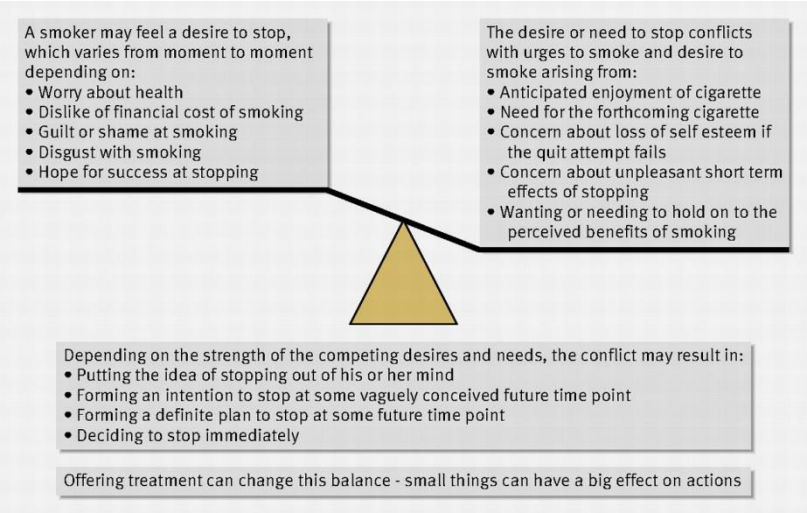
A complex intervention which addresses three main areas: the individual, the addiction and situational factors will support an individual chance of making a change.

Identify successful methods for quitting

What has worked?

- Social Support offered to the smoker in conjunction with NRT: smokers who received one-one or group support are 4 times more likely to quit (Nice, 1996)
- The smoker needs to have a 'readiness to quit' in order for it to be successful (Crittenden, et al 1998)
- Understanding the smokers specific needs in relation to quitting
- Offering alternative ways to manage a smokers stress, boredom levels
- Developing a personalised quit plan (Brendryen & Kraft, 2008)
- Offering replacement strategies: focusing on an additional area such as physical activity (Dahaner et al 2009)
- Understanding the barriers faced by smokers (Hughes, 2003)

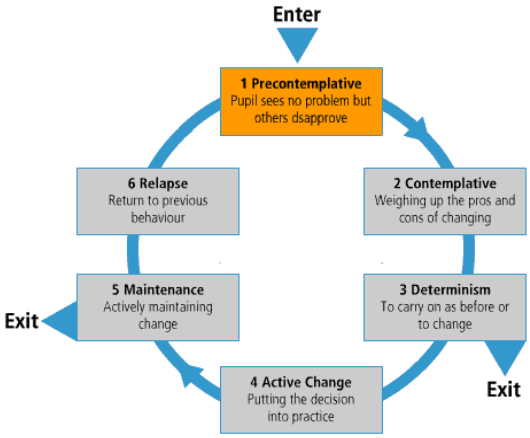
Highlight motivational factors associated with quitting



- Increase physical health and general health
- Starting a family (women who are pregnant)
- Diagnosed with a smoking related illness
- Financial difficulties
- The odour related to smoking/partner insisting that something need to change

See diagram for further references
Aveyard, et al (2007)

Relate smoking cessation behaviours to the Transtheoritical Model (Stages of Change)



Pre-contemplative stage: a smoker has not yet decided to take any action to alter their unhealthy behaviour
Contemplative stage: a smoker will begin to balance the pros and cons of altering their smoking behaviour with an intention to change
Action stage: once a plan is in place the smoker will make small but effective changes
Maintenance stage: following a successful action a smoker will learn to maintain that change.
Relapse Stage: one can either continue to maintain this change and refrain from returning to their unhealthy behaviour or they can enter the stage of relapse.
(Prochaska and DiClemente, 1983)

Incorporate elements of Cognitive Behaviour Therapy (CBT) to increase self-efficacy and abstinence

CBT:
Self-monitoring- smokers diaries
Goal setting need specific- encourage their motivation to continue when the goal is reached (increases their self-efficacy) Problem solving,
Relaxation music to reduce stress
Teaching the smokers to be aware of their smoking triggers
(Skyes and Marks, 2001)

4 Teaching Case Study

The Role of Smartphone Applications in Health Behaviour Change

1 Introduction

As a trainee health psychologist, my focus has been on understanding and developing digital mobile health initiatives and learning how these methods are being utilised within the healthcare domain. Through my experiences, I have developed an understanding of how health psychology theories can be integrated within a technological platform. For example, this involves understanding how psychological behavioural taxonomy can be included into a health app design (Michie, Richardson, Johnston, Abraham et al, 2013).

I was approached by Dr Catherine Sykes, who suggested that I should deliver an hour-long lecture focusing on mobile health apps. Due to my prior research interest in mobile technology I felt that delivering a lecture on the links between mobile apps and behaviour change was appropriate.

Whilst training, I have been fortunate to be offered opportunities to teach in different settings, as listed below:

- Module leader for professional and contextual issues in Health Psychology at City University London, MSc Health Psychology students, 4 months (one term).
- Lecturer, teaching introduction to Health Psychology at Florida State University, BSc Psychology students, 3 months (one term).

For the purpose of this case study, however, I will focus on my observed lecture, delivered on the 22nd October 2012 at City, University of London as part of the professional contextual issues module in health psychology (MSc).

This teaching was based predominantly on introducing mobile-led interventions and on how this concept can be ingrained in health psychology theory. Furthermore, the introduction of mobile health initiatives and the lack of evaluative measurements has indicated a need to understand what one can do to measure the success of such interventions. Although mobile-led interventions are still relatively new, and despite the limited amount of research in this area, there is a recommendation that app developers should establish a standard protocol which will effectively evaluate the efficacy of such apps and measure any behaviour change for those using them (Riaz and Sykes, 2015).

I planned the lecture to highlight this need by informing and educating the students about the current climate regarding mobile interventions. The MSc Health Psychology students were undertaking a specific module which included designing a digital health psychological intervention. Therefore, the need for this introduction was accepted positively and was deemed appropriate within their curriculum.

This case study will outline how I planned, designed, and delivered this session, and will include my personal reflections on this experience.

2 Plan and design a teaching programme that enables students to learn about psychological knowledge, skills, and practice

2.1 Assessing teaching needs

Dr Sykes (module leader) had assessed that there was a need to help educate and inform students about the links between behaviour change theory and the role of technology.

From my earlier discussions with the module leader, I had discovered that the students were currently learning about digital interventions and how apps are developed, and that they already had a basic overview of the different health psychology models. Due to time constraints, it was not possible to allocate time at the beginning of the lecture to assess the learners' needs. Predefined learning objectives were instead produced and discussed with the class at the beginning of the lecture, and students were offered an opportunity to add to these. Sharing clear and concise learning objectives helped me to engage the students, and offered some measure of ownership towards their learning. From a teacher's perspective, outlining the objectives also provides a basic blueprint of the lecture, rather than beginning the lecture with ambiguous intentions (Harden, 2002).

I adopted a formal role and remained professional throughout the session; however, I wanted the students to feel comfortable enough to ask questions intermittently. Offering a calm atmosphere also eased the learning experience for the students. My presentation content was driven by research, and points raised within the lecture were evidence-based, which I believe was important. I felt that developing an open and fact-based approach would be beneficial to the learners, particularly at a postgraduate level. Therefore, I adopted an analytic learning style, focusing on presenting the audience with facts about the topic area instead of assumptions (McCarthy and Anderson, 2000).

As a visiting lecturer, I struggled to get to know my audience before the session, even though Grow (1991) suggests an educator should correlate their teaching material and performance with the learner. My experience trying to understand the audience and their learning styles effectively was challenging, particularly as I had not met this group prior to this lecture. Despite this, a learner can enrich, shape, and influence the progression of the lecture as much as the educator can (Newman, 2002). With this acknowledgement, I was keen to remain open-minded and to follow and facilitate the students' learning during the session as opposed to being a didactic teacher.

Reflection

I was excited but extremely nervous: although I had presented my work numerous times, I had never performed as a lecturer. I felt fortunate that I had been offered the opportunity to do this, yet I wanted to ensure that I had everything in place prior to the lecture. I spent adequate time with Dr Sykes gauging the students' expectations of my lecture and their needs, which helped offer some reassurance.

2 Identify teaching program structure and content

Whilst planning the lecture, I ensured that I structured the content to the level expected for postgraduates, which meant ensuring that the points made were specific and interlinked with theoretical models. It was necessary to present the lecture within an hour, and so I spent time carefully planning each segment and allocating appropriate time.

As described earlier, I met with the course leader and collated information about the students' syllabus for the module and the topics they had already covered, which ensured that I was not duplicating any teaching that had already taken place. Using my systematic review

based on understanding the benefits of mobile health apps as a basic structure, I prepared my slides as appropriate to the learning objectives outlined.

As I chose to use an analytic style of presenting, I spent time ensuring that the content I included within the slides was appropriate but also interesting for the students. I did this by researching and extracting important information from relevant research papers and summarising this information within a lecture format, which can be easily understood and explained to students. Reading through relevant research articles and new press releases within the app market helped me to structure my slides (see Appendix 5).

The main components of the lecture were:

- **5 minutes**- Introduction and my background
- **5 minutes**- Learning objectives (expectation of the students and this lecture)
- **10 minutes**- The development of smartphones applications in health (at present)
- **10 minutes**- Examples of health 'apps' (screenshots). Focus on two specific but different conditions: Obesity (generic condition) and Crohn's (chronic condition)
- **15 minutes**- Specific module/components of these apps – linked to health behaviour
- **5 minutes**- Objective measures used to test the effectiveness of the 'app components' (systematic reviews)
- **5 minutes**- What more needs to be done in this area?
- **5 minutes**- Closing Statement/Questions/Evaluation

2.1 Selecting teaching material and producing material

Learning objectives	Whiteboard and marker
Presentation notes	PowerPoint, projector, lecture

Flow diagram of components/ health behaviours	Information sheet for student
Evaluation	Evaluation form for student

Reflection

This was a topic close to my heart and something I truly believe in as being the next step for health interventions. Therefore, I wanted the lecture to be interesting: from personal experiences of sitting in lectures, my mind would at times wander off, which is why I spent time designing the lecture slides and incorporating any additional images and colours to attract attention. I really wanted the presentation to be something that they would leave feeling like they had learnt something. Although I was putting a lot of pressure on myself, I really enjoyed the planning process, as I was able to do something different.

2 Deliver of such teaching programmes

The lecture took place in a large room within the social sciences building at City, University of London. There was a 15-minute interval between my arrival and the start of my presentation, which gave me time to meet with the course lecturer to go over any questions I had, and to download my slides onto her laptop.

The size of the group was more than I expected: 22 students were present on the day. The course leader introduced me, and my nerves subsided after a few minutes, once I had observed the students' body language and attentive attitudes. The students were engaged throughout the hour and asked questions when appropriate. This assured me that they were listening and that the information I was delivering was logical and clear.

I designed the visual aids to be attractive, which I believe helped the students to remain attentive. I used a range of real practical examples of health apps and used pictures and diagrams to illustrate my point further.

Reflection

I struggled with ensuring that I delivered the material within the given timeframe, although this was not evident from my performance as I managed to finish on time. Nevertheless, at times I felt that my speed was increasing slowly. I took this point on board during my second lecture opportunity in November 2013, and ensured that lecture slides had less information, enabling the students more time to discuss points they wanted to learn more about.

Another element I had to consider whilst planning and delivering the session was the postgraduate students' level of prior knowledge. Newman and Peile (2002) believe that learners with substantial previous experience and knowledge may provide a challenge to teachers in regard to maximising their learning. Whilst planning this teaching session, I felt that I had to over-emphasise the evidential basis of my findings within the lecture in order to ensure that I was offering the group new and noteworthy outcomes. From this experience, however, I have learnt that if the teacher is able to deliver the given material confidently, the students will appreciate the flow of knowledge. Again, this was evident during my second lecture in 2014; I instigated more class discussions and felt that the students appreciated this more as they were able to offer their personal experiences of the lecture topic.

3 Plan and implement assessment procedure

An evaluation feedback form was developed and shared with the students at the end of the lecture (Appendix 3). I designed the questions such that it measured feedback on my performance and evaluated the content of the lecture and lecturer, but also provided qualitative

comments which I could use to improve and adapt my future sessions. I was also interested in asking the students to recommend future topic areas.

All the students completed the feedback forms and the results are summarised and presented in Appendix 1.

Some of the main themes recommended by the students involved offering a longer session and an in-depth explanation of the process of app development from a health psychology perspective. Although this session offered an introduction to this approach, future sessions could be segmented into specific sessions, such as a step-by-step process for developing health apps.

At the end of the lecture, I also completed a self-evaluation form, which helped me to de-brief from and reflect on my overall performance. From this I learnt that I would make changes in two areas: when presenting I will ensure that I am not talking too fast, and that my speech is clear and coherent throughout the session. Also, if I were to repeat this lecture, I would include additional interactive elements for the students, including wireframes of apps, which would be dependent on the allocated time for the lecture.

Reflection

This experience really helped shape my foundations of how to plan, design, and deliver a lecture. Prior to this, I never knew how much effort and time it takes lecturers to ensure that everything goes to plan, and since this experience I now appreciate my lecturers and the time they spend teaching and sharing their skills more than I did.

I was offered a second teaching opportunity in 2014, and was able to take into account my personal reflections and student feedback whilst planning these lectures. The format of this lecture was based on a 3-hour timeframe, and I was able to meet all the recommendations

outlined within the feedback forms. I offered students more class discussions, emphasising my point and talking at a slower pace, which the students appreciated.

References

Grow, G. (1991). Teaching learners to be self-directed. Adult Education Quarterly SPRING 1991 vol. 41 no. 3 125-149.

Harden, R. M. (2002) Learning Outcomes and Instructional objectives: is there a difference? Medical Teacher, Vol. 24, No. 2, 2002, 151–155.

McCarthy, J. P. and Anderson, L. (2000). Active Learning Techniques Versus Traditional Teaching Styles: Two Experiments from History and Political Science. Innovative Higher Education June 2000, Volume 24, Issue 4, pp 279-294.

Michie, S., Richardson, M., Johnston, M., Abraham, C., Francis, J., Hardeman, W., Eccles, M., Cane J. and Wood, C. (2013) The Behavior Change Technique Taxonomy (v1) of 93 Hierarchically Clustered Techniques: Building an International Consensus for the Reporting of Behaviour Change Interventions ,ann. behav. med. DOI 10.1007/s12160-013-9486-6.

Newman, P. and Peile, E. (2002). Valuing learners' experience and supporting further growth: educational models to help experienced adult learners in medicine. BMJ 2002; 325:200.

Riaz, S. and Sykes, C. (2015). Are Smartphone Health Applications Effective in Modifying Obesity and Smoking Behaviours? A Systematic Review, Journal of Health and Technology.

Appendix 1: Student Feedback Evaluation Results

Objectives	Low Ratings				High
	1	**2**	**3**	**4**	**5**
Introducing different 'app' components and modules	0	0	2	8	12
Linking these 'apps' to behavior change theories	0	1	2	7	12
Introducing the different objectives measures used to test the effectiveness of these 'apps'	0	0	6	8	8
	Total	**1**	**10**	**23**	**32**

Speaker	Low Ratings				High
	1	**2**	**3**	**4**	**5**
Knowledge in the content area	0	0	2	5	15
Presented useful information	0	0	2	1	18
Responsiveness to questions	0	0	2	4	16
Speaking and teaching ability	0	1	2	9	10
	Total	**1**	**8**	**19**	**59**

Content	Low Ratings				High
	1	**2**	**3**	**4**	**5**
Appropriate for the intended audience	0	0	3	6	13
Consistent with the stated objectives	0	0	2	3	17
Was presented clearly and effectively	0	0	2	7	13

Teaching aid was useful and appropriate	0	0	1	11	10
	Total	**0**	**8**	**27**	**53**

Students Skills Acquired From the Lecture	**Low Ratings High**				
	1	**2**	**3**	**4**	**5**
I acquired new skills/knowledge in relation to topic discussed	0	0	7	8	7
I have a better understanding of 'app' development	0	0	5	8	9
	Total	**0**	**12**	**16**	**16**

Qualitative Comments

What did you like most about the lecture?

- 'A current student working in an applied setting'
- 'The topic'
- 'The presentation was very good and clear'
- 'Engaging- pace was right she was very comfortable'
- 'The context'
- 'Innovative idea of promoting health'
- 'Interesting topic'
- 'It was completely new subject and I have atleast an idea of what it is about'
- 'Thinking about how models and theories related to the development of apps e.g. Health belief model and SOC, and enthusiastic presentation and opportunity to get involved'
- 'Intro to apps development-useful- interesting/topical area'
- 'The examples of the health 'apps'. The fact this it was focused on health 'apps£ and not on general 'apps'
- 'The 'apps' that were presented'
- 'General idea of 'app' being made and modules'
- 'Relevance to current assignment in communication module'
- 'Trendy and current information'

- ‘Gave me a good understanding of app development and usage’
- ‘Very relevant to my job and to the group work we are focussing on’
- ‘The information on modules/components that go into an app’
- ‘It was pitched well, so accessible and relevant. Well delivered, nice style of delivery’
- ‘Current data- looking at topic in an evidence based and consistent manner’
- ‘Was clearly structured and represented’

What specific things did you like least about the lecture?

- ‘Insufficient time’
- ‘Perhaps some more short interaction session with the class e.g. questions and answers’
- ‘Too fast’
- ‘Perhaps not enough detail, to light’
- ‘The large table with lots of information about the review you completed. Although the summary points were useful’
- ‘Your lecture was great, but the subject of apps for me is still confusing I am an old dinosaurs when I.T is concerned’
- ‘Rushed, more time to present and interact with the group’
- ‘Little time for questions’
- ‘The lecturer performance, speech, speed of speech’

If the lecture was to be repeated, what should be left out or changed?

- ‘ A better intro to Crohn’s- full slide’
- ‘It looks fine to me I have so little knowledge about the subject that I am not in a position to make suggestions’
- ‘More on specific apps- how they work-clever designs, why some ‘apps’ are successful and other aren’t, what makes a successful app and e.g.’
- ‘Nothing really- needed more time’
- ‘Applications/use of ‘apps’ e.g. monitoring, preventing/ How much time and money it takes to develop an ‘app’
- ‘Quite a large amount of content covered in a short session’

- ‘It’s such a large topic I imagine more or less could be added or taken away-personally I would not take anything out’
- ‘Bit vague in places on the research, could have spent a bit more time on the review-interested audience! Spoke really quickly felt rushed (even though it wasn’t!)’
- ‘I don’t really know what Crohn’s disease is, so a better explanation about it’

Suggestions for future topic, as well as comments on how this program could be improved to better suit your educations needs are always welcome

- ‘Would be great to see how this are develops-definitely a topic to come back to- Thank you!’
- ‘More information into how health psychologist organise focus groups and work with companies to develop the product-app’
- ‘Thank you very interesting’
- ‘Specific focus on ‘apps’/development and more on behaviour change’
- ‘More examples about ‘apps’
- ‘Identify need for Crohn’s patients to change their current behaviour, theories of self-help’
- ‘How to design an ‘app’ a step by step process’

Appendix 2: Overview of Lecture Plan: Professional and Contextual Issues
19th October 2012

Title of Lecture: The Role of Smartphone Applications in Health Behaviour Change

The Purpose: To introduce the students to the different mechanises of health promotion using technology. The aim of this lecture will be to highlight the different modules/components of a smartphone 'app' and indicate how these are useful in altering unhealthy behaviours. This lecture will also guide the student in understanding which components of an 'app' are beneficial to a user, which will be guided by relevant research already undertaken using behaviour change theories. The students will also be introduced to objective measures utilized within an 'app' to test its effectiveness and for evaluation purpose.

The Lecture Format: 1 hour

5 minutes- Introduction and My background

5 minutes- Learning Objectives (expectation of the students and this lecture)

10 minutes- The increase of smartphones applications in health (at present)

10 minutes- Examples of health 'apps' (screenshots) Focus on two specific but different conditions: Obesity (generic condition) and Crohn's- (chronic condition)

15 minutes- Specific module/components of these apps- linked to health behavior

5 minutes- Objective measures used to test the effectiveness of the 'app components'- (systematic review's)

5 minutes- What more needs to be done in this area?

5 minutes- Closing Statement/ Questions/ Evaluation

Learning:	***Resources***
1. Learning Objectives	Whiteboard and Marker
2. Presentation Notes	PowerPoint, Projector, Lecture
3. Flow Diagram of Components/ Health Behaviours	Information Sheet For Student
4. Evaluation to Complete	Evaluation Form For Student

Appendix 3 Detailed Lecture Plan

Professional and Contextual Issues

The Role of Smartphone Applications in Health Behaviour Change

Thursday 19th October 2012

Name of Lecturer	Sumira Riaz
Subject	Smartphone Health Applications- Integrated Components of an 'app'.
Time Available	1 hour- 60 Minutes
Learning Aids Required	Computer or Laptop, Projector, Lecture notes, Whiteboard and Marker
Size of Group and Course	MSc Health Psychology Students
Learning Objectives	At the end of the lecture the students will be able to: • **Recognise** the different 'app' components and modules • **Understand and Explain** the links of these components using behaviour change theories • **Explain and State** the different objective measures used to evaluate the effectiveness of these health 'apps'
Entry Knowledge	Students will already have been introduced to the principles of behaviour change and have some grounded knowledge of the different health psychology models.
Evaluation and Assessment	Students will be asked to complete an evaluation form rating the lecture using a likert scale. The lecturer will carry out a self-evaluation of the session, as will the course leader who will be observing the session.

Time	Details of Contents	Learning Aids

5 minutes	**Introduction and My Background:** • Establish a link with the student by talking about their course and my own experience of the MSc. Brief summary of my background and the doctorate. Acknowledge that they have already done some work on understanding smartphone application. • Explain the purpose of this lecture and the format- why this is different and how this will support their learning. • Tell the student that they can ask questions intermittently and they will also get time at the end. • State the time of lecture- 1 hour	**PowerPoint Presentation** **First Few Slides**
5 minutes	**Learning Objectives:** • Ask the students what they expect from the next hour and what will facilitate their learning. • Tell them that if I don't have a chance to cover what they need then I can send them this information through the module leader • Write the students objectives onto the board: 2-3 objectives for the hour • Present the learning objectives to the students expected from this lecture	**Whiteboard and Marker**
10 minutes	**The increase of smartphone applications in health (present):** • Ask the student how many of them have a smartphone and if they do what types of 'apps' do they download • Brief summary of the increasing use of smartphones in society statistics and increase forecasted • Link these to the health conditions and some examples of 'apps' specifically developed to alter unhealthy behaviours (research review)	**Class Question** **PowerPoint Presentation**

10 minutes	**Examples of health 'apps'** • Show them a collage of different health 'app' • Inform the student that they are so many different health 'app' but for the purpose of time we will only focus on two conditions, obesity generic condition and Crohn's disease chronic health condition • Show the students screenshots of different obesity and Crohn's 'apps'	**PowerPoint Presentation**
15 minutes	**Specific modules/components of these 'apps' linked to behaviour change** • Inform the students that there are so many different components of an 'app' which influences why so many people utilize these 'apps'- illustrate this using the results table from the systematic review • Existing research: link how these components can alter unhealthy behaviours and reward pathways- why we continue using an 'app'? • Show the students the flow diagrams of the components found within a 'app' for both obesity and Crohn's and how these link to changing our behaviour	**Systematic Review- results table** **Flow Diagram Given to the student**
5 minutes	**Objective measures use to test the effectiveness of the 'app components'** • What is currently being done to test if 'apps' actually work and their specific components (Research overview) • How 'app' developers are currently testing this • Downfalls of this research for health psychologist and researchers alike; i.e. only have content analysis, no real RCT's	**PowerPoint Presentation**

5 minutes	**What more needs to be done?** • Research lacking in this field: the mistakes researcher have made • Why we need more research in this area and how it should look like • My research- If anyone has an interest in this field	**PowerPoint Presentation**
5 minutes	**Closing statement/Questions/Evaluation** • Go back to the students learning objectives on the whiteboard and discuss with them if these have been met • Give them some time to ask any specific questions • Ask them if they can kindly complete a quick evaluation of the lecture • Thank them for listening	**Whiteboard and Marker** **Evaluation Forms**
	END OF LECTURE **60 minute**	

Appendix 4: Lecture Evaluation Form

The Role of Smartphone's in Health Behaviour Change

Please indicate your rating of the presentation in the categories below by circling the appropriate number, using a scale of **1 (low)** through **5 (high).**

Please fill out **both sides** of this form; your comments and ratings are highly appreciated.

1. **Objectives- '*The lecture met the stated objectives of……..*'**

Introducing different 'app' components and modules	**1**	**2**	**3**	**4**	**5**
Linking these 'apps' to behavior change theories	**1**	**2**	**3**	**4**	**5**
Introducing the different objectives measures used to test the effectiveness of these 'apps'	**1**	**2**	**3**	**4**	**5**

2. **Speaker – *'The presenter had…...'***

Knowledge in the content area	**1**	**2**	**3**	**4**	**5**
Presented useful information	**1**	**2**	**3**	**4**	**5**
Responsiveness to questions	**1**	**2**	**3**	**4**	**5**
Speaking and teaching ability	**1**	**2**	**3**	**4**	**5**

3. **Content- '*The PowerPoint presentation was…..'***

Appropriate for the intended audience	**1**	**2**	**3**	**4**	**5**
Consistent with the stated objectives	**1**	**2**	**3**	**4**	**5**
Was presented clearly and effectively	**1**	**2**	**3**	**4**	**5**
Teaching aid was useful and appropriate	**1**	**2**	**3**	**4**	**5**

4. **My Skills- *'I benefited from this lecture because…..***

I acquired new skills/knowledge in relation to topic discussed	**1**	**2**	**3**	**4**	**5**
I have a better understanding of 'app' development	**1**	**2**	**3**	**4**	**5**

What did you like most about the lecture?

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What specific things did you like least about the lecture?

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If the lecture was to be repeated, what should be left out or changed?

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Suggestions for future topics, as well as comments on how this program could be improved to better suit your educational needs are always welcomed

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Thank you for completing this evaluation form!

Appendix 5- Teaching Slides – Lecture 1

The Role of Smartphone Applications in Health Behaviour Change

Professional and Contextual Issues

SUMIRA RIAZ

Layout of the Lecture

- Introduction and My Background
- Learning Objectives
- Smartphone Applications in Health: Present View
- Health "Apps"- Obesity and Crohn's
- "App" Modules and Components: Behaviour Change
- Measures to Test Effectiveness
- What More Needs to be Done?
- Questions and Evaluation

My Background

Education

- BSc Psychology at Birkbeck College University of London- (2006-2010)
- MSc Health Psychology (Stage 1) at City University London (2010-2011)
- Professional Doctorate in Health Psychology- 2nd Year (2011- to date)

Research

- Multi Disciplinary Models of Working (Mixed Methods)
- Chronic Condition- Cystic Fibrosis (Qualitative)
- Technology in Psychology: Smartphone and Internet Delivered Interventions

Learning Objective

At the end of the lecture you will be able to:

- **Recognise** the Different "app" Components and Modules
- **Understand and Explain** the links of these Components using Behaviour Change Theories
- **Explain and State** the Different Objective Measures used to Evaluate the Effectiveness of these Health "apps"

Question Time

How Many of YOU have a Smartphone?

What Types of "Apps" do YOU Download?

Present View: Smartphone "Apps"

Why Smartphones?

- Handheld Computers- powerful on-board capability
- More than just simple communication devices
- UK- **29%** of internet users access the net via their mobile at home- **13%** of all homes use mobile in replacement of landlines *(Boulos et al, 2011)*
- Forecasted: 2015 **90%** of mobile phones operated will be smartphones such as IPhones and Androids *(Maher, 2012)*
- Smartphone is a Phenomenon- rapidly progressing in it's evolution

Present View: Smartphone "Apps"

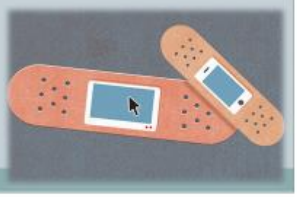
Mobile Applications

- 2010- **4000 "apps"** were available from the Apple Store
- **300 million** "apps" have been downloaded in 2009 - **5 billion** in 2010 *(Boulos et al, 2011)*
- Potential to create simple and easy "apps"- created an industry
- Now an "app" for every social, entertainment & educational area *(Mobile Future, 2010)*

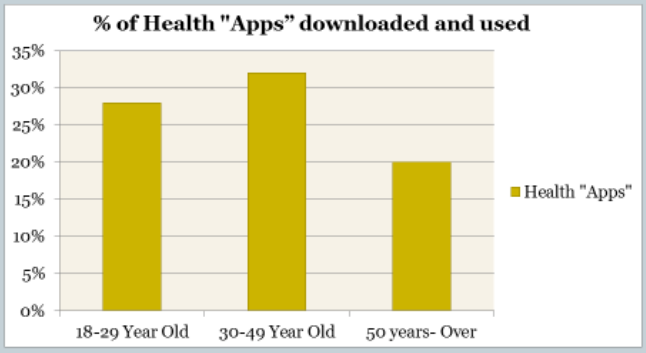
Present View: Smartphone "Apps"

Health Related "Apps"

- Sep 2010: **7, 136** Apple Store
  1,296 Google Android
  338 BlackBerry
- **78%** increase in health "apps"- Feb 2010 *(MobiHealthNews, 2010)*

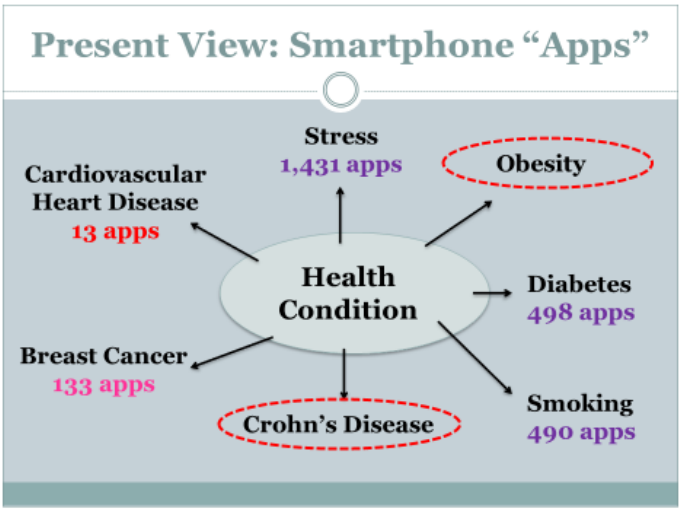


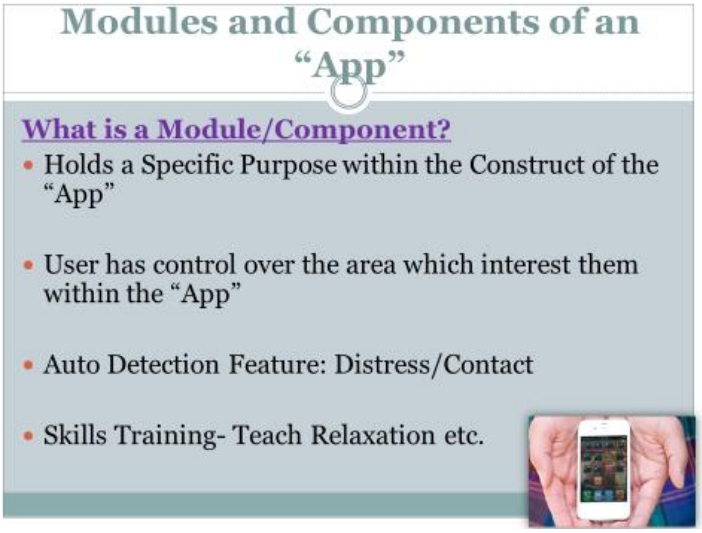
Present View: Smartphone "Apps"



(Kratzke et al, 2012)


Are These "Apps" Effective?


Present View: Smartphone "Apps"
Stress
1,431 apps
Obesity
Cardiovascular Heart Disease
13 apps
Health Condition
Diabetes
498 apps
Breast Cancer
133 apps
Crohn's Disease
Smoking
490 apps


Modules and Components of an "App"
What is a Module/Component?
Holds a Specific Purpose within the Construct of the "App"
User has control over the area which interest them within the "App"
Auto Detection Feature: Distress/Contact
Skills Training- Teach Relaxation etc.

Crohn's "Apps"

Chronic Health Condition
iTunes Search: 18 developed

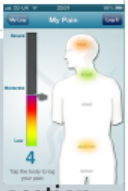
- Pain Management
- Clinical Description of Condition
- Medication Reminders
- Dietary Meal Planner
- Doctors Question/Notes
- Stress Management
- Gamification: Toilet Finder
- Social Facilitation (Support)

Obesity "Apps"

Generic Health Condition
100 of Weight Management "apps"
Developed Yearly (Results: 185)

- Dietary Meal Planner
- Goal Setting
- Self Monitoring- Food Diaries
- Topic Messages (i.e: Portion Control)
- Eating Behaviour (Tips/Questions)
- Physical Activity Schedule/Advice
- Diet Games
- Social Facilitation (Support)

Basic Module Pathway-Crohn's



Module: Pain Management

↓

User: Identify their Levels of Pain

↓

Module: Give the Participant Pain Level and Location Indicator

↓

User: Scroll and Rate their Pain (Day/Time/Reason)

↓

Module: Track (Daily/Weekly Graph)

User: **Self Monitor and Illustrate Pain Pattern to their Doctors**

Basic Module Pathway-Obesity

Module: Social Facilitation- Social Groups

↓

User: Join or Access to a Forum

↓

Module: Indicate to the User the Progress of Other Weight Loss Techniques and Achievement

↓

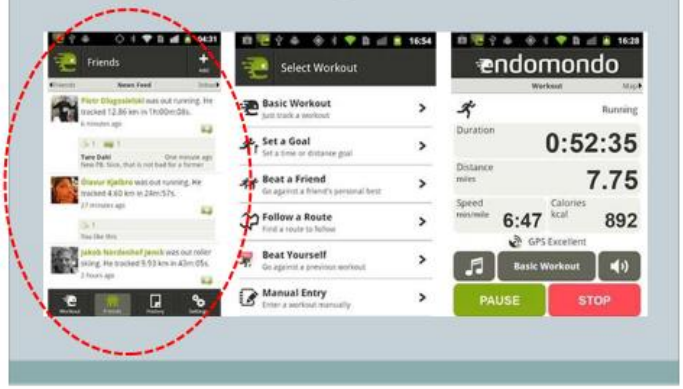
User: Add their Weight Loss Goals or Read Others

↓

Module: Track their Goals and Publish this on the Forum

User: **Sense of Achievement and Accomplishment**

Example of Social Module- Weight Management



Systematic Review: Results Table (Riaz and Sykes, 2012 -*in review*)

Study Reference Numbers	Study			Participants			Intervention and Condition				
	Design	Measurement	Country	Recruitment	Gender %	Age Group (M)	Condition (C)	Application Components	N	D	Effect Size
Obesity											
[4]	RCT: 2 conditions	Pre and Post questionnaires	Switzerland	Social network sites	50% F 50% M	33.7 years	C1: Internet group (Web interface program) Daily Goals Self-Monitoring	C2: Smartphone App Group ***Daily Goals/ Self-monitoring Diaries Eating and Physical activity tracker*** (30 mins of moderate exercise, 1 serving of fruit) ***Social Facilitation Modules***: (Visualisation of the activities of others) ***Program Alerts***: if no activity is being recorded	40	28 days	N/A
[14]	Case Control	Pre and Post body composition	Korea	Obese Clinic	N/A	28.2 yrs	C1: Control	C2: Smart Diet app ***My Page***: calculated weekly-daily calories (graph display) ***Meal Assessment***: calculate calories per meal ***Diet Game***: True/False quiz games (lifestyle and Nutrient) ***Exercise Schedule***: Using the stopwatch record time daily exercise	36	6 wks	Mean difference 1.14Kg No SD/E
[18]	RCT/2 conditions	Baseline and post	USA	Community	80% F 20% M	44.9 years	C1: Control: Printed material monthly	C2: Phone (Text Message) ***Personalised Interactive SMS/MSM***: ring 2-3 times a day (reminders and alerts) ***Topic Messages***: i.e., how to control your potions ***Tips/questions***: tailored to their eating behaviour ***Brief Phone Counselling***: (monthly- 10 mins) ***Printed Material***: nutrition topics, behavioural strategies, food and exercise journal to support self-monitoring	78	16 wks	-0.61
Smoking											
[17]	RCT: 2 conditions	Pre & Post Bio chemical (6 mths)	UK	Community	55% M 45% F	30.8 yrs	C1: Control Random messages	C2: Intervention Group (Txt2Stop) ***Messages***: Daily Motivational and Behavioural Messages (specific times, quit day, after quit day, crave support, lapse support) ***Personalised Algorism:*** smokers concerns, weight gain data gathered at baseline to personalise messages	5,80 0	6 mths	SD= 42.6 No Mean
[5]	RCT/2 conditions	Pre & post (6 months)	Australia & New Zealand	Community (younger adults)	43% F	27 years	C1: Control General Health Video Messages every 2 weeks	C2: Interactive Complex Video Messages ***MSM***: daily video messages ***Role Model***: 6 role models to choose from (ex-smokers) Modelling and observation will alter health behaviours ***Techniques/Coping Strategies***: Video Diaries ***Behaviour Techniques***: social support, goal setting, triggers, positive reinforcement, cue ***SMS***: on demand messages: crave, relapse, motivation	226	6 mths	No SD/Mean

Extracted from Systematic Review

Study Reference Numbers	Design	Condition (C)	Application Components
Obesity			
Gasser et al, (2006)	RCT/ 2 conditions	C1: Internet group (Web interface program) Daily Goals Self-Monitoring	C2: Smartphone App Group: ***Daily Goals/ Self-monitoring Diaries Eating and Physical activity tracker*** (30 mins of moderate exercise, 5 serving of fruit) ***Social Facilitation Modules:*** (Visualisation of the activities of others) ***Program Alerts:*** if no activity is being recorded
Lee et al, (2010)	Case Control	C1: Control	C2: Smart Diet app ***My Page:*** calculated weekly/daily calories (graph display) ***Meal Assessment:*** calculate calories per meal ***Diet Game:*** True/False quiz games (lifestyle and Nutrient) ***Exercise Schedule.*** Using the stopwatch record/time daily exercise
Patrick et al, (2009)	RCT/2 conditions	C1: Control: Printed material monthly	C2: Phone (Text Message) ***Personalised Interactive SMS/MSM:*** msg 2-5 times a day (reminders and alerts) ***Topic Messages:*** i.e.: how to control your potions ***Tips/questions:*** tailored to their eating behaviour ***Brief Phone Counselling:*** (monthly- 10 mins) ***Printed Material:*** nutrition topics, behavioural strategies food and exercise journal to support self-monitoring

Summary of Results- SReview

Outcomes varied for each study

"Apps" Useful, Successful in Meeting their Goals, Reduction in Weight when Comparing it to Usual Care

Study Reference Numbers	Health Condition	Comparison	Main Outcomes	Jadad Quality Scale
Obesity				
[4]	Health behaviours (activity and nutrients) in healthy sample	Internet intervention Vs. Smartphone application	There is no difference between two groups of participants - one working with a mobile application, the other with a web-based application – in terms of their lifestyle goal achievement, nor was there difference in lifestyle goal achievement between a group with social facilitation and a group without. Both groups in web & apps were successful in meeting their goals. Sig differences between woman & men, woman were more successful in meeting their food goals than men.	3
[14]	Diet and exercise in obese individuals	Intervention (SmartDiet app) Vs. Control	Participants in the intervention group found the app useful for health information (58%). There was a sig diff in weight, BMI, which decreased in the intervention group. However, with a small sample size it would be difficult to generalise.	Case control
[16]	Weight Control/Loss techniques in obese and overweight individuals	Usual care Vs. Mobile phone intervention	At the end of 4 months, the intervention group (n = 33) lost more weight than the comparison group (-1.97 kg difference). Intervention participants' adjusted average weight loss was 2.88 kg (3.16%). At the end of the study, 22 of 26 (92%) intervention participants stated that they would recommend the intervention for weight control to friends and family.	3

Mobiles = Habits
(Oulasvirta et al, 2011)

Why Do We Love to Check...Check and Check?

- Habit Forming
- Checking Behaviour- Quick Brief, Repetitive Inspection of Content on Your Device
- Checking Behaviour is Reinforced by Informational Rewards
- Automatic Behaviour Triggered by Situations

"Apps" and Behaviour Change

What Do We Gain From Using These "Apps?" From a Health Psychology Perspective:

Health Models the Missing Link

Are health "apps" based on Psychological Models?

- Health Psychology Models have served a basis in eHealth web and computer intervention
- Models need to be:
  1. Dynamic
  2. Rapid- guide intervention based on the individuals current and past behaviour
  3. Situational context

(Riley et al, 2011)

Argue: Current Models are Inadequate even for Low Tech Interventions

Example: Health Belief Model

(Rosenstock, Strecher and Becker, 1994)

Concept	Definition	Mobile Application
Perceived Susceptibility	One's opinion of chances of getting a condition	Factual, Personalised Health Information about the Condition
Perceived Severity	One's opinion of how serious a condition is	Social and Medical Support
Perceived Benefits	One's opinion of the efficacy of the advised action to reduce risk or seriousness of impact	Goal Settings and Social Support
Perceived Barriers	One's opinion of the tangible and psychological costs of the advised action	Reward, Social Support, My Progress
Cues to Action	Strategies to activate 'readiness'	Provide how-to information, promote awareness, reminders
Self-Efficacy	Confidence in one's ability to take action	Reassurance Social Networks, Progress Charts, Achieving Goals

Transtheoretical Model (TTM)
(Prochaska and Diclemente, 1984)

Example- Weight Management

- Develop an "app" based on the Stages ***(Each Stage has a Module)***

- **Precontemplation**

Pros and Cons of losing Weight
Health Benefits

- **Preparation**

How to set SMART goals

Measures-Test Effectiveness

How are Researchers Testing these "apps"?

- Randomized Control Designs: Intervention Vs. Control Study- ***best and reliable method***
- Case Control: Evaluation Study- ***Not Concrete***
- Examination of on-board digital diaries- symptoms research *(Boulos et al, 2011)*
- Sensor (GPS)- ***Tracking System*** *(BeWell Study- Lane, et al 2012)*

Mistakes Made- SReview

- Very few attempts made to evaluate any of the **Theoretical Components**
- **Missing** Statistical Data
- Methodological **Qualities** of the Studies
- **Small** Sample Sizes

Negatives Of "Apps"- Research

- Cost Implication
- Network Bandwidth
- Battery Power Efficiency
- Usability
- Privacy Issues
- Reliable Testing

What More Needs To Be Done?

- Research Does Not Reflect **Current Status** (New Research Needed)
- More Research based on **RCT Designs**
- Specific Module Analysis – **Not** Content Analysis
- Health "apps" need to be **tailored** to the user

My Research

- Developing an "app" for **Crohn's Disease**
- Test this using an RCT design **(Lessons Learnt)**
- ***Stage 1-*** *Product Development-* intricate part of deciding what will be included within the "app"
- Focus Groups with Crohn's Patients (Questionnaires)

Any Interest?

Anyone is Interested in Gaining Some Experience?

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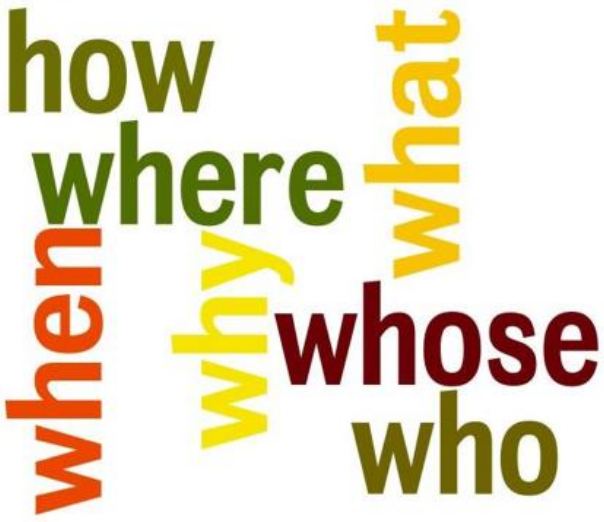
Reference's

- Riley TW, Rivera DE, Atienza AA, Nilsen W, Allison SM & Mermelstein R (2011) *Health behavior models in the age of mobile interventions: are our theories up to the task?* Transl Behav Med. 2011 March 1; 1(1): 53–71.
- Oulasvirta A, Rattenbury T, Ma L & Raita E (2011) *Habits make smartphone use more pervasive.* Pers Ubiquit Comput.
- Kratzke C & Cox C (2012) *Smartphone Technology and Apps: Rapidly Changing Health Promotion.* International Electronic Journal of Health Education, 2012; 15: 72-82
- Hebden L, Cook A, van der P & Allman-Farinelli M (2012) Development of Smartphone Applications for Nutrition and Physical Activity Behavior Change. JMIR Res Protoc, vol. 1, iss. 2



5 Training case study

Understanding behaviour change: AgeWatch

Introduction

AgeWatch was established in 2011 as a not-for-profit website managed by volunteers. The main objective of this organisation is to educate the general public by, *'helping them to live a long and healthy life'* (AgeWatch.com, 2014). This is delivered by offering a range of open access research and health articles via the website.

For the past four years, I have been volunteering for AgeWatch as a trainee health psychologist. My role was divided into two, as both a researcher and a member of the advisory board. As a researcher, I have written articles for the website on various health topics including obesity, alcohol use, and healthy living. As a member on the AgeWatch advisory board, I have reviewed articles published by other volunteer researchers and have supported the development and regeneration of their official website.

Over the last year, the growth of and interest in AgeWatch has resulted in the recruitment of a cohort of volunteers interested in writing articles for the website. With this growth, the managing director approached me and asked if I could plan and facilitate a training session to help the volunteers understand and learn about the different principles of behaviour change.

The behaviour change training day took place on 5 October 2013, at the Royal Festival Hall in London from 10:30 – 13:00pm.

2 Plan and design training programme that enables students to learn about psychological knowledge, skills and practices

2.1 Assessing training needs

The managing director emailed an invitation requesting that those interested sign up for the training, although he indicated that it was compulsory for new volunteers. The training was aimed at a group of professionals from varied backgrounds, including educators, accountants, programme managers, researchers, and media executives. Each came with years of experience within their field, and as they were volunteering for AgeWatch, they all arrived with their own set of skills and learning needs. Therefore, assessing their training needs was fairly difficult at first. Due to time constraints, I was not offered the opportunity to assess the participants' needs at the start of the training, and I therefore arranged a meeting with the managing director who kindly shared some background information about the participants.

Kaufman (2003) suggests that it is critical to take the learners' current knowledge and skills into account. Accordingly, I planned and developed the training programme so that it would be beneficial to all those attending. I took into account the fact that the participants were from non-psychological backgrounds, and so I designed the content material so that it would be easily understood by non-psychological professionals.

2.2 Selecting training method and approaches

The charity requested that the training should be based on models of health psychology, which is why it was important that this was included throughout. Health psychology is a very broad area, meaning that making this specific and relevant was the challenge. As outlined in Table 2.2.1, I decided to structure the presentation such that it would give the audience a brief introduction to health psychology as a discipline and an introduction to behaviour change tools, before ending with an overview of message framing from Tversky and Kahneman's (1981)

prospect theory. This theory focuses on critically evaluating the potential gains and losses of decision-making, and offers an alternative view in terms of understanding how messages are 'framed' and perceived by others. The session ended with a practical exercise which helped the audience engage with one another.

Table 2.2.1: Training plan by time segments

Session plan	**Time allocated**
Introduction and my background	10 minutes
Areas of Health Psychology	10 minutes
Introducing Health Psychology	10 minutes
Behaviour Change	10 minutes
Psychological models	15 minutes
Message framing	10 minutes
Alternative approaches: behaviour economics	10 minutes
Example articles: handout and group discussion	15 minutes
What techniques were used in the articles? (group discussion)	15 minutes

2.3 Material and Media Used for Each Segment

- Presentation (PowerPoint, projector, lecture notes)
- Example article with behavioural notions (hand-out)
- Evaluation (form for trainees)

Reflection

The idea of facilitating a workshop for professionals who were not from a psychology background was exciting, as this gave me the opportunity to design something original, unlike teaching material for undergraduates. I was slightly nervous as the group was so varied, but felt confident that the training would be beneficial to all. Whilst planning the content and structure, I worked closely with the managing director to ensure that I was meeting his expectations of the training. Fortunately, we worked very well together, which meant that I felt completely at ease and confident in what I had produced.

3 Deliver training programme encompassing psychological knowledge, skills, and practices

I arrived at the training location an hour early so that I could set up and meet with the managing director of AgeWatch. He informed me of any changes, and together we browsed through the PowerPoint presentation (see Appendix 3). Unfortunately, a projector was not available, so I quickly adapted and used my laptop for the presentation. This was quite unsettling, because the screen of the laptop was small, but fortunately, I had already printed the presentation in booklet form for the participants, which they used to make notes during the training.

I was given an hour and a half's slot at the start of the session, which worked very well because everyone was very attentive. I felt slightly anxious as some of the participants were very opinionated and very research-focused, which meant that I was asked about evidence and

research studies to support my statements. Kolb (1984) describes these individuals as assimilators, or learners who prefer logical theories when presented with information. Fortunately, I had evidenced and referenced the presentation, which participants could access at their leisure.

I found explaining the different behavioural change techniques at times difficult without using psychological terminology. Funkhouser and Maccoby (2006) state that when presenting to a lay audience, the key factor to consider is ensuring that there is a sense of information gained from the presentation. I felt that participants were engaged throughout the session as questions were being asked. Participants were very interested in how health psychological techniques can be implemented within a health website. Mullins (2005) suggests that motivation is imperative when learning new material: trainees need to be interested, which encourages them to learn. The positive response led me to believe that the training was successful.

On reflection, I ensured that the presentation was relevant and appealing to all who attended by adopting Kolb's (1984) significant experiential learning framework. Based on this theory, I created the presentation to suit a mixed group of personalities. I ensured that it was engaging for learners with an accommodator's style who prefer practical activities, and for divergent learners who preferred to observe.

The location arranged by the charity was very spacious and the seating was arranged in a circle, and so I adopted an informal training style which created a relaxed atmosphere. Effective communication is essential when delivering training, together with appearance and attitude. Ellis and Beattie (1986) suggest that there are many factors which influence communication, in particular non-verbal communication such as prosodic, paralinguistic, kinesics, and standing features. For example, kinesic elements include body language, eye

contact, and posture. Ellis and Beattie suggest that interpretations of the message can differ depending on the trainer. Acknowledging this, I ensured that I was aware of how I was presenting myself during and after the training session, remaining professional and approachable throughout. Adopting this holistic attitude enabled me to deliver a successful presentation confidently.

Reflection

Presenting to a group of professionals was somewhat challenging, as they were all from different backgrounds, both in education and employment. I concluded that training professionals within the psychology field would be less overwhelming; nevertheless, experiencing this unsettling environment has enabled me to become confident in repeating this type of training.

I felt that the location was not appropriate for this type of training, as the open space made it difficult for me to present and the lack of technological equipment (computer and projector) increased the difficulties in illustrating my point to the audience. Nonetheless, I wrked with these unavoidable difficulties and found a way to overcome them.

4 Plan and implement assessment procedures for such training programmes and evaluate such training programmes

I developed an evaluation feedback form *(Appendix 3)* which was given to the participants at the end of the training. The questions within the form were designed such that it would encourage the participants to offer feedback on the performance of the trainer and content of the training, and also provide qualitative comments which can be used to improve and adapt the training.

Participants completed the feedback forms, and the results are presented in *Appendices 1 and 2*. In summary, the feedback suggested that when presenting in future, improvement could be made in areas including time, location, and visibility of presentation. Most of these things were not within my control, but I have learnt to plan ahead if this were to happen again.

Future training in areas such as behaviour change, practical techniques applied in health, and specifically relating models to the AgeWatch articles were recommended. This feedback was explored with the managing director.

Summary reflection

Although it was challenging, I enjoyed almost every part of planning, designing, and facilitating this training session. I learnt how to design training for a lay audience, together with adapting with the environment I was in. I can confidently repeat this session again and adapt it based on my learning.

References

Ellis, A. & Beattie G. 1986. The psychology of language & communication. London: Weidenfield and Nicolsen.

Funkhouser, G. R. and Maccoby, N. (2006). Communicating Specialized Science Information to a Lay Audience, Journal of Communication Volume 21, Issue 1, pages 58–71, March 1971

Kaufman, D.M. (2003). Applying Educational Theory into Practice, British Medical Journal, 326, 213-16.

Kolb, D.A. *(1984):* Experiential learning: experience as the source of learning and development. Englewood Cliffs, NJ: Prentice Hall.

Mullins, L. J., (2005). Management and Organizational Behavior. 7th ed: Prentice Hall

Appendix 1: Evaluation Form

Understanding Behaviour Change – AgeWatch

Please indicate your rating of the presentation in the categories below by circling the appropriate number, using a scale of **1 (low)** through **5 (high).**

Please fill out **both sides** of this form; your comments and ratings are highly appreciated.

---

1. **Objectives- '*The presentation met the objectives of……..*'**

Introducing behavior change theory	**1**	**2**	**3**	**4**	**5**
Describing and illustrating Health Psychology Models	**1**	**2**	**3**	**4**	**5**
Presenting different behavior change methods	**1**	**2**	**3**	**4**	**5**

2. **Speaker – *'The presenter had…..'***

Knowledge in the content area	**1**	**2**	**3**	**4**	**5**
Presented useful information	**1**	**2**	**3**	**4**	**5**
Responsiveness to questions	**1**	**2**	**3**	**4**	**5**
Speaking and training ability	**1**	**2**	**3**	**4**	**5**

3. **Content- '*The PowerPoint and any relevant handouts presented were…..'***

Appropriate for the intended audience	**1**	**2**	**3**	**4**	**5**
Consistent with the stated objectives	**1**	**2**	**3**	**4**	**5**
Was presented clearly and effectively	**1**	**2**	**3**	**4**	**5**
Training aid was useful and appropriate	**1**	**2**	**3**	**4**	**5**

4. **My Skills- *'I benefited from this training because…..***

I acquired new skills/knowledge in relation to topic discussed	**1**	**2**	**3**	**4**	**5**
I have a better understanding of health behaviour	**1**	**2**	**3**	**4**	**5**

What did you like most about the presentation?

.....

.....

.....

.....

What specific things did you like least about the presentation?

.....

.....

.....

.....

.....

Suggestions for future topics, as well as comments on how this program could be improved to better suit your needs are always welcomed

.....

.....

.....

.....

Thank you for completing this evaluation form!

Appendix 2: Evaluation Results

Objectives	Low Ratings High				
	1	**2**	**3**	**4**	**5**
Introducing behavior change theory	0	0	0	7	2
Describing and illustrating Health Psychology Models	0	0	0	7	2
Presenting different behavior change methods	0	0	0	7	2
	Total	**0**	**0**	**21**	**6**

Speaker	Low Ratings High				
	1	**2**	**3**	**4**	**5**
Knowledge in the content area	0	0	0	4	5
Presented useful information	0	0	1	6	2
Responsiveness to questions	0	0	2	4	3
Speaking and teaching ability	0	1	3	4	1
	Total	**1**	**6**	**18**	**11**

Content	Low Ratings High				
	1	**2**	**3**	**4**	**5**
Appropriate for the intended audience	0	0	3	4	2
Consistent with the stated objectives	0	0	2	5	2
Was presented clearly and effectively	0	1	3	5	0
Teaching aid was useful and appropriate	0	0	4	5	0
	Total	**1**	**13**	**19**	**4**

I benefited from this training because….	Low Ratings High				
	1	2	3	4	5
I acquired new skills/knowledge in relation to topic discussed	0	1	2	6	0
I have a better understanding of health behaviour	0	0	3	6	0
	Total	1	5	12	0

1.1 Qualitative Comments

What did you like most about the presentation?

- 'The examples from real people e.g. smokers and alcohol abuses'
- 'Presenting the bigger picture within which we must operate'
- 'Practical examples of behaviour change theory'
- 'Explanation of Health Psychology a various model to effect behavioural change'
- 'Enthusiasm and content of knowledge'
- 'The message training and other topics which are not academic and statistic based considered using quizzes and pictures to engage people'
- 'Explanation of the different behavioural models'
- 'Example of booze, showing how research officers should present information'

What specific things did you like least about the presentation?

- 'Too long for the schedule'
- 'slides could have been clearer and simpler'
- 'length and too much psychology for non-psychology people'
- 'Very small font on the slides'
- 'Nothing'
- 'more focus on what and how it can be implemented for AgeWatch'
- 'use of technical language'

Suggestions for future topics, as well as comments on how this program could be improved to better suit your needs are always welcomed

- Relating each model to different articles in AgeWatch
- Segmentation
- Health behaviour change why people don't make rational choices and decisions
- Feedback on practical techniques to effect behavioural change i.e. smoking, overeating and drinking

Appendix 3: Training presentation

Understanding Behaviour Change

Sumira Riaz
AgeWatch

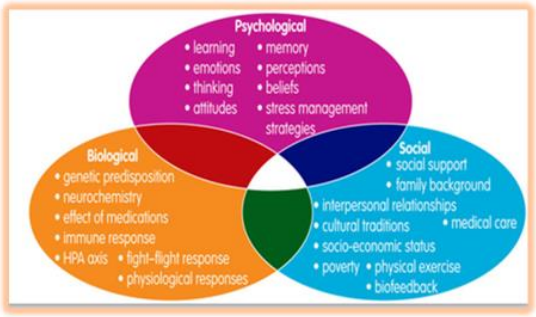
Overview

- Where Health Psychology can help
- Health Psychology Models
- Techniques of Behaviour Change
- Alternative Methods

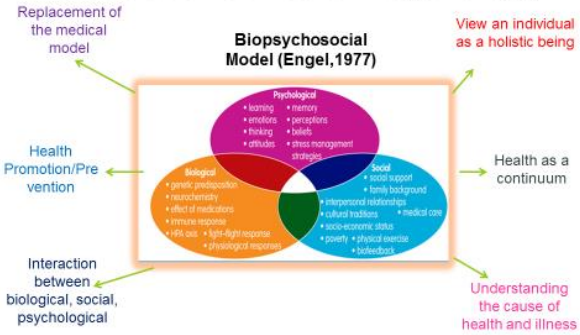
Areas of Health Psychology

- **Health Risk Behaviours** ***(drug abuse, poor diet)***
- **Health Enhancing Behaviours** ***(screening, exercise)***
- **Modifying Health Beliefs** ***(health interventions)***
- **Processes and Influencing the Delivery of Health Care** ***(prevention campaigns)***
- **Psychological aspects of illness** ***(self management, coping, improving quality of life)***

Biopsychosocial Model (Engel,1977)



Introduction to Health Psychology



Behaviour Change

Psychologist have an interest in *exploring the nature of behaviour change*

1. Development of interventions based upon models such as stages of change theory or HBM
2. Analysing existing intervention data to identify strategies which work and maintain effective change
3. Health Promotion: **Message framing**

Health Psychology Models

Cognitive Models

- Health Belief Model *(Rosenstock, 1966, Becker 1974)*
- Protective Motivational Theory

Social Cognition Models

- Theory of Reasoned Action *(Fishbein, 1967, Ajzen & Fishbein 1975)*
- Theory of Planned Behaviour *(Ajzen, 1985; Ajzen & Madden, 1986; Ajzen, 1988)*
- Transtheoretical Model (Stages of Change) *(Prochaska 1985)*

Alternative Model

- Health Action Process Approach (*Schwarzer, 1992)*

Health Psychology Models

Stages of Change- Transtheoretical Model (TTM)
(Prochaska and Diclemente, 1984)

Stages of Change Model

Suggests a stage-like approach to behaviour change

Assesses an individual's readiness to act on a new healthier behaviour

Provides strategies or processes of change to guide the individual through the stages of change to action and maintenance.

Widely used with addictive behaviour *(smoking and weight management)*

Health Belief Model

Health Belief Model
(Rosenstock, Strecher and Becker, 1994)

I am **susceptible** to getting lung cancer

The **threat** to my health is serious

The **benefits** of the recommended action outweighs the **costs**

I am **confident** that I can carry out this recommendation successfully.

Exchange Theory (HBM)

- To increase the likelihood of behaviour change the intervention (articles) must be designed in such a way that it maximizes perceived benefits while minimizing the perceived costs

- Example: Smoking less will save you thousands of pounds

Assumption of the HB Model

Individuals are rational information processing agents and thus strong core beliefs will result in behaviour

What do you think about this statement?

Nisbet and Gick (2008)

In order for behaviour to change people must:

- Feel personally vulnerable to a health threat,
- View the possible consequences as severe
- See that taking action is likely to either prevent or reduce the risk at an acceptable cost with few barriers.

In addition, a person must feel competent (have self-efficacy) to execute and maintain the new behaviour.
Some trigger, either internal ... or external .. is required to ensure actual behaviour follows'.

Cognitive Behaviour Therapy (CBT)

CBT provides a teachable set of skills that have been shown to produce modest results

- Psycho-education (i.e. emphasis in increased self-efficacy in problem solving)
- Self-monitoring
- Goal setting
- Stimulus control, exposure and response prevention
- Self-reinforcement
- Identification and modification of unhelpful thinking
- Relapse training

Health Models

No single theory can account for the complexities of Behaviour Change

Message Framing

Tversky and Kahneman (1981) Prospect Theory

- People consider their "prospect" (potential gain and losses) when making a decision.
- Peoples preference are sensitive as to how messages are framed
- **Gain framed messages**: information about a health behaviour that emphasizes the benefits of taking action
- **Loss framed messages**: information about a health behaviour that emphasizes the cost of failing to take action.

Example of Message Framing

Health Behaviour	Gain Frame	Loss Frame
HIV testing (Apanovitch, McCarthy & Salovey, 2003)	There are many benefits or good things you may experience if you get tested for HIV. If you decide to get HIV tested, you may feel the peace of mind that comes with knowing about your health. There are many problems or bad things you may experience if you get tested for HIV. If you decide to get tested you may feel less anxious because you would not wonder if you were are ill.	There are many benefits or good things you may **not** experience if you **do not** get tested for HIV. If you decide **not to** get HIV tested you will **not feel the peace of mind** that comes with knowing about your health. There are many problems or bad things you may experience if you **do not get** tested for HIV. If you decide not to get HIV tested you may feel **more** anxious because you may wonder if you are ill.

Alternative Approach Behavioural Economics

Cialdini, (2001)- our brain creates positive and negative schemas or internal maps of each individual experience; these can in reality be **altered** using the art of persuasion.

The art of persuasion is based on six basic principles ***reciprocation, commitment and consistency, social proof, scarcity, liking and authority.***

Research suggests that acquiring these skills can influence an individual to concede, comply or change, by appealing to a number of deeply embedded human drives and needs

Therefore, learning the art of persuasion can influence an individual to change or alter their behaviours.

This method has also been fostered by the Cabinet Office Behavioural Insights Unit, labelled as "nudge".

(Richard Thaler and Daniel Kahneman 2008)

Examples Handout

Refer to the article

Techniques used in this article

- Cognitive behavioural tools- drinking diary
- Health Belief Model- *benefits and costs of drinking*

It is not possible to include every model/theory in your article but to use a uniformed approach, this will benefit the reader and encourage them to make a change.

Any Questions ?

Appendix 4: Example article presented to the group

How many Calories do these drinks have?

50ml Brandy
110 Calories

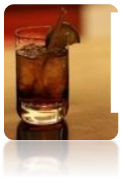
Pint of Ale
180-230 Calories

White Wine (glass)
130 Calories

Bottle of Red Wine
510 Calories

Pint of Larger
240-250 Calories

Medium Glass of Red Wine
120 Calories



Rum and Coke
142 Calories

Pint of Stout
210 Calories

Bottle of White Wine
555 Calories

Interactive element (illustration)

Did You Get It Right?

Well done if you did. If not, don't be surprised. Research suggests these are HIDDEN calories, with many people not aware if the calories they are putting on by drinking. Unfortunately, alcohol is something also referred to as EMPTY CALORIES because these calories have no nutritional value. So empty calories are ones we drink unnecessarily. If we're trying to maintain a healthy diet and are struggling, alcohol can be part of the problem and not enough people know this.

When do we drink the most?

Open questions for the reader throughout the article used to engage the reader

We tend to have a drink for a range of different situations. These are ju
common:

1. With Friends (Socialising)
2. After Work (Colleagues)
3. Tension-reduction hypothesis- drinking to reduce tension and anxiety (Cappell and Greeley, 1987)
4. Drinking during a meal or after

These are just some of the occasions when we may drink. So an important question which arises from this is WHY do we decide to drink in the first place?

Focus on a few important areas

Social Drinking?

Many people would argue that the odd drink is harmless and it tastes nice. And moderate drinking may even have some health benefits. Yes, all these reasons are acceptable. However, could it be that we drink mainly to be social? Numerous researchers have focused on drinking and socialisation, in particular peer group alcohol use (Orford and Velleman, 1991). Like many

Evidence your finding to support your statement: *it's not only your problem other people are going through it as well*.

other addictions such as smoking, do we do these to fit in with our surrounding and then when it becomes a habit, is it just too hard to stop?

Cause or Effect?

Others suggest that drinking reduces our anxiety levels and calms us. But is this true? Does alcohol really reduce our stress and tension levels? George and Marlatt, (1983) found that it's not the alcohol itself which makes us feel stress free it is what we **think** alcohol will achieve. We believe that alcohol will reduce our tension and stress levels and pair this belief with a drink; then continue to drink because we believe that this works. In actual fact, perhaps we're just training ourselves to manage our stress with a drink. If so, why not find another way to manage our stress?

How to monitor your drinking?

Use real world examples as to why someone adopts an unhealthy habit for example: drinking because your stressed?

There are many different ways to monitor how much you may be drinkin
diary. A drinking diary is a good tool which can be used on a daily or week
of monitoring allows you to:

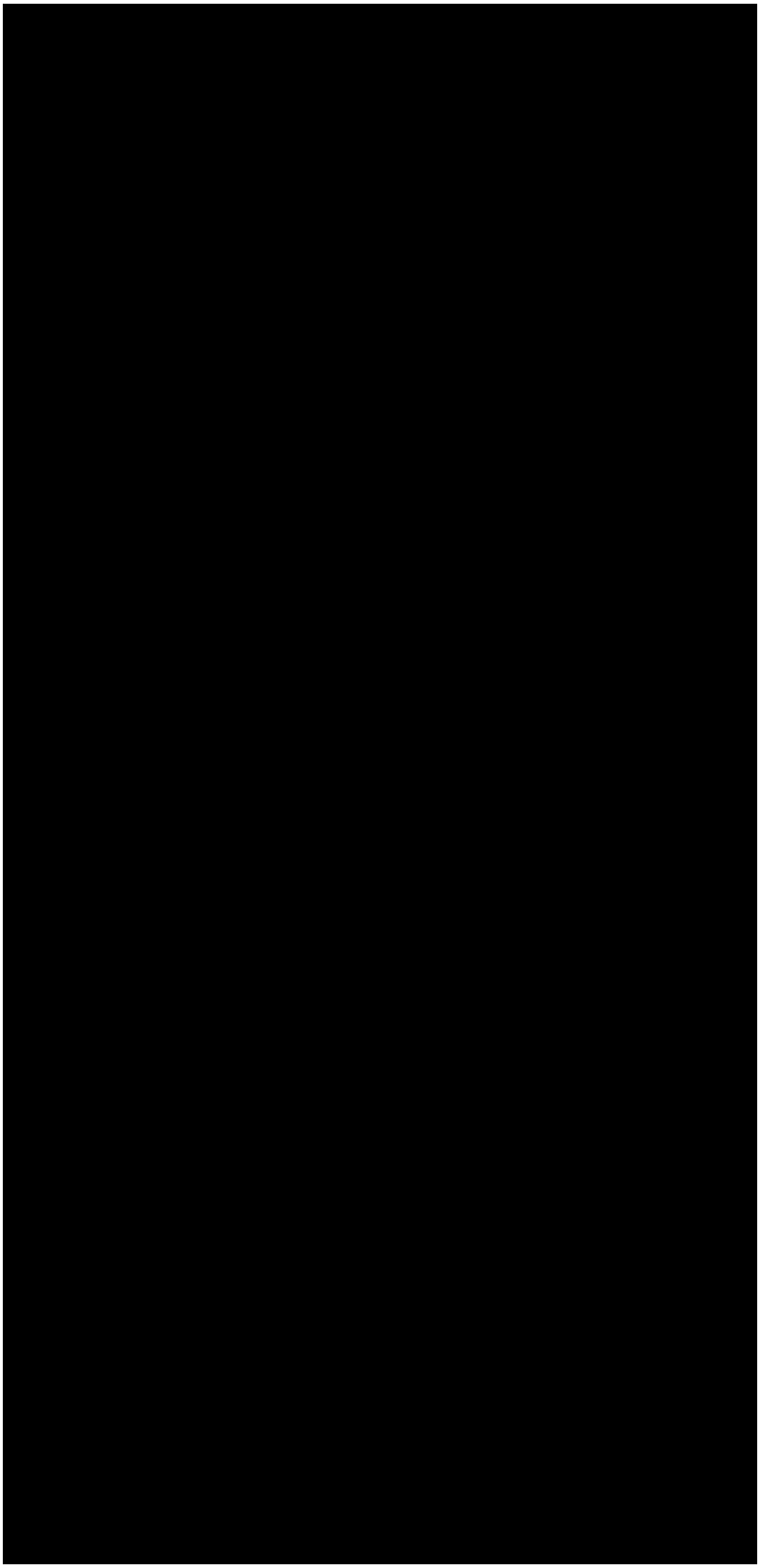
- Track the amount of alcohol you are drinking and the calories you are consuming.
- See when and where you may be drinking and why you decided to reach for the bottle.

Diaries can also be adapted to monitoring your food intake and your exercise regime, so have other potential health benefits. Below is a PDF which you can download and use at your own leisure.

Sumira Riaz
Published 12/07/2012, Review date April 2014

Offer manageable ways the reader can use to change their drinking behaviour

Appendix 5- Photos from the training session (premission to use these photos granted from AgeWatch)



6 Psychological Intervention Case Study 1 – implemented through face to face work

Setting: Newham Secondary School and Teens and Toddler Charity, London.

Target group: Teenagers (14-15 year olds).

Description of intervention: Pregnancy prevention initiative for teenagers at risk of becoming young parents, and teaching to support and enhance interpersonal skills.

Background

There is an immediate need to address teenage pregnancy. In comparison to other European countries, statistics suggest that teenage pregnancy within the United Kingdom is significantly high (Collier, 2014). National statistics for England and Wales in 2015 reveal that one in twenty women under the age of eighteen was pregnant in 2014 (Conception in England and Wales, 2015). Although this is relatively high, there has been a decline of 8% over the last two years. Teen pregnancy, a complex social issue, can be difficult to prevent. Strategies or approaches require ongoing effort to make them effective in their goal of reducing the rate of teen pregnancy.

Offering specific programmes to teenagers within school can be a method for addressing this issue. Suellentrop (2012) found that teen pregnancy programmes require specific features within their design to be successful, and then when implemented in the correct environment, can have a significant impact. Suellentrop suggests that a teen pregnancy prevention programme should include (1) education about the use of contraception, (2) a programme lasting longer than a few weeks, (3) facilitation by trained professionals, (4) interactive personalised information, (5) addressing peer pressure, (6) teaching communication skills, (7) considering the teenagers' age and culture within the programme.

Evidence suggests that teenagers are able to vocalise their concerns and assumptions through prevention programmes, which foster change in a safe environment (Bennett & Assefi, 2005). Therefore, it is essential to offer support which not only focuses on specific health behaviours, but also educates teenagers to develop effective interpersonal and communication skills, helping them to make sensible, informed decisions regarding their sexual relationships, whether future or current.

Based on the theoretical beliefs held in Positive Youth Psychology, the programme is designed such that it focuses on building upon teenagers' human potential. Damon (2004) believes that every child 'has talents, strengths and interest that offer potential for a bright future.' Supporting the growth of that potential is important, particularly in the early years of the adolescent stage, which is why Larson (2006) recommends that adults need to acquire the role of nurturing this potential through positive appraisal, and by supporting teenagers to become consciously aware of the decisions they make along the way.

This case study outlines my experiences of co-facilitating a pregnancy prevention intervention with a group of teenagers in a London school. The design and implementation of the programme was based on the Teens and Toddlers model of early nurture.

Background: Teens and Toddlers

Established in 2001, Teens and Toddlers is a registered charity which has been offering teenager pregnancy prevention interventions to a number of schools across the United Kingdom. The charity originated in America in the late 1970s, and was initiated by Laura Huxley. Huxley's concern was that disadvantaged children were at risk of not meeting their full potential and, based on this premise, she developed a project which aimed to 'nurture the possible human.' Huxley felt strongly about the implications of early experiences, and how these impact the developmental stages.

The design of this intervention meets all the requirements previously outlined by Suellentrop (2012). Teens and Toddlers programmes also focuse on three significant psychological factors: self-esteem (achievement, success, and wellbeing), self-efficacy (resilience, achievement, and wellbeing) and sense of coherence (adaptive coping, reducing risky behaviours, and wellbeing). Interestingly, Crisp and Cruz (2009) recommend that interventions designed to increase self-esteem are effective in reducing depressive symptoms and enhancing psychological wellbeing.

Although labelled as a prevention programme, Teens and Toddlers also offers mentoring within a structured environment. This has been shown to help support and increase self-awareness, self-esteem, and self-efficacy in teenagers. Evidence from informal teen mentoring has demonstrated positive health outcomes in education, problem behaviours, choices, and psychological well-being. Although mentoring is deemed successful, there is a recommendation that any type of informal mentoring should be incorporated within a comprehensive intervention, as opposed to singular support (Dubois and Silverthorn, 2005).

Initial Assessment

This intervention was aimed at teenagers at risk of becoming young parents. Those referred were assessed by their teachers as underachieving and having behavioural difficulties, meaning they were at risk of becoming young parents and NEET (not in employment, education or training). The programme was available for boys and girls from Year 9 onwards. At first, the school initiated contact with the charity when they had identified a number of teenagers in need of further sexual relationship advice and support. Once the school had made contact, my co-facilitator and I arranged a screening session for those identified as potential participants. The school was responsible for informing the parents, and potential participants were handed paper versions of parental consent forms during the informal induction. A request to obtain parental consent was deemed a prerequisite for teenagers' participation. During the screening session, we explained the structure of the intervention, the commitment expected from the teenagers, and which topics we would cover. We also discussed the opportunity to achieve a Diploma in interpersonal skills at the end of the programme, as an incentive for their commitment. At the end of the screening session, we arranged to meet with the Head of Year, who was responsible for identifying the potential participants. During this meeting, the reasons for referral were discussed along with the risks identified by the Head of Year were outlined, including in cases where teenagers were currently in relationships or were lacking in confidence.

This process was repeated for the chosen primary school where the teenagers were visiting. My co-facilitator and I explained the process of the programme, and formal consent was obtained from the parents of the nursery children. Pre-school children aged between 2-5 years were selected by their nursery teachers on the basis that they required extra support or attention in varied areas of their development, such as social interaction or special educational needs.

I had previously co-facilitated five other Teens and Toddlers groups prior to this, so I was confident in my ability to assess the suitability of the programme for those chosen for the intervention. There was definitely a need for such an intervention, and decisions to participate were based on parental consent.

Detailed needs assessment and formulation

2.1a Design and implement a health psychology baseline assessment of behaviour related to health outcomes

As a charity, Teens and Toddlers is invested in supporting and educating teenagers about the risks associated with sexual activity. The intervention aims to foster awareness of the realities of conception and parenting.

Therefore, prior to the intervention, teenagers' 'risky behaviour' was assessed using the Adolescents Risk Behaviour Screen (ARBS), developed by Jankowski (2007). This seven-item validated scale is used to identify teenagers' perceptions of risk in multiple instances. The scale contains a range of questions, covering topics ranging from usage of seat belts to attitudes to substance use. A sample question was phrased as follows: 'How often do you wear a seat belt when riding in a car driven by someone else?' (4=never/1=always) and 'During the past 12 months, how many times were you in a physical fight?' (1=0 times, 3=2 or more times) (see Appendix 2). Scores above 17 indicate a high risk, and below 17 indicate a low risk.

This was used to assess the suitability of the intervention for those chosen to participate in the programme. As specified earlier, Teens and Toddlers have predefined assessment criteria based on the NEET which are adhered to during the recruitment process, and the charity works closely with secondary schools to ensure that those chosen to participate have a real need for support.

2.1b Evaluate the patterns of behaviour and formulate a working hypothesis about the target behaviour based on assessment

2.1c Provide feedback on the outcome of the assessment and working hypothesis

Following the initial screening meeting, those who had sought parental consent were invited to complete the ARBS questionnaire, alongside the Teens and Toddlers version of the self-efficacy and self-esteem questionnaire adapted from the Self-Esteem Scale (Rosenberg, 1965) and the Generalised Self-Efficacy Scale (Schwarzer and Jerusalem, 1995).

The combined results suggested that out of the eight students, three were indications of risky behaviour. The other five teenagers, although scoring low on the ARBS, were still suitable candidates for the intervention based on their past history as indicated by the secondary school. From this, I hypothesised that over the course of the intervention, the educational and practical experience of the intervention would change the attitudes amongst the teenagers, in particular in terms of their perceptions of risky behaviour. I anticipated that they would observe an increase in confidence and a sense of achievement on completion of the programme.

The intervention

2.1d Design, plan, and implement interventions based on the assessment and formulation

The intervention was designed to be delivered over 16 weeks, with each week covering different topics. The programme was delivered during term time, with a commitment of once a week. As pre-defined by Teens and Toddlers, the teenagers were required to spend approximately twenty hours on curriculum work and forty hours on contact time with the nursery children. The first hour and half of the session was spent engaging the teenagers, whist the second hour involved the teenagers spending time with their assigned toddlers. Nursery time was observed by my co-facilitator and I, and we also helped the teenagers to interact with the toddlers.

Table 2.1 Intervention Outline

Week	Topic	Outline of Session
1	Unit 1 Introduction	• History Teens & Toddler • Being with Toddlers • Ground Rules/Boundaries
2	Unit 2 Confidentiality	• Confidentiality • Group guidelines • Completion of ground rules process • Role models • Core conditions
3	Unit 3 Caring and Communication	• Interpersonal Skills and Qualities • Journal Writing
4	Unit 4 Communicating and Developing	• How to interact with young children • Role play • Importance of Body language
5	Unit 5	• Learning is Exploring • Support your mentee child to learn new skills

	Learning through Exploring	
6	Unit 6 It's a Risky Business	• Video clip on Brain development • What is risk • Consequence • Understanding Risk
7	Unit 7 What works in Relationships	• Ideal Friend/ Boy/Girl Friend Parent • Why young people have sex • Planned Vs Unplanned Pregnancy
8	Unit 8 Are Relationships Risky?	• Support Networks • Referral Exercise
9	Unit 9 Human Potential	• What is Human Potential • Toddlers Potential • What we may be
10	Unit 10 The Marshmallow Experiment	• Proposal of treat offer • Marshmallow video clip [patience and reward incentive] • Is it worth waiting for
11	Unit 11 Learning can be fun	• Engaging in learning • Role play Helping Interview
12	Unit 12 Your Life Your Dreams	• Role Play Dare to dream • Dare to dream Visualisation
13	Unit 13 Bothered!	• What are the toddlers learning through play
14	Unit 14 Getting more of what you want	• Sub personalities Mask • Qualities and strengths • Impact of Endings
15	Unit 15 My Contributions	• My Contribution • Value of community engagement
16	Unit 16 Skills Celebrations	• Self-Reflection • Certificate Ceremony

Implementation (detail of the process)

A day before each session, I would arrange a meeting with my co-facilitator to discuss the week's topic and plan the session in detail. The group consisted of eight teenaged boys between 13-14 years of age. The sessions took place within the secondary school at lunchtime, typically between 12:30pm and 4pm.

During our planning session, we ensured that all the flip chart papers and the participants' folders were prepared. Teenagers were assigned a work folder, which contained 16 weeks of planned work that they were required to complete during the classroom sessions. Participants were also required to complete a reflective journal after sessions, which gave them the opportunity to detail and record their experience and progression.

At the start of each session, we would do a 'check in', which varied on a weekly basis. This was our way of making the session fun, informative, and engaging, and we would ask questions such as 'choose a colour to describe how you're feeling today?' This type of questioning allowed us to assess the mood of the teenagers and then to engage with them accordingly. My co-facilitator and I embedded a non-didactic, collaborative approach towards the group, meaning that classroom time was interactive and required the teenagers to take part actively in the discussions, role play, and mind mapping activities.

The final hour of the session was spent in the nursery. Each teenager was pre-assigned a toddler with whom they would spend the hour. Targeted work plans had been developed by the nursery teacher for the teenagers to use as guides when working with their toddlers. This assigned task focused the teenagers over the hour, and was dependent on the toddlers' response to them. My role was to support the teenagers in engaging with their toddlers, and role-modelling adult and toddler interaction where necessary. We also observed the teenagers during this time.

At the end of nursery time we would conduct a 'check out.' Each individual teenager was offered positive praise in areas which they did really well, such as 'I really liked the way you sat down with your toddler and patiently explained the task by giving eye contact and going down to their level.' They might be given an area they needed to work on for the following week, for example: 'I noticed that you are finding it difficult to engage with your toddler; why don't you try to find a task they enjoy by asking the class teacher?'

This process was repeated over 16 weeks, with each week covering a different topic.

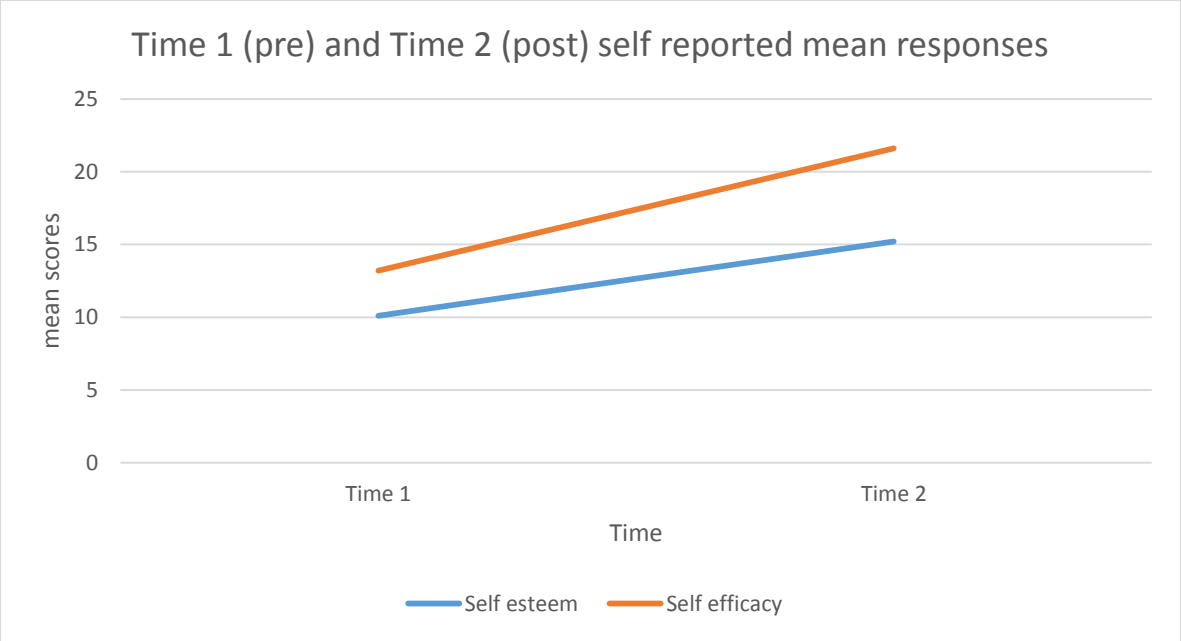
Evaluation

2.1e Evaluate and communicate the outcome of intervention

Teenagers were required to complete an initial questionnaire (see Appendix 1) at the start of the programme. This questionnaire was repeated at the end of the programme in order to evaluate the impact, if any, on the teenagers, particularly in terms of self-esteem and self-efficacy.

Self-esteem was measured using the adapted version of the Self-Esteem Scale (Rosenberg, 1965), and self-efficacy was measured using the short version of the Generalised Self-Efficacy Scale (Schwarzer and Jerusalem, 1995). Additional questions based on attitudes to sexual health and teenage parenting (advice seeking, sexual health knowledge, and attitude to being a parent) were also included within the pre- and post-measures. The teenagers' reflective journals, although not included within this case study, were also used to assess the change over the course of the intervention.

Figure B1: Results from the evaluation of Teens and Toddlers (n=8)



The graph shows a visual comparison of participants' overall mean score. Pre- and post-differences are evident in both self-esteem and self-efficacy. This suggests that the intervention elicited a positive change by increasing their general self-esteem and self-efficacy.

Therefore, the initial evaluation suggests that offering positive appraisal within a supportive environment can enhance self-esteem and self-efficacy. Teenagers were actively receiving positive appraisal throughout the session, whether from the facilitators or the toddlers. This mirrors Humphrey's (2011) evaluative study of the Teens and Toddlers intervention, which found that teenagers who were at a high risk of becoming disengaged and who had low levels of confidence reported improvements in confidence at the end of the programme.

4.2 Reflection

Teens and Toddlers is a unique programme, which is why I was interested in becoming a facilitator for this charity. Over the sixteen weeks, the teenagers developed skills which supported them in realising areas in which they wanted to develop. I observed how withdrawn

teenagers become confident, and how disruptive and aggressive teenagers began to notice their behaviour, particularly when working with the toddlers.

At times, I felt that the group was very demanding, in particular in terms of encouraging the teenagers to complete their work, engaging with them, and maintaining their concentration during classroom time. At times, the teenagers found working with their toddlers to be challenging, and extra support and role-modelling was required. I learnt a considerable amount of skills over the course of the programme. I learnt to be patient and to engage in positive appraisal, and I also learnt that treating teenagers as young adults enhanced their confidence and their trust in me, which helped them develop healthy relationships with their toddlers. Once they learnt to trust me, the process of working with them became better. I found that the structure of the intervention helped us plan the weekly sessions with ease, and I enjoyed taking part in fun activities such as the marshmallow challenge where I observed the teenagers open up and show their kind, generous side, which they often shy away from in front of their peers. The overall experience has taught me a unique set of skills which I will continue to use throughout my professional career.

References

Bennett, S. E., & Assefi, N. P. (2005). School-based teenage pregnancy prevention programs: a systematic review of randomized controlled trials. Journal of Adolescent Health, 36(1), 72-81.

Collier, J. (2014) Erratum to 'The rising proportion of repeat teenage pregnancies in young women presenting for termination of pregnancy from 1991 to 2007' [Contraception 79 (2009) 393–396] Contraception, 89, 475-477

Crisp G and Cruz I. (2009) Mentoring college students: A critical review of the literature between 1990 and 2007. Research in Higher Education. 2009;50:525–54

Damon, W. 2004. What is positive youth development? The Annals of the American Academy of Political and Social Science 591:13-24

Humphrey, K. (2011), 'A retrospective analysis exploring the efficacy of the teens and toddlers programme (internal)

Jankowski, M.K., Rosenberg, H.J., Sengupta, A., Rosenberg, S.D. and Wolford, G.L. (2007), 'Development of a screening tool to identify adolescents engaged in multiple problem behaviors: the Adolescent Risk Behavior Screen (ARBS)', Journal of Adolescent Health, Vol. 40 No. 2, pp. 180.e19-180.e26.

Larson (2006). Positive youth development, willful adolescents, and mentoring Youth Mentoring: Bridging Science with Practice Volume34, Issue 6 Pg 677-689

Office for National Standards, Report on Conception in England and Wales. (2015) Accessed online:https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/conceptionandfertilityrates/bulletins/conceptionstatistics/2015

Rosenberg, M. (1965). Society and the adolescent self-image. Princeton, NJ: Princeton University Press.

Appendix 3- Placement confirmation

[redacted]

Dr Catherine Sykes
THERAPY COACHING CONSULTANCY

16th February, 2018

TO WHOM IT MAY CONCERN

Dear Sir/Madam,

The Effectiveness of Interactive Coronary Heart Disease Patient Education: a multi-perspective participatory approach.

I confirm that Sumira Riaz was a Research Assistant on the above project.

Yours faithfully,

[redacted]

Dr Catherine Sykes
Chartered Psychologist

St Paul's Practice,
16 St Martin's le Grand, London
EC1A 4EN

Section C: RESEARCH

Title: A pilot study of a text messaging intervention to modify illness and medication beliefs amongst patients diagnosed with inflammatory bowel disease

Abstract

Introduction. Intentional and unintentional medication non-adherence is a particular challenge for patients with inflammatory bowel disease (IBD). Non-adherence can affect patients' quality of life, which can result in unfavourable treatment outcomes, more hospitalisations, and higher healthcare-related costs. The purpose of this study was to assess whether a tailored text message intervention designed to modify illness and medication adherence beliefs in patients with IBD would increase treatment compliance, and change patients' illness perceptions and medication concerns.

Method. This pilot study utilised a pre-test-post-test non-randomised design. A sample of 32 IBD patients was recruited within the United Kingdom. Participants' medication beliefs and illness perception scores determined the set of tailored daily text messages, which were sent to patients over duration of twelve weeks. The frequency of messages differed, and some messages were repeated for reinforcement. Self-reported medication adherence was measured pre- and post-intervention.

Results. Medication adherence increased post-intervention, as 'forgetting to take medication' decreased whilst 'never' forgetting to take medication increased over time. A significant increase in treatment control and coherence and a decreased level of concern surrounding their condition was evident. Participants' level of concern towards their medications changed during the twelve weeks, with a baseline mean concern score of 3.08 (.57) in comparison to the twelve weeks mean concern score of 2.89 (.59), which is statistically different, $t(31) = 2.16$, $p<.038$, $r= .36$ (medium effect). 66% of participants from the baseline were aware of the necessity of their medication: 'without my medication I would become ill.' They agreed that their health is dependent on their medication. Understanding the links between their health and medication

increased post-interventions, with 71% of participants reporting that their health was reliant on their medication intake.

Conclusion. The results have direct implications for improving medication adherence and changing illness and medication beliefs. This study validated the benefits of text messages and highlighted the importance of addressing these beliefs in order to understand the reasons for non-adherence fully. Through mobile connectivity, the messages elicit a change, which can help researchers and clinicians offer alternative support to patients away from the traditional clinical setting.

1 Introduction

Inflammatory bowel disease (IBD) is used to describe two conditions which are characterised as chronic and lifelong: Crohn's disease and ulcerative colitis (NHS Choices, 2017). These idiopathic conditions affect around one in 250 people living within the United Kingdom, and are not gender specific (Crohn's & Colitis UK, 2012). Crohn's disease is a chronic inflammatory disorder of the entire gastrointestinal tract (from the mouth to the anus), while ulcerative colitis only affects the patient's rectum and colon (large intestine). Common symptoms of both conditions include diarrhoea, abdominal pain, and rectal bleeding (Vilela, Torres, Martins, Ferrari, Andrade & Cunha, 2012). Although these conditions are not curable, treatment to manage the symptoms is frequently offered to patients. Furthermore, the aetiology of both Crohn's disease and ulcerative colitis is not fully understood, and the influence and progression of these diseases remain unclear. Ogura, Bonen, Inohara, Nicolae et al. (2011), however, propose that a combination of genetics and environmental triggers may contribute to the aetiology of IBD.

Aside from the traditional medical explanations around IBD, there is an urgent need to understand the psychological determinates of Crohn's and ulcerative colitis, and furthermore to understand how environmental triggers contribute to the progression of these diseases. Sarbor (2006) has attempted to address this by emphasising four domains which account for the cause of IBD (Figure C1). Within the model, Sarbor (2006) suggests that the immune response, genetic susceptibility, luminal microbial antigens and adjuvants (bacterial

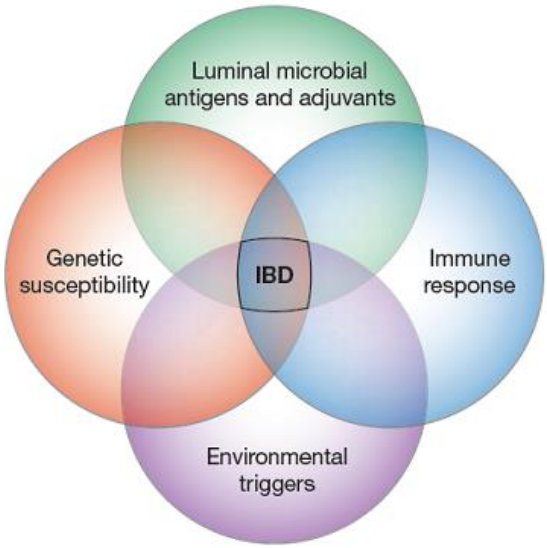


Figure C1. Adapted from Sarbor's (2006) Interaction diagram of various factors contributing to IBD

movement), and environmental triggers all play a major role in the causation of IBD. The causes of IBD identified by Sarbor (2006) are, therefore, not isolated, but interweave with each other to provide a diagnostic approach that can predict a subset of patients living with IBD more effectively.

Other approaches have been offered as alternative explanations for the progression of Crohn's disease and ulcerative colitis, which take into account environmental determinates such as smoking, diet, depression, stress, and poor quality of life; these have all been cited in research as key determinates in the negative progression of these chronic conditions (Loftus, 2004, O'Toole & Korzenik, 2014, Kaplan, Molodecky & Panaccione, 2010 and Danese, Sans & Fiocchi, 2004). Yet, the fundamental interconnection between how environmental triggers influence the progression of IBD is still unclear. O'Toole & Korzenik (2014) suggest that genetic susceptibility does not, in isolation, lead to the development of IBD, and that the likelihood of developing the clinical features of this condition manifests in combination with environmental factors.

The treatment pathway for IBD is not linear in comparison to other chronic conditions. Over the last decade, it has become apparent that the immune system plays a major role in facilitating inflammation and tissue damage within the gut region of an IBD sufferer. The exact degree of the impact the immune system has and what triggers these reactions, however, remains unclear (Brown & Mayer, 2007). Nevertheless, in seeking to understand the immune pathways of IBD, researchers suggest that a key biological feature of IBD is the incongruous mucosal immune response that is elicited within the normal intestinal regions (Fiocchi, 1997). This response then triggers and creates an imbalance within the local pro- and anti-inflammatory cytokine, which leads to tissue damage (Fiocchi, 1997). These symptoms are then exacerbated by the individual's psycho-neuroendocrine network, which comprises brain

receptors that control the pain perception, and which are inflamed if patients are not able to cope with their symptoms effectively (Miehsler, Weichselberger, Ernst, Dejaco, Reinisch, et al., 2014).

The experience of diagnosis, treatment initiation, and maintenance is not a linear process; the initial diagnosis of IBD can take some time, and as a result, the first signs of the disease are often dismissed as 'normal' (D'inca, Bertomoro, Mazzocco, Vettorato, Rumiati & Sturniolo, 2008). Once a diagnosis is confirmed, education about the condition and available treatment options may contribute to patients adopting self-coping techniques in order to accept and manage the condition. Techniques such as educational programmes to enhance health literacy, lifestyle modification advice, disease-specific skills (i.e. awareness of signs and symptoms), increased understanding of the function of treatment, and wellness techniques such as relaxation can help to manage the condition. These techniques can vary, and are usually defined as a way of keeping the illness under control (Saibil, Lai, Hayward, Gilbert, et al., 2008).

Following treatment initiation, however, adherence is not always optimal, and patients with IBD go through stages of maintenance (when the inflammation reduces and the pain subsides) where they begin to feel better, and this is usually when noncompliance to their medication may begin (Broide, Dor, Ruhimovitch, Shitrit, Sklerovsky, et al., 2017). The long-term struggle to understand their diagnosis and feel confident in sharing the impact of this condition with significant others, including friends, family, and work colleagues, can be challenging, which may result in comorbidities such as anxiety and depression (Guthrie, Jackson, Shaffer, Thompson, Tomenson & Creed, 2002). Finding self-help techniques to manage the feelings of anxiety and depression may lead to unhealthy coping techniques, which may result in a complex relationship with food and the need to withdraw from social situations (Guthrie, et al., 2002).

Currently, the predominant mainstream pharmacological medicines offered to patients with IBD are aminosalicylates, azathioprine/6-mercaptopurine, or steroids (Brown & Mayer, 2007). Despite the long-term benefits of these medications, a commitment to adhering to the medication regimen is challenging for most IBD suffers, and may not always take priority. The consequences of missing a dose can be detrimental, and is attributed to build-up over time, increasing disease progression.

1.1 Treatment adherence: a review

The World Health Organisation (WHO, 2013) report on adherence to long-term therapies makes the point that *'adherence to therapies is a primary determinant of treatment success. Poor adherence attenuates optimum clinical benefits and therefore reduces the overall effectiveness of the health systems*' (WHO, 2013, p. 1). This report highlights the global scale of the problem and the extent of its impact. It calls for action and suggests that improving adherence rates to long-term therapies would have a greater impact on population well-being than the discovery of new therapeutic options (WHO, 2003).

Whilst earlier discussions have established that adherence is problematic for IBD patients, the fundamental issues related to non-adherence are compounded by the complex nature of human behaviour. Although the term 'adherence' commonly refers to the physical act of taking medicine, its definition encompasses more than just the patient's response towards medication, but instead takes into account the whole treatment experience. Horne, Weinman, Barber, Elliott and Morgan (2005) found that patients need to be supported throughout the experience, covering prescription, collection, and administration. Furthermore, they highlight that *'stipulating unconditional and unquestionable adherence to prescribers' instructions as our goal, in most cases, is not justified if the patient has not made an informed choice about taking their medication'* (Horne, et al., 2005, p. 37). Therefore, we need to consider the benefits

of patient engagement and informed choice, which will be discussed in the following section by defining adherence and what this means for a patient with IBD.

1.2 Medication adherence: Taking a holistic view

Adherence to medication is a complex and dynamic phenomenon, which relates to the patient, health system, and broader socio-economic context. The non-medical definition of adherence describes it as *'attachment of a commitment to a person, cause or belief*' (Cambridge Dictionary, 2017) whereas the medical definition defines adherence as '*the degree to which a patient correctly follows medical advice, commonly referred to medication or drug compliance'* (Medical Dictionary, 2017). In order to understand adherence behaviours, the term has been segmented into two groups: unintentional and intentional non-adherence. Unintentional non-adherence is considered as passively inconsistent medication-taking behaviour, also defined as forgetfulness or carelessness, whereas intentional non-adherence is an active decision of the patient to refuse their medication (Gadkari & Mchorney, 2012). Both intentional and unintentional non-adherence results in a lack of compliance to the medication regimen, and accounts for why patients fail to show improved health outcomes and an overall enhanced quality of life (DiMatteo, Giordani, Lepper & Crogan, 2002). Gadkari and McHomey's (2012) systematic review suggests that over the last decade, intentional non-adherence is, in fact, driven by patients' beliefs about their treatment, disease, and prognosis, and by their personal subjective experience of their medication. They recommend that developing an intervention that focuses on and integrates patients' personal beliefs about their treatment may remove preconceived negative attitudes and address both intentional and unintentional non-adherence.

There are several adherence models that attempt to identify and explain the different aspects of patient behaviour and the underlying belief structure. Leventhal's (1987) common

sense model of illness representation suggests that self-regulation is a function of the representation of health threats and coping mechanism adopted by the individual (Leventhal, Diefenbach et al., 1992). In contrast, the Necessity Concerns Framework (Hornes, et al., 1999; Hornes, 2005) measures the individual's illness beliefs about the necessity of medication, which then explains the beliefs associated with non-adherence. Although these models are robust and offer significant insight on an individual level, the focus is still very much on the specific beliefs associated with the diagnoses.

When considering medication adherence, research should turn its attention to a complete experience, which would ensure that we consider not only the patient but all the potential factors involved in treatment compliance. We also want to consider medication adherence as part of the experience of a condition that moves beyond a physical act of taking medication, into an examination of what it is like for a patient to live with a diagnosis, while taking into account emotional engagement, beliefs and perceptions related to the condition, the medicine they have been prescribed, and their social circumstances. Taking this holistic view and considering all the different determinants can be helpful in defining the experience of a patient. In reality, however, how receptive and engaged in their healthcare are patients, and does this influence their treatment compliance?

1.3 Shared decision-making

Patients are no longer identified as passive recipients of care; instead, there is an expectation that patients should be engaged in their treatment decisions. What are the benefits of engaged patients? Hibbard and Greene (2013) discussed the benefits of shared decision-making and found that engaged patients are more likely to take medicines appropriately and to self-monitor at home. Interestingly, the Picker Institute in Europe (2010) reported that in reality, shared decision-making is complicated, and that there are a number of implications. Questions include

'is the patient making a rational decision?', 'how knowledgeable are they?', and 'what are these decisions based on'? Concerns such as these can trigger reluctance in healthcare professionals. In fact, the review identified that there is an unbalanced ‘power’ relationship between doctors and patients, and that in order for real engagement and involvement to take place, these differences need to be addressed (Kings Fund, 2010). The importance of improving treatment decision-making suggests that clinician and patient should work together as ‘active’ partners, discussing any concerns whilst choosing appropriate treatment options (Coulter, Parsons, and Askham, 2008). The importance of a strong therapeutic agreement is essential to chronic disease management; negative attitudes to medication can interfere with patients accepting the advice offered by their physicians. In the case of IBD, the reluctance to accept long-term therapy may present a challenge if the relationship with their healthcare professional is not built on trust and understanding. Marshall (2017) suggests that patients have a vested interest in improving their health outcomes; therefore shared decision-making, if done effectively, can strengthen the doctor-patient therapeutic alliance. This would also help to empower patients, as positive self-management has been shown to have beneficial results for the overall healthcare system. Despite this, the benefits of shared decision-making do not always filter into consultations, which calls into question whether the lack of patient engagement accounts for non-adherence in IBD.

1.4 Adherence and IBD

Patients diagnosed with IBD or any long-term condition are not always treatment-compliant, and research has outlined various reasons for non-adherence amongst IBD patients. In a study by Ediger, Walker, Graff, Lix, Clare, Rawsthorne & Bernstein (2007), gender differences were found, showing that females were more likely to be non-adherent than males. Men were more likely to be non-adherent if they were employed, however, as work commitments were prioritised and medications were often forgotten. Ediger et al. (2007) explained that non-

adherence to treatment can also be a result of the patient's experience with medication, irrespective of gender. Ardizzone, Bollani, Manzionna and Porro (1999) found a link between drug palatability and drug formulation, which resulted in difficulties in swallowing the tablet, the dislike of loose powder, and unmanageable general or specific side effects of the medication, such as pain or abdominal discomfort. Similarly, D'inca, Bertomoro, Mozzocco, Vettorata et al. (2008) found that a significant reason for low treatment compliance to IBD medication was the high dose expectation and complex regimen which required patients to take medication three times a day at specific time points. Other indicators of non-adherence were due to a lack of understanding of how and when to take the medication, scepticism about drug efficacy and safety, and forgetfulness (Engel, Ungar, Haim, Levhar, Eliakim & Horin 2017). Unfortunately, the clinical implications of non-adherence to therapy in IBD patients result in an increased risk of relapsing and disease flare-up.

Consequently, the benefits of adhering to a treatment regimen are associated with better overall health outcomes (Horne, et al., 2005). Despite this, patients may not always be able to assess consciously the beneficial factors of taking their treatment as prescribed. Compliance to medication and the complicated relationship people develop regarding their diagnosis will differ for every individual: some may be very adherent, whilst others may be less. In the event that some are not compliant, there is a need to understand their reasons, which may not always be clear, as outlined in the research. So far, this review has started to outline the problems with non-adherence from a patient-engagement perspective, and now aims to uncover the complicated relationships with the beliefs one holds, illness perceptions, and medication concerns.

1.5 Illness Perception and Medication Beliefs

Illness perception is described as an organised cognitive representation, or as the preconceived beliefs patients adopt regarding their illness (Hale, Treharne & Kitas, 2007). Interestingly,

patients unconsciously or consciously balance the importance of their diagnosis with how this affects their ability to lead a 'normal' life. Research suggests that 90% of our actions are unconsciously driven, and that most of our decisions are controlled via our emotions (Simpkins & Simpkins, 2013). Acknowledging this, it is important to understand the unconscious beliefs we may hold regarding our condition, which may not always be apparent until the experience of managing a long-term condition becomes real. From a theoretical perspective, however, what does this look like and how can this be explained?

Leventhal, Diefenbach and Leventhal (1992) introduced the Common-Sense Model (CSM) of illness representation, which suggests that patients' beliefs surrounding their illness are integrated within existing schemas, which enable them to understand their condition and adopt coping strategies. The model consists of five components: (1) identity (the name/label given to the symptoms and conditions, which will differ for each patient's perceptions), (2) cause (the personal adopted ideas as to the aetiology of the condition, based on information gathered from personal experiences and health professionals), (3) timeline (the beliefs surrounding the duration of the condition, which are interchanging over the duration of the condition), (4) consequence (the beliefs surrounding how their condition will impact on their life, particularly the physical and social aspects), and (5) curability/controllability (the beliefs about whether this condition can be controlled or cured).

Leventhal et al. (1992) state that each patient develops an individualistic view that serves as the foundation of the illness beliefs, which change over time. The perceptions will evolve from the start of a diagnosis, whilst the individual is learning more about the condition and ways to cope. During this process, new representations are formed along the way, and these transition into the patient's schemas. This, in turn, contributes to our understanding of how and why patients develop personal beliefs surrounding their medication and the ways in which they view their treatment pathway. For this reason, patients with the same condition can hold

disparate views surrounding their illness, which may explain why some patients are adherent to their medication regimen and others are not.

1.6 Illness perception/medication beliefs and IBD

The multifactorial nature of medication adherence depends very much on how the patients perceive the benefits of their treatment, and on their understanding of the diagnosis. Kane (2007) found that around 60% of patients fail to adhere to their prescribed medication dose, and around 70% fail to take their prescribed medication. Often, adherence research specific to IBD has found that patients become non-adherent when they begin to question the need for medication, particularly during periods of remission (Kane, 2006). Similarly, the fear of developing an addiction to the medication limits willingness to comply with planned treatment (Lesnovska, Hjortswang & Frisman, 2010). Hornes, Parham, Driscoll and Robinson (2008) found that non-adherence to maintenance therapy was due to beliefs associated with the 'need' for therapy and the potential adverse effects of long-term treatment. Unknowingly, patients begin developing an unconscious bias towards their medications and the label of their diagnosis, as stipulated within the common-sense model of illness representation.

Subsequently, Tsianou, Giannakeas, Tsipouras, Tzallas et al. (2017) highlighted the importance of understanding the beliefs patients hold about their medication and what types of illness perceptions they develop. So far, there is an assumption that there are several different beliefs and perceptions held by IBD patients; for instance, some are associated with the drug (identity) and how it can be harmful for their health, and the overall concerns about the treatment (consequence) have all been consistently shown to be associated with non-adherence. Similarity, perceptions surrounding the necessity of the drugs can also impact the overall adherence of an individual. Ideally, understanding that the medication prescribed is in fact necessary to manage my condition would lead to adherence, but this is not always the case.

Therefore, understanding what these pre-conceived beliefs are – and then offering an interventional initiative which seeks to address these beliefs – should elicit change. Better understanding and knowledge about the treatment journey can increase patients' self-efficacy in managing their illness and can highlight any pre-existing illness beliefs and medication concerns, which, in turn, supports increased compliance (Lenti & Selinger, 2016).

The current study aims to test whether personalised text messages could be used to improve adherence in participants with informational exchange. The suitability of this approach will now be explored.

1.7 M-health: text messaging interventions and treatment adherence

The latest generation of smartphones are now considered to be handheld computers. The highly sophisticated on-board capacity and ease of access enables individuals with low computer literacy to operate this specialist technology (Boulos, Wheeler, Tavares & Johns, 2011). Similarly, the recent trends of health and consumer 'apps' are increasing. In 2010, Mobile Future announced that there had been a dramatic growth in downloading mobile 'apps' over two years, which had risen from 300 million in 2009 to five billion in 2010.

In light of this, the new generation of health interventions are moving towards digitised innovative methods that seek to support people in managing their health conditions more effectively. There are several approaches to date, which have used mobile-led tools to encourage physical activity, healthy diets, symptom management for conditions such as asthma and heart disease, smoking cessation support, post-surgical support, and general appointment reminders (Fiordelli, Diviani & Schulz, 2018, Klasnja, & Pratt, 2012, Symer, Abelson, Milsom, McClure & Yeo, 2017). Interventions delivered through mobile platforms are increasing rapidly. We do not understand the long-term benefits of these mobile interventions and how they can change health behaviours, however. Recently, the rise of mobile health or

mhealth has given researchers, psychologists, and app developers a solid foundation of what can be developed through 'good' methods of delivering technological interventions, but what have we learnt from this, and how does this further our understanding of digital health? The following discussion will explore the process of introducing mobile interventions, specifically through text messaging, and the implications and benefits of adopting this approach within this present study.

1.8 Text Messaging Interventions (TMIs)

Mobile phones are becoming highly accessible tools, whilst text messaging has become one of the most frequently used methods of communication. Interestingly, according to published research, healthcare agencies, researchers, and academics have taken the leap in developing various text messaging interventions which seek to improve health outcomes and change health behaviours. Research measuring the success of text messaging interventions (TMIs) has been published since 2002, with the first study of this kind focusing on mobile messaging and asthma (Neville, Greene, McLeod & Surie, 2002). Since 2002, there have been a number of papers testing the impact of text messages as part of a health intervention, or as a standalone tool (Gerber, Stolley, Thompson, Sharp & Fitzgibbon, 2009, Franklin, Waller, Pagliari & Greene, 2006, Fjeldsoe, Marshall, & Miller, 2009). These studies have found promising results, and have shown that TMIs are targeting a variety of health conditions such as weight loss (Gerber, et al., 2009) and chronic health conditions such as asthma and diabetes (Franklin, et al, 2006, Petrie, Perry, Broadbent, & Weinman, 2012).

1.9 Advantages and disadvantages of text messaging interventions

Text messaging interventions (TMIs) are noticeably low-cost and adaptable, and the content of the messaging is quite flexible. This simple but sophisticated method has the capacity to reach a multitude of people across the globe. In addition, TMIs have a number of qualities such as

offering personalised, time-specific messages, and the ability support reinforcement through repetition. Furthermore, this method can be significantly effective for those who use their mobile device frequently and enjoy communicating via this process (Hall, Lewis & Bernhardt, 2015). Mobile statistics have shown that 99% of sent text messages are opened, while 90% of all mobile text messages are read within three minutes of being received (Hall et al., 2015). Therefore, we can assume that sending health messages via this mode of communication will be accessible, effective, and measurable.

TMIs can be relatively successful, but developers should be mindful of how they deliver the messages. A recent review found that interventions that used personalised messages and messages of unpredictable frequency over the course of the intervention were more successful than interventions that offered a fixed messaging frequency (Head, Lannorina & Harrington, 2013). This finding was similar to Vervloet, Linn, Weert, Van, Bouvy, and Dijk's (2012) systematic review. This review specifically focused on the effectiveness of electronic reminders such as SMS, audio/visual reminders, pagers, and beeper systems. Within this critical review, non-adherent patients became adherent over time in all but two of the thirteen studies. The two that were not successful were due to the frequency of the messages, as weekly reminders were deemed more appropriate than daily. The authors concluded that electronic reminders lead to short-term improvements in treatment compliance, but recommended that tailoring the content of the messages is helpful for long-term change. The significance of reminder messages was ignored when reminders were sent daily, regardless of whether the patient had already taken their medication or not. Vervloert et al. (2012) argue that sending daily reminders develops a habituated attitude, which has a negative influence on the patient. Instead, the authors of this review suggest that weekly messaging or developing a real-time monitoring module which only intervenes when a patient misses a dose is significantly more

acceptable and realistic. In comparison, SMS reminders were more effective than electronic reminders ERD and beeper technology.

It should still be acknowledged, however, that TMIs may not always be the best method to offer all patients, and that the suitability of this type of method is dependent on what the researcher hopes to achieve. The non-human method of interacting and, importantly, the intrinsic motivations to reflect on the messaging can be a barrier to the success of this approach. Bandura (1977) described self-efficacy as an internal constraint, which can be targeted via verbal persuasion. Those with high self-efficacy are more likely to believe in their ability to make a change and to persist, regardless of the difficulties. Low self-efficacy entails the opposite: lack of self-confidence in persisting with the change, and the belief that 'I can't do it.' Therefore, it is important to consider those who may not have high self-efficacy and to whom text messages may be a barrier to making a change. Studies evaluating TMI have found that messages can improve adherence in patients on a short-term basis, but that frequency of messaging is as important as the type of personalisation approach offered by the intervention.

1.10 Text messaging interventions and IBD

Adherence is a key factor and one of the main reasons why people with IBD relapse, as discussed earlier. Adhering to the treatment regimen requires patients to follow a standardised treatment process including various medication demands. Research suggests, however, that only around 43% to 60% of patients with IBD are adherent to their oral medication (Greenly, Kunz & Walters, 2013). Therefore, finding alternative measures to address non-adherence is vital for this group.

Studies evaluating IBD adherence to medication using behavioural interventions focusing on self-management techniques via SMS have found that TMIs, when offered to paediatric IBD patients, resulted in a significant increase in medication adherence over a period

of 6-12 months. The modified text messages sent to patients were simple, short messages that only targeted adherence to medication and not illness beliefs or medication concerns (Keefer, Kiebles & Matinovich, 2011, Miloh, Shub, Montes, Ingebo, Siber et al., 2017). This translates into other chronic conditions, as established in Dekoekkoek, Given, Given, Ridenour, Schueller and Spoelstra's (2017) review. They found thirteen published TMI studies have all validated the benefits of text messaging as an intervention to improve medication adherence across different chronic conditions, besides IBD.

1.11 Summary of the review

IBD is a chronic bowel condition and consists of Crohn's and ulcerative colitis. So far, this review has found that identifying an individual's illness beliefs and medication concerns can help target the specific belief, thereby improving various other domains such as quality of life, adherence to medication, and better overall self-management of the condition. It has also been established that offering text messaging as an interventional function and standalone initiative has shown significant results in terms of adherence.

In the existing research, there is a mutual understanding that patients would like to increase engagement with their treatment and would like to have the right information about all the possible support they can receive in order to manage their IBD more effectively. Moser et al. (1995) found that patients' worries and concerns were related to ambiguous information. They concluded that better information about IBD and psychosomatic counselling for patients showing levels of concern could improve their quality of life and clinical care. Similarly, Jackson et al. (2010) found that psychological distress, patients' beliefs about medication, and doctor-patient discordance were associated with non-adherent behaviour. Acknowledging these needs suggests that an intervention should follow and that some of the following basic

principles should be taken into account: (1) measuring illness belief, (2) identifying levels of medication concerns, and (3) measuring adherence to medication.

In order to challenge and address these factors, Petrie et al. (2011) sent targeted text messages to a sample of chronic asthma sufferers in the hope of improving their adherence. The text messages were specifically related to diminishing patients' prior illness perceptions and medication beliefs that resulted in non-adherent behaviours. The results were promising: after 18 weeks, patients in the intervention group had become adherent with their inhalers, and their preconceived negative beliefs surrounding their medication had reduced, enabling them to become more confident in managing their condition. This suggests that offering patients support via a text message that addresses their medication beliefs and illness perception can improve their willingness to take their medication.

Therefore, this study proposes to replicate the methodological principles developed by Petrie, et al. (2011) but to deliver it to a sample of people living with IBD. Developing a text message initiative is a delicate and timely process, and there are several factors to consider, including frequency of messaging, content of the message, and a robust measurement strategy to capture any behavioural change, which will determine the success of the intervention. Therefore, ensuring that the methodology section is robust with a strong foundation is significant in driving the research.

1.12 Research Aim and Objectives

The overall aim of this research is to establish a pilot for a mobile text messaging intervention to increase adherence in people living with IBD. The objectives of the present study are: a) to evaluate the acceptability and suitability of the intervention and b) to provide a preliminary evaluation of responses to the intervention.

1.13 Research question

The following research questions were investigated in the current study:

(1) Is this intervention suitable for participants with IBD?

(2) Does the intervention have promise for success with the intended population?

(3) What are the benefits or negative aspects of a text messaging intervention for this group?

(4) Does this text messaging intervention alter medication and illness perceptions for participants with IBD?

It was hypothesised that participants will show changes in their illness and medication beliefs, as well as improved adherence to their medication.

2 Methods

2.1 Study design

The research design for this pilot study was a pre-test-post-test non-randomised design. Specifically, the research design was a within-subject design, which consisted of two time points (baseline and twelve weeks). All of the study participants took part in the same interventional offering in terms of frequency of messages. The independent variable was the use of tailored text messages specific to the participants' beliefs, which were pre-defined from the questionnaire measurements. The study measured the difference in adherence to medication, changes in illness perception, and medication beliefs (dependent variables).

2.2 Participants

The target population for this pilot study consisted of participants from across the United Kingdom. The sample for this study was made up of adults who have a diagnosis of Inflammatory Bowel Disease (IBD), aged 18 years and older, and who volunteered to participate in the three-month study. Participants were required to have access to a mobile phone.

2.3 Participant recruitment

Study participants were recruited via study adverts that were distributed around a university campus and local GP surgeries. Participants were also recruited via paid advertisement on popular social media sites. Facebook was chosen as the main recruiting site, as it has open access to the public and billions of daily users. A website domain was purchased and developed to assist potential participants in enquiring about or enrolling onto the study (www.crohnsdiseasestudy.org.uk). The designated website included relevant information for the study and directed participants to self-enrol by prompting them to complete an ‘I'm interested’ form. Once completed, an email notification was sent to the researcher, who then

emailed the consent form (see Appendix A) and Participant Information Sheet (see Appendix B) to interested participants. The preloaded consent form, information sheet, and information related to the study were also found on the website. Using the CONSORT process, the recruitment lasted for approximately two months (January 2014 until March 2014). Figure C2 illustrates the pathway of recruitment which led to the end of the research study.

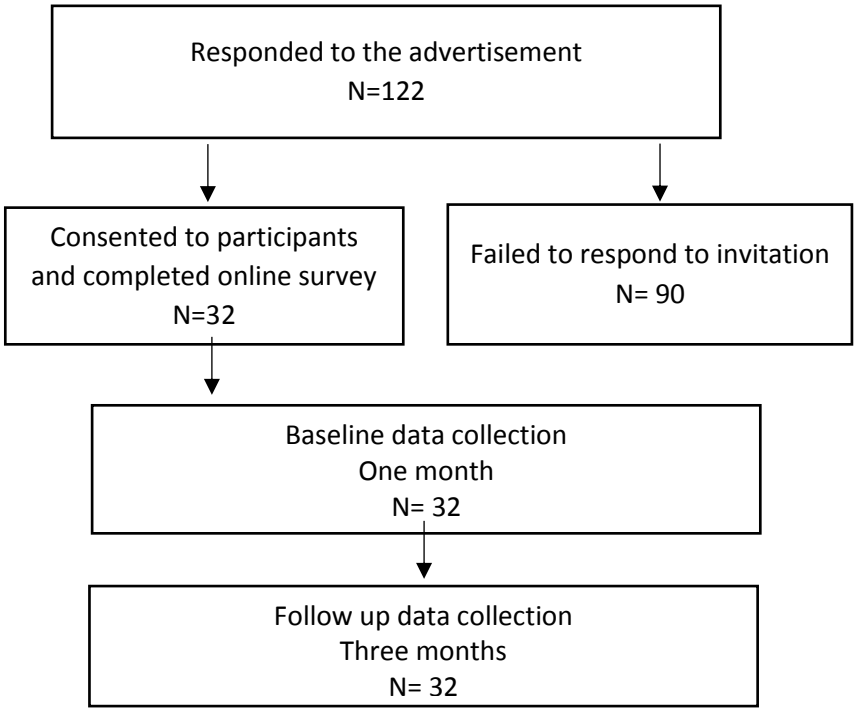


Figure C2: Consort diagram for the IBD TMI pilot study

There was a high number of interested participants at the beginning of the recruitment phase of this project (N = 122). Of the 122 who completed the 'I'm interested' form, 32 signed and returned the consent form and completed the pre-questionnaire. Ninety potential participants did not respond to the invitation, accounting for an overall 26% recruitment rate. On completion of the study, all 32 participants completed the post-questionnaires. There were no incentives offered to participants.

2.4 Data collection

The data collection process was accomplished in two phases, once at the beginning of the study, and once again at the end of the study. Pre- and post-questionnaires were validated using scales which have been tested for reliability. Below is the outline of each questionnaire and scoring mechanism.

2.4.1 The Demographic Data Questionnaire

The *Demographic Data Questionnaire* was created by the researcher and collected basic medical history, age, gender, year of diagnosis, ethnicity, and medication usage.

2.4.2 The Brief Illness Perception Questionnaire

The Brief Illness Perception Questionnaire (BIPQ; Broadbent, Petrie, Main, & Weinman, 2006) measured how a patient perceives their illness. The sub-constructs of illness perception cluster around five significant themes: identity, cause, timeline, consequences, and cure control. The following are some examples related to the sub-constructs: 'Identity' – *'how much does your illness effect your life?'* (0= *'no effect at all'* and 10 = *'severely effects my life'*) and 'Timeline' – '*how long do you think your illness will continue?'* (0 = 'a very short time' and 10 = 'forever'). Each item is scored on an 11-point Likert scale. Total scores for this questionnaire were calculated by summing the item scores together and reverse scoring items 3, 4, and 7. A higher total score reflects a more threatening view of the illness, whereas a lower score indicates benign illness representation. The BIPQ has shown good test-re-test validity in six illness group psychometric properties, and has been shown to measure patients' cognitive and emotional representation of their illness, including consequences, timeline, personal control, treatment control, identity, coherence, concern, emotional response, and causes (Broadbent, Petrie, Main & Weinman, 2006).

2.4.3 Beliefs about Medication Questionnaire

Beliefs about Medication Questionnaire (BMQ; Weinman, Petrie, Moss-Morris, & Horne, 1996). BMQ assesses both the general and specific medication beliefs of a participant. The objective of this questionnaire is to help the researcher understand why some people fail to adhere to their medication by learning about their medication perception. The BMQ is divided into two sections: BMQ-General (sub-scales: Overuse and Harm, 4 items per sub-scale) and BMQ-Specific (sub-scales: Necessity and Concerns, 5 items per sub-scale). The specific section assesses patients' beliefs about medications prescribed for an illness and comprises two scales assessing personal beliefs about the necessity of medication prescribed for controlling their illness. Sections included *'my health at present depends on my IBD medicine'* (5 statements) and concerns about the potential adverse consequences of taking it i.e. *'I sometimes worry about becoming too dependent on my IBD medication'* (5 statements). Each statement has 5-point Likert scale answers (strongly disagree, disagree, uncertain, agree and strongly agree). The answers are scored from 1= 'strongly disagree' to 5 = 'strongly agree', and the points of each scale are summed to give a scale score. Higher scores indicate stronger beliefs in the concepts of the scale (high/low necessity and high/low concern).

2.4.4 The Adherence Measure

The Adherence Measure (Morisky, Green & Levine, 1986) measured levels of medication adherence. Using one item question from the 4-item questionnaire, the adherence measure was presented to participants through the following question: 'How often do you forget to take your medication?' Participants were asked to rate their level of adherence on a scale of 1 ('never') to 6 ('very often'). The question was adapted from the validated Morisky Medication Adherence Scale (MARS). For the purposes of this study, the interest lay in understanding how

often patients would forget to take their medication, as opposed to learning about the other variables within this measure (Morisky, Green & Levine, 1986).

2.5 Procedure

Once the initial questionnaires were completed and received by the researcher, the information was logged and an email and ‘test' text message were sent to the participants to confirm that their number was working and that they could receive text messages from the programme number. Participants were prompted to reply to the email and to confirm their receipt of the message. Over the course of the twelve weeks, participants were sent tailored text messages based on their baseline BIPQ and BMQ scores. Messages were sent randomly – but specific to each BIPQ scores – and participants who scored high or low on each of the targeted beliefs were sent messages from that category. If participants did not score high or low in the target beliefs, they were not sent text messages relating to that belief. The frequency of these messages differed over the twelve weeks (illustrated in Table 2.1). A completed template of messages which included allocated times for each message was preloaded onto a text messaging programme every week in order to ensure accuracy of messages, and this was checked by the researcher on a weekly basis prior to the messages going out to participants. At the end of the twelve weeks, participants were prompted to repeat the pre-screener questionnaires, including the BMQ, BIPQ, and the adherence scale. Pre-and post-scores were used to measure the efficacy of the programme.

2.6 Smartphone text messages – process plan

Table 2.1 outlines the frequency of text messages sent to participants. There was a decrease in messages sent from weeks 4-8, with an increase to three messages per day from weeks 8-12. Participants received targeted, tailored text messages related to their illness and medication beliefs. Text messages were specific to the targeted beliefs listed in Table 3. Each belief

consisted of seven messages, giving a total of 112 messages. The aim of the messages was to address participants' prior illness and medication beliefs relating to their condition.

Table 2.1: Frequency of text messages

Duration	Frequency of messages
Week 1-4	2 text messages per day
Week 4-8	1 text message per day
Week 8-12	3 text messages per day

Table 2.2: Segmentation example process of how messages were tailored per participants Participant X (BMQ and IPQ)

Illness Perception Questions	Scores	High/Low on average	Example Messages
Q1 Consequence	7	No messages needed	
Q2 Timeline	10	**High**	Crohn's is always present; your treatment can help it go into remission.
Q3 Personal Control	5	No messages needed	
Q4 Treatment Control	0	**Low**	When you have Crohn's Disease you will not have the same symptoms all the time, sometimes you will have no symptoms, this is when you are in remission.
Q5 Identity	8	No messages needed	
Q6 Illness Concern	8	No messages needed	
Q7 Coherence	0	No messages needed	
Q8 Emotional Representations	5	No messages needed	

Medication Beliefs Questionnaire	Scores	High/Low on average	Example Messages
Medication Necessity	1.5	**Low**	Medication is there to help you manage your conditions

Table 2.3: IPQ- extracts of the different text messages which were sent to participants

IPQ scale	Example text messages
Low identity (low symptoms)	'Coming off your medication is likely to worsen your symptoms'
High identity (high symptoms)	'Abdominal pain, diarrhoea, weight loss and bloody stools can be managed if you follow your treatment plan, this will improve your symptoms.'
Low consequences	'Crohn's Disease is a condition that needs regular care and attention.'
High consequences	'Managing your Crohn's Disease means getting on with life.'
Short timeline	'Your Crohn's Disease is always there even when you don't have symptoms.'
High timeline	'Your Crohn's Disease will always be there but you can learn to manage it and accept it.'

Table 2.4: BMQ extracts of the different text messages which were sent to participants

BMQ scale	Example text messages
Low personal control	'Control your Crohn's, don't let it control you'
High personal control	'I'm doing my best to cope with my Crohn's'
Low treatment control	'Using medication reminders can help you control Crohn's Disease'
High treatment control	'Being in control of your medication means you are likely to benefit from symptom reduction'
Low concern	'Studies have shown that patients' quality of life worsens during relapse'
High concern	'Worrying rarely helps people to come up with solutions. Your worrying just goes in circles'
Low understanding	'Don't worry your medication may not work immediately it can take up to 3 – 6 months before you start to feel improvements'
High emotional response to illness	'Making a note of new enjoyable activities can help you to improve your quality of life'
Medication concern high	'Taking medication after eating or in two smaller doses each day instead of all at once may help reduce side effects such as vomiting and nausea'
Medication necessity low	'Your medication works best when taken every day'

2.7 Analytic Strategy

The data were analysed using the statistical package SPSS version 22 (SPSS Inc). Based on the aims of the research, changes in illness perception scores pre- and post-process were compared using a parametric paired sample *t* test. This was to test for any significant differences in participants' illness perceptions within the sample group over the period of three months. In order to use the *t* test, the assumptions were met, ensuring that the data was normally distributed, the variance between the groups were equal, and the sample size was adequate (at least 30 cases).

The research aimed to measure a change in participants' medications beliefs (necessity and concern) over three months, and a paired sample *t* test using the scores (pre/post) was conducted to examine the mean differences within the group. In addition, participants did not drop out of the study over the three months. The final complete data set did not include any missing data.

Although this is a pilot study, the post-screener offered space for participants to include qualitative feedback of their experience if they had any additional insight or recommendations regarding the acceptability and suitability of the intervention.

2.8 Sample size

Lancaster, Dodd, and Wiliamson (2004) recommend that the sample size for a pilot study should be 30 participants. Other evidence has suggested that a sample size between 24-50 participants is justifiable for such a study.

2.9 Ethical approval

All aspects of the research methodology reported have been reviewed and approved by the City, University of London ethics committee. The research proposal was submitted to the ethics committee in accordance with the British Psychological Society code of human research ethics framework (BPS, 2014). There were low risks associated with this study and the measures administrated to the participants. Participants were given a full description of the study outlined within the information sheet (Appendix 1) and a consent form (Appendix 3) which was explained and signed prior to the commencement of the study. Participants had the choice to opt out at any time during the twelve weeks or up to the point of write-up, without declaring a reason for withdrawal. Participants were anonymised, and their confidentiality was respected by replacing their names with ID numbers. Any information collated from the research was stored in a secure location and documents stored on a PC were password-protected. At the end of the twelve weeks, participants were debriefed and offered a chance to read the completed research paper if published. If participants were interested in the outcome of the study, there was an option to have a summary of the results sent out to them via an email request.

3 Results

The study sample consisted of 32 participants with a mean age of 42 years all of whom completed pre- and post-questionnaires. Out of the 32 participants, 39% were white British, and 68% females. Demographic characteristics of study participants are shown in Table 3.1.

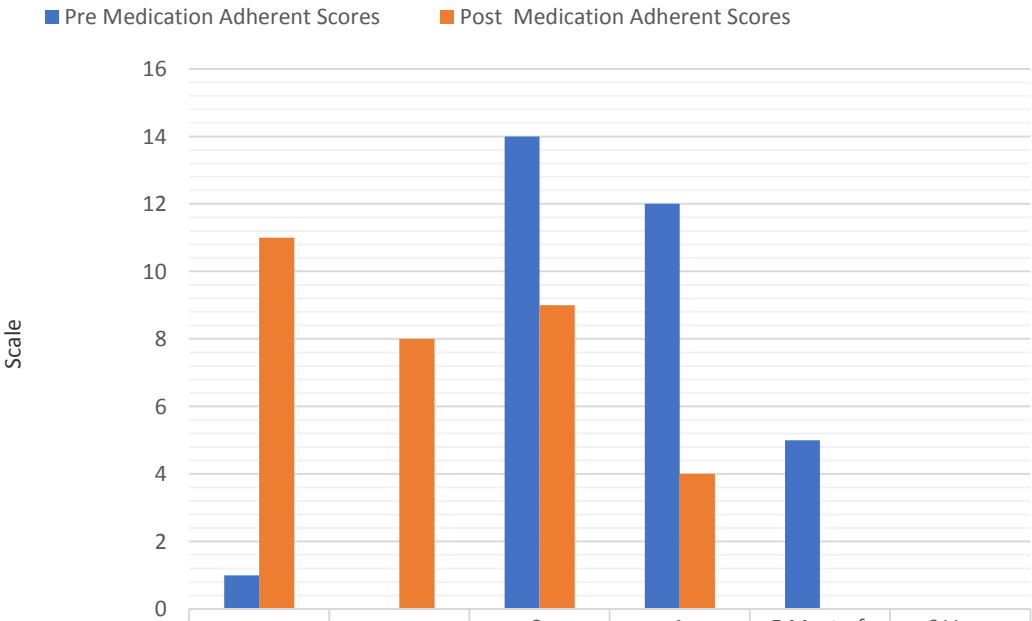
Table 3.1: Participants demographics characteristics (*N*=32)

Variables		
Ethnicity		**N (%)**
	White British	32 (39%)
	Black British	3 (4%)
	Pakistan	2 (2%)
	Sikh	1 (1%)
	Irish	1 (1%)
Gender		
	Female	22 (69%)
	Male	10 (31%)
Age	Range: 25-70 years, Mean: **42.7 (9.16)**	
Year of diagnosis	Range: 3 months – 31 years	

3.1 Medication adherence

Self-reported adherence was measured at baseline and at the end of the twelve weeks. Participants were asked '*how often do you forget to take your medication*?' Figure C3 below illustrates the pre- and post-process self-reported medication adherence scores per participant over the three months. A total of 32 participants rated how often they forgot to take their medication on a scale of 1-6 (1= never and 6= very often).

Medication adherence increased post-intervention, as 'forgetting to take medication' decreased whilst 'never' forgetting to take medication increased over time. The rate of self-reported adherence at pre-intervention was 1 (3.1%) and there was an increased level of change over there months, with the rate of adherence at 11 (34.4%) at the three-month interval. This suggests that the tailored text messages increase medication adherence.



	1 Never	2 Rarely	3 Ocassionally	4 Sometimes	5 Most of the time	6 Very Often
Pre Medication Adherent Scores	1	0	14	12	5	0
Post Medication Adherent Scores	11	8	9	4	0	0

Figure C3 Self-reported medication adherence rating

3.2 Illness perception

Table 3.2 (below) outlines the pre-and post-results taken from the illness perception questionnaire. There was no overall significant difference in illness perception, but significant changes occurred in three categories of the IPQ: concern, coherence, and treatment control. A paired sample *t* test reported an increase in treatment control and coherence, and a decreased level of concern surrounding their condition. This analysis shows that text messages did change the beliefs in a direction consistent with an increase in adherence.

Table 3.2 Illness perception questionnaire analysis

	Participants (N=32)		**Parametric Analysis**
	Baseline Mean (SD)	**12 Weeks Mean (SD)**	**Paired Sample T test**
Consequences	6.0 (2.8)	6.63 (2.5)	t = (31), -1.44, p<.158*
Identity	6.38 (2.1)	7.03 (2.4)	t = (31), 1.56, p<.129*
Timeline	9.81 (.59)	9.88 (.33)	t = (31),-.495, p<.625*
Concern	**7.53 (2.1)**	**6.66 (1.8)**	**t = (31), 2.35, p<.025****
Personal Control	6.13 (2.8)	6.13 (2.6)	No Change
Coherence	**3.09 (2.3)**	**6.53 (3.0)**	**t = (31), -5.63, p<.001****
Treatment Control	**3.91 (1.9)**	**6.72 (1.9)**	**t = (31), -6.04, p<.001****
Emotional Representation	6.75 (2.5)	6.72 (2.2)	t = (31), .076, p<.940*

***p<0.05**

****p < .01**

The paired sample t-test indicated a significant change in the data set when comparing pre- and post-intervention mean IPQ scores. In particular, there was a change in concern at baseline (M= 7.53, SD = 2.1) and at twelve weeks, (M= 6.66, SD = 1.8) which was significantly lower post-intervention, with *t* = (31), 2.35, p<.025. This was the same for coherence, at baseline (M= 3.09, SD= 1.9) and at twelve weeks (M= 6.53, SD = 3.0), and was significantly higher post-intervention, with *t* = (31), -5.63, p<.001. Finally, treatment control at baseline (M= 3.91, SD = 1.9) and at twelve weeks, (M= 6.72, SD= 1.9) was significantly higher at twelve weeks, with *t* = (31), -6.04, p<.001. There was no significant change in consequences, identity, timeline, and emotional representation, as represented in Table 3.2.

3.3 Medication adherence

3.3.1 Descriptive statistics

The baseline means concern score of 3.08 (.57) in comparison to the twelve weeks mean concern score of 2.89 (.59) is statistically different; t (31) = 2.16, p<.038, r= .36 (medium effect). This suggests that participants' level of concern towards their medications changed during the twelve weeks. When comparing the baseline necessity mean scores of 2.37 (.55) with post-intervention necessity mean scores of 2.39 (.74), no statistical significance was evident from the t test*;* t (31) =.171, p>.865. This change is consistent with an increase in adherence to medication, suggesting that when participants' level of concern is decreased, they are more likely to adhere to their treatment.

Table 3.3: Medication Belief Questionnaire

Medication Beliefs	Baseline Mean (SD)	12 Weeks Mean (SD)
Medication Concern	3.08 (.57)	2.89 (.59)
Medication Necessity	2.37 (.55)	2.39 (.74)

3.3.2 Percentage rating of each question within the BMQ

Table 3.4 (below) presents baseline and post-intervention self-reported participant measures for the Beliefs about Medication Questionnaire. Interestingly, the results indicate that 66% of participants at the baseline were aware of the necessity of their medication: *'without my medication I would become ill.'* This suggests that they agree that their health is dependent on their medication. Understanding the links between their health and medication increased post-

intervention, with 71% of participants reporting that their health was reliant on their medication intake.

Concerns relating to the long-term effects of the medication were significantly high: at baseline, 91% of participants agreed *'I sometimes worry…'*. This concern was also evident when 62% of participants agreed that *'having to take medicine worries me.'* These worries decreased post-intervention, however, with only 37% agreeing that they were still worried about their medication.

Table 3.4 shows that a change in each domain has occurred from baseline to-post intervention; this suggests that sending tailored text messages can change an individual's beliefs surrounding their medication.

Table 3.4: Percentage of participants agreeing/strongly agreeing with statements from the Belief about Medication Questionnaire

Necessity scale	**N**	**Percentage Agreeing or Strongly Agreeing**	
		Baseline (0 Weeks)	**Post (12 Weeks)**
My health, at present, depends on my medicines	32	66%	84%
My life would be impossible without my medicines	32	50%	62%
Without my medicines, I would become very ill	32	66%	71%
My health in the future will depend on my medicines	32	59%	75%
My medicines protect me from becoming worse	32	62%	87%
Concerns scale			
Having to take medicines worries me	32	62%	37%
I sometimes worry about the long-term effects of my medicines	32	91%	87%
My medicines are a mystery to me	32	25%	21%
My medicines disrupt my life	32	37%	37%
I sometimes worry about becoming too dependent on my medicines	32	50%	43%

4 Discussion

4.1 Summary of main findings

The research aims for this pilot study was to investigate the suitability of this interventional approach within the IBD population. If the method of sending personalised text messages was successful in changing behaviour, the positives and negatives of this approach could be defined. Aside from the practicality of this method, the aim was to also measure whether text messages could alter medication and illness perceptions in people diagnosed with IBD. It was hypothesised that participants would show changes in their illness and medication beliefs, as well as improved adherence to their medication. Further discussion will elaborate on the success of this approach, based on the previously defined aims.

This research evaluated the efficacy of personalised tailored text messages. Personalisation was based on participants' illness perceptions and medication beliefs. These results were analysed over a twelve-week period, and baseline and post-test results were compared for each questionnaire administered. A statistical analysis was carried out in order to measure the significance of the data. The results found that a significant change occurred over the period of interest.

Self-reported medication adherence was shown to improve over the twelve weeks, with participants stating that they had started to '*never or rarely'* miss their medication dose. There was no specific set of text messages for the adherence category; instead, messages were tailored to each participant's specific illness and medication beliefs, and this was the approach taken throughout the study.

The illness perception questionnaire held a range of categories such as consequence, identity, timeline, and concern, which detailed specific beliefs relating to their diagnosis. This

questionnaire tool allowed for an in-depth overview of significant areas, onto which tailored text messages were mapped.

Results from the illness perception questionnaire were compared pre- and post-intervention; evidently, a significant change occurred for three domains within the IPQ, namely concern, coherence, and treatment control. Participants' levels of concern surrounding their condition reduced post-intervention. Coherence and treatment control increased post-intervention, which suggests that participants felt more in control of their condition, possibly as a result of the daily positive IBD messages which enabled participants to become more aware of the demands of their condition. The results support prior research which posits that personal beliefs about IBD play a significant part in the adjustment to the diagnosis (Leventhal et al., 1992; Hornes et al., 2008; Tsianou et al., 2017 & Lenti et al., 2016). So far, the hypothesis can be accepted, as the results have indicated a change in adherence, illness perception, and medication beliefs. In order to offer a detailed explanation of these findings, however, discussion will outline how and why these changes may have occurred, and will investigate whether this was a true experimental effect, and whether these findings are consistent with the common-sense model of illness representation.

4.2 Interpretation of main findings based on the literature review

4.2.1 Medication adherence

Measuring adherence was instrumental in understanding whether text messages were eliciting any type of behavioural shift, particularly in terms of a change in medication. Similarly to the Petrie et al. (2011) study, this research has identified a positive medication adherence trend over the period of three months. When comparing the pre- and post-measures, participants were more likely to ‘never’ forget to take their medication post-intervention. Although this is a positive finding, understanding the occurrence of this shift will help in evaluating the

methodology. Earlier discussions and the reviewed literature on adherence suggested that sending targeted messages specific to the individual, instead of generic messages, is generally more acceptable (Dekoekkoek, 2017; Head, 2013). Similarly, there is a consensus that patients may not always be willing to admit that they are not adhering to their medication. Given this, offering an alternative strategy for identifying patients and informing them about the benefits of medication via messaging has been shown to be effective in addressing some of the underlying concerns relating to non-adherence. Therefore, this type of intervention can be applied to those who may not always be in touch with their healthcare providers, and can offer a means of challenging any pre-conceived, unconscious assumptions regarding their medication.

4.3 Illness perception scale

4.3.1 Level of concern

Patients are generally concerned about their diagnosis, treatment, and general day-to-day factors surrounding their condition. Finding a tool which measures this level of concern can contribute to our understanding of why some individuals intentionally or unintentionally reduce or forget to take their medication as prescribed by their healthcare professional.

Participants' levels of concern was measured via the illness perception scale, and the analysis reported a significant difference over the period of three months. This finding was consistent with previous research (Petrie et al., 2011). Indeed, this change is positive, but in order to help understand why there was a behavioural shift, we need to recognise why patients may hold these concerns. As discussed earlier, McCarthy and Sahm's (2014) systematic review stated that the most common themes for non-adherence was patients' knowledge and attitude surrounding their medication, and the negative beliefs they associated with their treatment, including about side effects of the medication. They found that these perceived concerns influenced patients' decisions to become non-adherent. Similarly, Moser (1995) outlined some

of the significant concerns held by IBD patients, including beliefs surrounding the possibility of having an ostomy bag, the general effects of medication, surgery, the uncertain nature of the disease, and lack of energy.

With this acknowledgment, both studies recommended that our understanding of the level of information patients have about their condition and any disease-related concerns should be queried and considered within clinical practice, thereby equipping patients to feel more empowered to self-manage their condition. These findings are consistent with Gadkari and McHomey (2010), who also believe that removing or altering patients preconceived negative beliefs surrounding their medication would increase medication adherence.

This study has been able to illustrate the links between the benefits of educating patients about their condition by reducing the number of preconceived concerns held by the individuals via text message. The process of sending personalised text messages – addressing topics such as ‘the effects of medication’ and ‘the importance of managing your diagnosis’ – has been shown to improve and reduce significant levels of concern.

4.3.2 Coherence

Coherence, like the other illness perception variables, was measured throughout this research. Participants' coherence positively increased post-intervention; this change suggests that respondents felt more in control of their condition, and that receiving daily positive IBD messages enabled participants to become more aware of what their condition entails. Previous research has outlined the importance of coherence, and the benefits of addressing this. The concept of coherence is used to describe a person’s capacity to respond to stressful situations; given the complexity of living with IBD, personal resources and capabilities are often drawn upon in response to managing the condition. Although coherence is a complex variable which will differ for every individual, we can measure and challenge the ability to feel motivated and

to cope with the condition, and we can develop an understanding of what the different obstacles may be in order to manage them effectively (Opheim, Fargermoen, Jorgensen, Berklev and Moum, 2014).

Given the significant increase in coherence post-intervention, we can assume that this method of addressing motivation and tackling challenges has been successful by providing clear and coherent information about IBD, which is an important protective factor against psychological stress. Findings such as this further support the imperative nature of tailored text messages, as this method opens many different communication pathways and permits the researcher to tackle other underlying factors such as coherence, which other methods may neglect.

4.3.3 Treatment control

The results from the study found a significant change in participants' perceived ability to control their treatment when comparing pre- and post-measures. The final significant variable within the illness perception scale suggests that over the twelve weeks, participants noticed a change in their ability to control their treatment or feel a sense of control.

A lack of understanding about treatment can significantly influence how a patient may accept their diagnosis, or adhere to their treatment regimen. Patients fear a loss of control over their treatment decisions, as these are mostly left to the clinician. Therefore, taking responsibility for their treatment can represent delicate territory for some. Nevertheless, offering strategies to cope with and understand the importance and purpose of treatment for IBD can help to empower patients to feel a part of the process, instead of merely receiving and following orders. Effective management to change beliefs from *'I am not in control of my treatment'* to '*I know I can make the right treatment decisions'* can be empowering and motivating. The results from this study found a significant increase in treatment control after

the twelve weeks. Participants felt more involved with their treatment, through understanding how their treatment was helpful in the short- and long-term, together with outlining the consequences of non-adherence. This was yet another positive finding, which supports the idea of sending targeted text messages.

4.4 Beliefs about medication scale

The Beliefs about Medication Questionnaire (BMQ) was used to measure participants' perceived and actual beliefs associated with their medication and treatment, and to investigate whether there was a difference between the concern about and necessity for medication. A significant change in concern was illustrated from the results. Participants who had high medication concern at the start of the study finished with a reduced level of concern. As discussed earlier, Tsianou et al. (2017) suggested that the most important factor affecting compliance with medication regimens is how one feels about the drugs they are prescribed, which then contributes to how successful they are in following the doctor's advice. This is of interest, as this study has supported this assumption and confirmed that patients' levels of concern around medication can be addressed through some type of interventional or conversation process. In practice, this should alter the concern threshold and increase patients' awareness of necessity for their treatment. Although there was a significant change in levels of concern around medication, this was not transferred to heightened awareness of the necessity for treatment. Over the period of twelve weeks, the results found no significant change in participants' beliefs about the necessity of treatment. This is not to say that the text messages did not address this, however; another explanation could be that at baseline, participants' understanding that their treatment was necessary for their condition was already high, which is why a change did not occur.

4.5 What is the added value of this research?

This research aimed to uncover, challenge, and change the cognitive representation of IBD using text messages. An increase in treatment control and coherence represents the emergence of positive beliefs about controllability and personal understanding of IBD (Hill, 2010). Addressing these variables in isolation without the other measures has already shown a positive change with this technique. When comparing the outcomes of this study in combination, however, we can agree that this methodology has been positive and can confirm that offering non-conventional alternative strategies via technological interventions can be effective in targeting hard-to-reach patients across different regions. Therefore, this study has added to the IBD literature and has re-confirmed the findings of Petrie et al. (2011) in their asthma intervention. This transferable method can be applied to different therapy areas and offers the possibility of a significant change in attitudes and beliefs surrounding medication and diagnosis.

4.6 Strengths and Limitations of the study

We can agree that text messaging can elicit behavioural change in relation to medication adherence. Mobile interventions are scalable and cost-effective, and do not require face-to-face interactions for participants or researchers. Therefore, this method enabled the researchers to attract participants from across the UK. Offering a mobile and interventional approach that is not specific to one location specific can engage participants who may usually shy away from traditional research methods. Reaching those hard-to-reach participants is significant, especially for research that focuses on adherence, where that patients are not always willing to disclose their behaviours around their treatment expectations.

Text messaging interventions take on the form of a narrative approach, permitting the researcher to devise effective and meaningful messages. This descriptive method encourages the delivery of informative health messages. It encourages self-management and self-belief, as the change comes from within the patient, and the messages act as triggers to encourage change.

One participant observed: *'I enjoyed taking part in this study, and I honestly felt the last text was a really positive boost ('You are doing your best to manage Crohn's). At the time of receiving this, I was flaring more than I had been and it really made me feel positive.'* This suggests that the text messages were not only supportive in encouraging medication intake, but that participants also utilised the messages as a source of positive encouragement and reinforcement.

This method, however, has also been described as repetitive. One participant noted that *'at the start of the study I found the texts to be a great reminder but as the end of the study neared I found myself ignoring the texts as I had got used to them.'* Messages were repeated over the twelve weeks in order to encourage continuous, long-term change, but some participants may have found this frustrating. This was an expected response from a twelve-week study, even though messages were only repeated three or four times over the course of the trial. This study has proved that texts can be offered as a stand-alone intervention or in conjunction with other interventions, such as web-based interventions. Nonetheless, lessons learned from this study and its recommendations can be implemented in further text message studies.

4.7 Future research

This study has offered a good example of how text messaging interventions can be effective in the IBD population. This followed the methodological principles outlined in an asthma study by Petrie et al. (2011), and has shown similar successful results. A recommendation to test this

method in other chronic conditions can be considered; an extension of this study can also be suggested. As this was a pilot study, a further twelve weeks could be added to give a six-month trial period, which will further test the efficacy of mobile text messaging trials, in conjunction with a control group. There are, of course, other variables that could be introduced within this study design, such as quality of life measurements and or motivational measures of self-efficacy, in order to test whether the messages have increased intrinsic motivation and if this change can improve participants' quality of life.

4.8 Implications for Health Psychology

This study reinforces the importance of alternative methods of behavioural change and recommends the introduction of such programmes in a wider context. Although mobile health is steadily increasing within the healthcare domain, studies such as this can help educate and enforce change. These findings can contribute considerably to the development and evaluation of other TMI interventions, and verify the importance of developing subtle, innovative techniques that are based in health psychology theories. The results from this study offer direct practical relevance, and add to the literature within the field of mobile technological behaviour change interventions. The specific focus of this investigation was to measure both likelihood of success and the change in participants' illness and medication beliefs through TMIs. The results from this study highlighted the importance of understanding patients' pre-defined illness and medication beliefs when prescribing treatment. Often, healthcare professionals (HCP) prescribe treatment with no evidence that the patient will adhere to their treatment. Using measurement techniques to identify the individual's beliefs and perceptions, however, can help direct the HCP to offer interventional techniques in the form of health literature, TMIs, or online interventions. This study has shown that such techniques work within the IBD population; changes within doctor-patient consultations may, in the long term, ensure that

patients have a better understanding as to why adhering to their treatment is beneficial to the overall management of their condition.

4.9 Conclusions

This is the first study evaluating the effects of tailored text messages with IBD patients. Previous research has focused on asthma patients, as previously discussed, and has demonstrated a positive behavioural shift in beliefs and perceptions (Petrie et al., 2011). Studies that have adopted text messaging within their design have consistently shown improved health behaviour outcomes, such as quality of life improvements, increases in health literacy, decreases in concerns about medication, and improvements in self-management.

This research aimed to determine whether this type of intervention was suitable and acceptable for participants with IBD, whether it would be successful with the intended group, whether personalised text messages could change an individual's prior beliefs and perceptions, and outlined and defined the benefits of this approach. The outcome demonstrates the efficacy of mobile text messages, and shows positive results in eliciting change in prior beliefs and perceptions about individuals' diagnoses and conditions. This inexpensive and useful tool, if used correctly, can make a positive impact in areas such as illness perceptions, medication beliefs, and levels of medication adherence for IBD patients. This evaluation has shown that tailoring text messages, although time-consuming, does in fact elicit positive change in areas where other techniques or methods may not be as effective.

5 Critical Analysis of the Present Study

This present research has shown promising results, however, considerations of the implications of these type of interventions need to be critically appraised in order to provide a broader view of the benefits and harms of such approaches. Different issues relating to the potential harm of digital interventions, such as adherence, text messaging and language will be discussed herein as a means to provide a greater balance to the thesis.

5.1 Potential Problems with the Digital Age

As the introduction of digital interventions are increasing with time, more and more people are accessing services and support via these methods. Technology, at times, has been accused of promoting anti-social behaviour i.e. a constant need to be check your phone, or withdrawing from social situations by playing games. Although, we can argue that the current generation is digital savvy and the majority of the UK population have access to a phone or laptop, it does not necessarily mean that they would like to receive healthcare advice via this portal. Thus, the importance which is placed upon the doctor-patient relationship comes into question when thinking about digital inventions in the healthcare setting.

Studies have highlighted, for several years now, the importance of the doctor-patient relationship with patients living with long-term health conditions, seeking support from healthcare professionals and receiving advice and information about their conditions. There are also those patients who simply prefer traditional experiences of support, and may not want to replace their face-to-face interactions with a digital one. One can argue that this type of offering should be a choice, with the possibilities of such explored with the patients during consultation. With that, digital tools should be offered as a complimentary value add service with social interactions still taking precedence in patient consultations.

5.2 Problems with Promoting Adherence

The definition of treatment adherence suggests that patients should take their medication as prescribed by their doctor. This study has discussed the benefits of adherence in great detail and acknowledge that interventions such as text messaging can support patients to adhere to their treatment. However, it is important to consider other factors in promoting adherence. One important factor is the trusting relationship formed with the patient and the provider. Patients like to feel reassured that the medication they are taking is working, and discussions around adherence may be best placed with their consultant. Promoting adherence through positive interactions with their consultant may be enough to remind patients of the importance of following their treatment plan, whilst text messaging may not address those particular needs and subsequent questions the patient has. The unique needs of every individual may mean that for some missing a dose may not be detrimental to their health but something they choose to do to exert some control over their condition, particularly those living with a long term condition. Hearing healthcare professionals or receiving digital messages to encourage adherence for those who are not interested may become a barrier and withdrawal from services may become inevitable. Therefore, although this study has highlighted the enormity and benefits of promoting adherence, we still need to consider that for some this may just not be a priority.

5.3 Problems with Text Messages

This study has also shown that tailoring text messages can elicit behavioural change by targeting specific illness beliefs. One can argue that the delivery of text messages are non-invasive and act as a buffer for reminding patients to take their medication or delivering motivational messaging. Although within this study, participants consented to receiving

messages and the frequency differed over the twelve weeks; the influence offered by the real world may have allowed participants to experience this differently.

The majority of the UK population own or access a mobile phone and this device is with them for most of the day, delivery treatment reminders and motivational messaging via this portal would make sense. However, for some, particularly those living with a long-term health condition, may not want be reminded that they have a diagnosis. Daily prompts offered via text messaging may become an annoyance or perhaps an element of avoidance may reduce the amount of cognitive dissonance experienced by these patients. Messages may also feel unnecessary and the purpose behind this intervention may become oversaturated by the persistence of regular reminders. With this said, there needs to be a fuller consideration of the barriers to uptake when developing text messaging interventions, and ideas around affording flexibility to personalise the response so patients can "turn off" notifications as and when needed.

5.4 The Impact of Language

When a text message is delivered to a mobile phone, the receiver reads the message and interprets this based on their understanding of what that message is trying to say. Developing a text messaging intervention required the researcher to produce a bank of messages ready to send to participants. Individuals are unique in how they process information and no one should be assumed to be alike. When trying to develop a bank of messages which will align to the general public's needs may be considered unrealistic. Therefore, it is important to consider the content and language developing these messages. Text messages at times are calls to action and suggestive statements, hoping the receiver will elicit some behavioural change. If misinterpreted, the purpose of the intervention could be lost. Therefore, testing the language of the messages amongst a diverse sample in relation to cultural background, educational

attainment level and native spoken language are all important areas in which to start the conceptual frameworks underpinning a text messaging intervention. Language and wording in particular can be validated with representative patients and healthcare professionals to ensure that the messages are accurate and the information is appropriate for that condition and patient sample. Co-creation workshops can also be an opportunity to seek advice from patients and healthcare professionals, this will ensure that the content hold true meaning and the messages are not misleading.

5.5 Final thoughts

Within the critique offered on digital health intervention, it can be stressed that great caution should be taken to consider the type of individuals who are better fit for these interventions as well as the mode of delivery and content of them. Even though we are living in a digital age with technology becoming the forefront of health services offered to patients, we must not forget the importance of traditional healthcare services experiences which enable patients to have positive doctor-patient relationship which provide a sense of empowerment, response and a shared responsibility of medical decision-making. Despite its many benefits related to increasing accessibility, reducing financial burden and improving patient health outcomes, digital support should be offered as a complimentary additional support for patients as opposed to entirely replacing traditional care.

6 References

Ardizzone, S., Bollani, S., Manzionna, G., & Porro, G. B. (1999). Inflammatory bowel disease approaching the 3rd millennium pathogenesis and therapeutic implications? *European journal of gastroenterology & hepatology,* 11(1), 27-32.

Bandura, A. (1977). Self-efficacy: toward a unifying theory of behavioral change. *Psychological review,* 84(2), 191.

Boulos, M. N. K., Wheeler, S., Tavares, C., & Jones, R. (2011). How smartphones are changing the face of mobile and participatory healthcare: an overview, with example from eCAALYX. *Biomedical engineering online*, *10*(1), 24

Brown, SJ and Mayer, L. The Immune Response in Inflammatory Bowel Disease, *The American Journal of Gastroenterology;* published online September 2007. DOI:10.1111/j.1572-0241.2007.01343

Broide, E., Dor, A. E., Ruhimovitch, N., Shitrit, A. B., Sklerovsky, F., Benjaminov, S. M., ... & Naftali, T. (2017). Can we Predict Adherence to Treatment in IBD Patients? *Gastroenterology,* 152(5), S852.

Broadbent, E., Petrie, K. J., Main, J., & Weinman, J. (2006). The brief illness perception questionnaire. *Journal of psychosomatic research*, *60*(6), 631-637

Cambridge dictionary, (2017). Retrieved from https://dictionary.cambridge.org/dictionary/english/adherence

Coulter, A, Parsons, S and Askham, J, (2008). Where are the patients in decision-making about their own care? Retrieved from: http://www.who.int/management/general/decisionmaking/WhereArePatientsinDecisionMaking.pdf, WHO and the European Observatory on Health Systems Policy.

Code of human research ethics, (2010). Retrieved from: http://www.bps.org.uk/sites/default/files/documents/code_of_human_research_ethics.pdf The British Psychological Society 2010.

Crohn's and Ulcerative Colitis UK, (2012) Retrieved from: http://www.nacc.org.uk/content/home.asp#top

Danese, S., Sans, M., & Fiocchi, C. (2004). Inflammatory bowel disease: the role of environmental factors. *Autoimmunity reviews,* 3(5), 394-400.

DeKoekkoek, T., Given, B., Given, C. W., Ridenour, K., Schueller, M., & Spoelstra, S. L. (2015). mHealth SMS Text Messaging Interventions and to Promote Medication Adherence: An Integrative Review. *Journal of Clinical Nursing*, *24*(19–20), 2722–2735. http://doi.org/10.1111/jocn.12918

D'inca, R., Bertomoro, P., Mazzocco, K., Vettorato, M. G., Rumiati, R., & Sturniolo, G. C. (2008). Risk factors for non‐adherence to medication in inflammatory bowel disease patients. *Alimentary pharmacology & therapeutics*, 27(2), 166-172.

DiMatteo MR, Giordani PJ, Lepper HS and Croghan TW (2002). Patient adherence and medical treatment outcomes: a meta-analysis. *Med Care 2002*, published online September 2002, DOI 12218770

Ediger, J. P., Walker, J. R., Graff, L., Lix, L., Clara, I., Rawsthorne, P., ... & Bernstein, C. N. (2007). Predictors of medication adherence in inflammatory bowel disease. *The American journal of gastroenterology*, *102*(7), 1417-1426.

Engel, T., Ungar, B., Ben-Haim, G., Levhar, N., Eliakim, R., & Ben-Horin, S. (2017). Re-phrasing the question: A simple tool for evaluation of adherence to therapy in patients with inflammatory bowel disease. *United European Gastroenterology Journal*, 2050640616687838.

Franklin, V. L., Waller, A., Pagliari, C., & Greene, S. A. (2006). A randomized controlled trial of Sweet Talk, a text-messaging system to support young people with diabetes. *Diabetic Medicine*, *23*(12), 1332-1338.

Fiocchi, C, The immune system in inflammatory bowel disease, *Acta Gastroenterol* Belg. Published online 1997 Apr-Jun; DOI PMID: 9260327

Fiordelli, M., Diviani, N., & Schulz, P. J. (2013). Mapping mHealth research: a decade of evolution. *Journal of medical Internet research*, *15*(5).

Fjeldsoe, B. S., Marshall, A. L., & Miller, Y. D. (2009). Behavior change interventions delivered by mobile telephone short-message service. *American journal of preventive medicine*, 36(2), 165-173.

Gadkari, AS and McHorney, CA. (2012) Unintentional non-adherence to chronic prescription medications: How unintentional is it really? *BMC Health Services Research 2012*, published online June 2012. DOI: 10.1186/1472-6963-12-98

Gerber, B. S., Stolley, M. R., Thompson, A. L., Sharp, L. K., & Fitzgibbon, M. L. (2009). Mobile phone text messaging to promote healthy behaviors and weight loss maintenance: a pilot study. *Health informatics journal*, *15*(1), 17-25.

Greenley RN, Kunz JH,Walter J, et al. Practical strategies for enhancing adherence to treatment regimen in inflammatory bowel disease. *Inflamm Bowel Dis* 2013; 19:1534–45.

Guthrie, E., Jackson, J., Shaffer, J., Thompson, D., Tomenson, B., & Creed, F. (2002). Psychological disorder and severity of inflammatory bowel disease predict health-related quality of life in ulcerative colitis and Crohn's disease. *The American journal of gastroenterology*, 97(8), 1994-1999.

Hale E D, Treharne, GJ Kitas, GD (2007) The Common-Sense Model of self-regulation of health and illness: how can we use it to understand and respond to our patients' needs? *Rheumatology*, Volume 46, Issue 6, 1 June 2007, Pages 904–906, https://doi.org/10.1093/rheumatology/kem060

Hall, A. K., Cole-Lewis, H., & Bernhardt, J. M. (2015). Mobile Text Messaging for Health: A Systematic Review of Reviews. Annual Review of Public Health, 36, 393–415. http://doi.org/10.1146/annurev-publhealth-031914-122855

Head, K. J., Noar, S. M., Iannarino, N. T., & Harrington, N. G. (2013). Efficacy of text messaging-based interventions for health promotion: a meta-analysis. *Social Science & Medicine*, 97, 41-48

Hibbard JH and Greene J. (2013) *Health Affairs:* 32(2) 207-14

Horne, R, Weinman, J, Barber, N, Elliott, R, Morgan, M. (2005) Concordance, adherence and compliance in medicine taking. *Report for the National Co-ordinating Centre for NHS Service Delivery and Organisation R & D* (NCCSDO).

Hornes, R (2006). Compliance, adherence and concordance: Implications for asthma treatment. *Chest*, 130, 65S-72S.

Horne, R., Parham, R., Driscoll, R., & Robinson, A. (2009). Patients' attitudes to medicines and adherence to maintenance treatment in inflammatory bowel disease. *Inflammatory bowel diseases*, 15(6), 837-844.

IBM Corp. Released 2013. IBM SPSS Statistics for Windows, Version 22.0. Armonk, NY: IBM Corp.

Jackson, C. A., Clatworthy, J., Robinson, A., & Horne, R. (2010). Factors associated with non-adherence to oral medication for inflammatory bowel disease: a systematic review. The *American journal of gastroenterology*, 105(3), 525-539

Kaplan, G. G., Molodecky, N., & Panaccione, R. (2010). Environmental Triggers of IBD. *Inflammatory Bowel Disease Monitor*, 11(2)

Kane, S, and Shaya, F. Medication Non-adherence is Associated with Increased Medical Health Care Costs Digestive. *Diseases and Sciences*, published online April 2008, DOI 10.1007/s10620-007-9968-0

Keefer L, Kiebles JL, Martinovich Z, et al. Behavioral interventions may prolong remission in patients with inflammatory bowel disease. *Behav Res Ther* 2011; 49:145–50.

Kings Fund, (2010) Report on Patient engagement and involvement. Retrieved from: https://www.kingsfund.org.uk/projects/gp-inquiry/patient-engagement-involvement

Klasnja, P., & Pratt, W. (2012). Healthcare in the pocket: mapping the space of mobile-phone health interventions. *Journal of biomedical informatics*, 45(1), 184-198

Leventhal H, Cameron L. (1987) Behavioural theories and the problem of compliance. *Patient Education and Counseling*, 10: 117-138

Lancaster, G. A., Dodd, S., & Williamson, P. R. (2004). Design and analysis of pilot studies: recommendations for good practice. Journal of evaluation in clinical practice, 10(2), 307-312.

Leventhal, H., Diefenbach, M., & Leventhal, E. A. (1992). Illness cognition: using common sense to understand treatment adherence and affect cognition interactions. *Cognitive therapy and research*, 16(2), 143-163

Leventhal, H., Diefenbach, M., & Leventhal, E. A. (1992). Illness cognition: using common sense to understand treatment adherence and affect cognition interactions. *Cognitive therapy and research*, 16(2), 143-163

Lesnovska, KP, Hjortswang, H and Börjeson, S. What do patients need to know? Living with inflammatory bowel disease. *Journal of Clinical Nursing*, published online September 2014, DOI: 10.1111/jocn.12321

Lenti, M. V., & Selinger, C. P. (2016). Patients' beliefs and concerns about the necessity of long-term therapies are crucial for medication adherence for inflammatory bowel disease. *Journal of Crohn's and Colitis*, jjw213.

Leonard, T. C. (2008). Richard H. Thaler, Cass R. Sunstein, Nudge: Improving decisions about health, wealth, and happiness. *Constitutional Political Economy*, *19*(4), 356-360.

Loftus EV Jr. Clinical epidemiology of inflammatory bowel disease: incidence, prevalence, and environmental influences. *Gastroenterology*, Published online June 2004, DOI: 10.1053/j.gastro.2004.01.063

Medical dictionary, (2017). Retrieved from: http://medicaldictionary.thefreedictionary.com/

Miehsler, W, Weichselberger, M, Ernst, FA, Dejaco, C, Reinisch, W, Vogelsang, H, Machold, K, Stamm, T. (2014). Which Patients with IBD Need Psychological Interventions? A Controlled Study, Inflamm Bowel Dis, published online September 2014 DOI: 10.1002/ibd.20462.

Moser, G., Tillinger, W., Sachs, G., Genser, D., Maier-Dobersberger, T., Spies, K., ... & Gangl, A. (1995). Disease-related worries and concerns: a study on out-patients with inflammatory bowel disease. *European journal of gastroenterology & hepatology*, 7(9), 853-858.

Morisky, D. E., Green, L. W., & Levine, D. M. (1986). Concurrent and predictive validity of a self-reported measure of medication adherence. *Medical care*, 67-74.

NHS Choices, (2017) Retrieved from: https://www.nhs.uk/conditions/inflammatory-bowel-disease/

Neville R, Greene A, McLeod J, Tracy A, Surie, J. Mobile phone text messaging can help young people manage asthma. *BMJ.* 2002; 325:600

Ogura, Y, Bonen, DK, Inohara, N, Nicolae, DL, Chen, FF, Ramos, R, Britton, H, Moran, T, Karaliuskas, R, Duerrk, RH, Achkar, JP. A frame shift mutation in NOD2 associated with susceptibility to Crohn's disease. *NATURE,* published online May 2001, DOI: doi:10.1038/35079114

O'Toole, A., & Korzenik, J. (2014). Environmental triggers for IBD. *Current gastroenterology reports*, 16(7), 396.

Petrie, JK, Perry K, Broadbent E and Weinman J. (2001) A text messaging programme designed to modify patient illness and treatment beliefs improves self-reported adherence to asthma preventer medication. *British Journal of Health Psychology*, BPS, published online February DOI:10.1111/j.2044-8287.2011.02033.

Questionnaire (BMQ): A Review Study. *J Drug Res Dev* 3(1): doi http://dx.doi.org/10.16966/2470-1009.130

Sartor R. Mechanisms of Disease: pathogenesis of Crohn's disease and ulcerative colitis *NATURE clinical practice gastroenterology and hepetology*, published online April 2006, DOI: 10.1038/ncpgasthep0528

Sajadinejad, M. S., Asgari, K., Molavi, H., Kalantari, M., & Adibi, P. (2012). Psychological issues in inflammatory bowel disease: an overview. *Gastroenterology research and practice*, 2012.

Saibil F, Lai E, Hayward A, Yip J, Gilbert C. (2008). Self-management for people with inflammatory bowel disease. *Can J Gastroenterol.* 2008;22(3):281–287.

Siegel CA (2012) Shared decision-making in inflammatory bowel disease: helping patients understand the tradeoffs between treatment options. *Gut* 2012;61:459-465.

Simpkins, CA and Simpkins, AM (2013). How Psychotherapy Changes the Brain Neuroscience for *Clinicians Evidence, Models, and Practice*, ISBN: 978-1-4614-4841-9 (Print) 978-1-4614-4842-6 (Online)

Symer, M. M., Abelson, J. S., Milsom, J., McClure, B., & Yeo, H. L. (2017). A Mobile Health Application to Track Patients After Gastrointestinal Surgery: Results from a Pilot Study. *Journal of Gastrointestinal Surgery*, 21(9), 1500-1505.

Tsianou K, Giannakeas N, Tsipouras MG, Tzallas AT, Skamnelos A, et al. (2017) Accessing Patient Views about Medication in Chronic Conditions using the Beliefs about Medicine

Vilela, EG, Torres, HOG, Martins, FP, Ferrari, MLA, Andrade, MM and Cunha, AS. Evaluation of inflammatory activity in Crohn's disease and ulcerative colitis. *World J Gastroenterol* 2012: published online March 7; DOI: 872-881 ISSN 1007-9327

Vervloet, M., Linn, A.J., Weert, J.C.M. van, Bakker, D.H. de, Bouvy, M.L., Dijk, L. van. The effectiveness of interventions using electronic reminders to improve adherence to chronic medication: a systematic review of the literature. J*ournal of the American Medical*

Informatics Association: 2012, published online April 2012, DOI 10.1136/amiajnl-2011-000748

WHO, (2003). Adherence to long term therapies: Evidence for action, chronic disease and health promotion: Available online and Retrieved from: http://www.who.int/chp/knowledge/publications/adherence_report/en/

Appendix 1- Information Sheet

Can a text message programme designed to modify illness and medication beliefs in people who have inflammatory Disease increase self-reported adherence to medication management therapy?

You are being invited to take part in a research study. Before you decide whether or not to participate, it is important you understand what it involves. Please read the following information carefully.

What is the purpose of the research?

We are aware that when living with a long term chronic health condition patients can begin to taking less medication due to various reasons. We are hoping to see if text messages can support your medication uptake. The research is being carried out to see whether the programme of support is effective and how it might be improved.

Who is carrying out the research?

The research is being led by Sumira Riaz (Trainee Health Psychologist) and supervised by Dr Catherine Sykes (Health Psychologist) who are based at City University London. This research has received ethics approval from Senate House and City University Psychology Department Ethics Committee.

Can anyone take part?

You need to be over the age of 18, have access to a mobile phone, have an email account and access to the internet. You also have to be diagnosed with and Inflammatory Bowel Disease (Crohn's or Ulcerative Colitis). If you have any conditions that affect your diet (e.g., diabetes, eating disorder) we also recommend you contact your GP before making any dietary changes.

What happens if I agree to take part?

If you are interested in taking part you will be asked to complete a set of questionnaires at the initial stage of the research. These questionnaires will be based around your condition, medication beliefs and illness perception and a Beck Depression questionnaire.

Over the course of three months you will receive text messages, the frequency of these will differ over the weeks, below is a table which will inform you on what to expect.

Duration	Frequency of messages
Week 1-4	2 text messages per day
Week 4-8	1 text message per day
Week 8-12	3 text messages per day

You will be asked to complete the same set of questionnaires at the end of the 3 months. There will be two groups, intervention and control, you will be randomly assigned to either group and have a 50% chance of being in either the control group or the intervention group.

What happens if I sign up then change my mind?

If you decide to change your mind once you have signed up you are free to withdraw at any time. Simply contact/email Sumira Riaz on [redacted]

What will happen to the information you collect?

All information collected will be confidential and will be kept securely in strict accordance with the Data Protection Act. It will not be used for any other purpose. An analysis of the information will form part of our report at the end of the study and may be presented to interested parties and published in scientific journals.

What if there is a problem?

If you would like to complain about any aspect of the study, City University London has established a complaints procedure via the Secretary to the University's Senate Research Ethics Committee. To complain about the study, you need to phone 020 7040 3040. You can then ask to speak to the Secretary to Senate Research Ethics Committee and inform them that the name of the project is: **Can a text message programme designed to modify illness and medication beliefs in people who have inflammatory Disease increase self-reported adherence to medication management therapy?**

You could also write to the Secretary at:

Anna Ramberg
Secretary to Senate Research Ethics Committee
Research Office, E214
City University London
Northampton Square

London
EC1V 0HB

Email: [redacted]

Who has reviewed the study?

This study has been approved by City University London *Psychology department* Research Ethics Committee

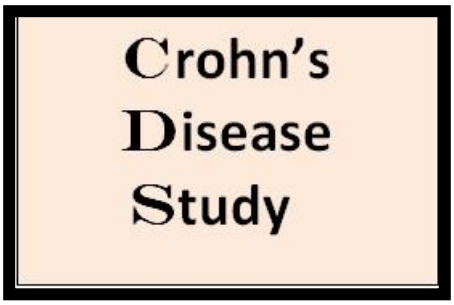
What if there is something I don't understand or if I have further questions?

If you still have any additional questions please contact Sumira Riaz who will be very happy to discuss the project further with you, [redacted]

Thank you for taking the time to read this information sheet.

Appendix 2- Study advert

Crohn's Disease Research Study



Have you been diagnosed with Crohn's Disease?

Would you like to take part in a research study?

We are testing to see if sending personalised text messages will support you to take your medication.

If you are interested in taking part in this trial, please follow the website link, where you will find more information about the research.

http://www.crohnsdiseasestudy.org.uk/

Appendix 3 Participant Consent Form

Can a text message programme designed to modify illness and medication beliefs in people who have inflammatory Disease increase self-reported adherence to medication management therapy?

I have been briefed to my satisfaction on the research project named above for which I have volunteered. I understand that I have the right to withdraw from the research at any time and I can question the investigator if I have any concerns. I understand that, within the constraints of the research, my rights to anonymity and confidentiality will be respected, and in the event of this research ever being published, I give my permission for my information to be used, providing my identity remains anonymous, unless I request it to be otherwise. I understand that any information I provide is confidential, and that no information that could lead to the identification of any individual will be disclosed in any reports on the project, or to any other party.

I agree to participate in this research on the understanding that the information I give will be treated as confidential material, my anonymity will be protected as stated above and any recorded information will be stored in a secure location.

I agree to City University London recording and processing this information about me. I understand that this information will be used only for the purpose(s) set out in this statement and my consent is conditional on the University complying with its duties and obligations under the Data Protection Act 1998

I agree to take part in the above study

_____	_____	_____
Name of Participant	Signature	Date

Appendix 4- Demographic Questionnaire

1. How old are you? ……..

2. Gender (please circle the appropriate)

Male Female

3. What is your ethnicity? ……

4. Currently which medication(s) are you taking?
……
……
……
……
…..

5. How long have you been diagnosed with Crohn's? ……..

6. Please state your **Mobile** number ……. *This is the number we will use to send you your personalised text messages.*

7. Since being diagnosed with Crohn's Disease, have you ever forgotten to take your medication?

1	2	3	4	5	6
Never	Rarely	Occasionally	Sometimes	Most of the time	Very Often

8. What are you hoping to achieve from this study?
……

Thank you for completing this short questionnaire

Appendix 5- Example target beliefs and messages template

Target beliefs	Text Messages
Low identity (low symptoms) *	1. No symptoms for a few days does not mean no Crohn's Disease. 2. Even if you don't have symptoms, you may still need medication to control your symptoms. 3. Coming off your medication is likely to worsen your symptoms. 4. Your symptoms may have improved, but these can worsen if you stop taking your medication 5. Forgetting to take your medication even when you have no clinical symptoms will only worsen your outcome 6. Your medication is helping you to control your symptoms 7. Crohn's Disease means, you must continue taking your medicine even when you are feeling well, in order to keep feeling well. 8. Even if you feel fine, you should continue taking your medication the doctor has prescribed 9. When you have Crohn's Disease you will not have the same symptoms all the time, sometime you will have no symptoms, this is when you are in remission.

Target beliefs	Text Messages
High identity (high symptoms)*	1. Reduce your risk of flare ups by taking your medication. 2. Your medication can help you manage your symptoms. 3. Taking your medication means taking control of your symptoms. 4. Abdominal pain, diarrhoea, weight loss and bloody stools can be managed if you follow your treatment plan, this will improve your symptoms. 5. Manage your Crohn's both mentally and physically by taking control of your medication. 6. Medication may not immediately relieve all of your symptoms which you are experiencing, but it is the best way to control your Crohn's Disease. 7. Taking maintenance medication can significantly reduce the risk of flare ups, in between flare up most people feel quite well and free of symptoms. 8. If weight gain is preventing you from taking your medication, speak to your doctor about the different types of physical activities you can engage in.
Low consequences	Crohn's Disease is a condition that needs regular care and attention.

Target beliefs	Text Messages
High consequences	1. When you get the management of your Crohn's right you reduce the impact of the consequences on your life. 2. Managing your Crohn's Disease means getting on with life. 3. Controlling your symptoms with medication means decreasing the impact of actual or potential distressing symptoms or embarrassment.
Short timeline*	1. Your Crohn's symptoms may come and go but the Crohn's disease is always there. 2. Your Crohn's Disease is always there even when you don't have symptoms. 3. Learn new facts about Crohn's Disease, this will help you to understand what to expect
High timeline	1. Your Crohn's Disease will always be there but you can learn to manage it and accept it.

Target beliefs	Text Messages
Low personal control*	1. You can control your Crohn's Disease by taking your medication. 2. Take your medication every day and control your Crohn's before it controls you.' 3. Take control of your Crohn's Disease by taking your medication 4. Control your Crohn's, don't let it control you. 5. Medication has been shown to control Crohn's' 6. You can control Crohn's Disease rather than letting it control you. 7. Research has shown that medication can maintain your condition.
High personal control	1. My (medication) helps to control my Crohn's. 2. I'm doing my best to cope with my Crohn's.
Low treatment control	
High treatment control	1. It is great to be in control of your medication for Crohn's Disease. 2. Being in control of your medication means you are likely to benefit from symptom reduction.

Target beliefs	Text Messages
Low concern	1. It is worth thinking about your Crohn's Disease to find out if there is anything more that you can do to help yourself. 2. Studies have shown that patients' quality of life worsens during relapse.
High concern **	1. Having Crohn's Disease leads to various problems that may cause you to worry. This understandable but worry can impact on your physical state. 2. Sometimes people with Crohn's Disease imagine the worst will happen. This worry can cause stress and increase your symptoms. Notice your worries and evaluate them. 3. Worrying rarely helps people to come up with solutions. Your worrying just goes in circles. 4. Noting down your worries and asking yourself what would you say to a friend with these worries can help you to re-evaluate your worries. 5. Practicing talking back to your worries can help to weaken your worries once you have re-evaluated your worries. 6. Knowing which situations make you worry helps you to reduce the impact of your worries. 7. It is often helpful to get another's person's opinion about your worries

Target beliefs	Text Messages
Low understanding*	1. Many people with Crohn's disease can lead productive lives once they follow a treatment plan. 2. Crohn’s disease is an inflammatory condition of the intestines and can respond well to medical management. 3. Crohn’s disease varies from person to person, therefore your treatment will vary, follow your personalized medication regime. 4. If you would like to improve and manage your symptoms, taking your medication is important 5. Don’t worry your medication may not work immediately it can take up to 3 – 6 months before you start to feel improvements. 6. Crohn’s disease is incurable, but there are treatments available to relieve your symptoms. 7. Following your medication regime, will mean managing your condition, most people with Crohn’s disease lead full, happy and productive lives.

Target beliefs	Text Messages
High emotional response to the illness **	1. If you become inactive you might be avoiding the kind of activity that would be helpful in dealing with your conditions. 2. Sharing your experience with others who are understanding and sympathetic may be helpful in coping with the emotions related to having Crohn's disease. 3. Avoiding all physical or social activity and doing very little can reduce your strength, decrease your energy and cause more pain. 4. Setting goals that are realistic even on a bad day can help you cope with your condition. 5. It's more difficult to deal with a health condition when you're cut off from other people. 6. Making a note of new enjoyable activities can help you to improve your quality of life. 7. Taking care of yourself can help your mood to stay level. 8. Developing a healthy perspective of your condition will help you to improve your day to day experience.

Medication concern high	1. Your medication is not addictive. 2. Taking your medication after eating or in two smaller doses each day instead of all at once may help reduce side effects such as vomiting and nausea. 3. It is important to attend regular monitoring sessions with your doctor, this will tell you if your medication is working or needs to be changed. 4. Don't worry your medication does not work immediately it can take up to 3 – 6 months before you start to feel improvements. 5. Although there is currently no cure for Crohn's Disease, medical management includes long-term drug therapy which can be effective in inducing or maintaining remission. 6. The medication for Crohn's Disease can be complex and inconvenient but in the long run, it can help you to manage your symptoms. 7. Your treatment regime is demanding, but taking your medication will improve your symptoms. 8. Your medication is inconvenient and intrusive. Taking your medication can help with the intrusiveness of Crohn's Disease.

Target beliefs	Text Messages

Target beliefs	Text Messages
Medication necessity low	1. Taking your medication (as prescribed) reduces and improves your Crohn's Symptoms.' 2. Your medication works best when taken every day. 3. You need to take medication every day for it to be effective. 4. Taking medication makes it more effective. 5. Medication can help you manage your symptoms. 6. Medication is there to help you manage your conditions 7. Crohn's is a chronic condition which can be managed continually with medication. 8. The risk of flare up is reduced when you take your medication consistently. 9. Crohn's Disease is a chronic condition, which can be controlled by treatment, not cured.

(1) beliefs shown to be linked to adherence in asthma patients.

(2) Green = beliefs that may not be necessary to modify to improve adherence. If we keep them then we need statements to reinforce the positive beliefs.

** - beliefs that put people at risk of depression.

Appendix 6- Sample text messages template

TEST001	+155599	Hello John, you are receiving this message as a test.	2014-04-15 15:30:00
Week 2 G2			
106	+4478	Getting your treatment right can be a difficult time but it should help you get to remission in the end.	2014-06-23 10:00:00
108	+447775	Getting your treatment right can be a difficult time but it should help you get to remission in the end.	2014-06-23 10:00:00
55	+4477	Crohn's Disease means, you must continue taking your medicine even when you are feeling well, in order to keep feeling well.	2014-06-23 10:00:00
119	+4477	Research has shown that medication can maintain your condition.	2014-06-23 10:00:00
121	+4475	When you have Crohn's Disease you will not have the same symptoms all the time, sometime you will have no symptoms, this is when you are in remission.	2014-06-23 10:00:00
111	+447	It is great to be in control of your medication for Crohn's Disease.	2014-06-23 10:00:00
122	+4477	Getting your treatment right can be a difficult time but it should help you get to remission in the end.	2014-06-23 10:00:00
106	+4478829	. You are in control of your medication.	2014-06-23 15:00:00
108	+447775	You are in control of your medication.	2014-06-23 15:00:00
55	+447792	Having Crohn's Disease leads to various problems that may cause you to worry. This understandable but worry can impact on your physical state.	2014-06-23 15:00:00
119	+44778	Even if you don't have symptoms, you may still need medication to control your symptoms.	2014-06-23 15:00:00

121	+447584	Your medication is helping you manage your symptoms.	2014-06-23 15:00:00
111	+44787	Being in control of your medication means you are likely to benefit from symptom reduction.	2014-06-23 15:00:00
122	+447715	You are in control of your medication.	2014-06-23 15:00:00
106	+447882	Studies have shown that patients' quality of life worsens during relapse.	2014-06-24 09:00:00
108	+447775	Treatment can reduce the impact of Crohn's	2014-06-24 09:00:00
55	+447792	Your medication is helping you to control your symptoms	2014-06-24 09:00:00
119	+44774	No symptoms for a few days does not mean no Crohn's Disease.	2014-06-24 09:00:00
121	+4475835	You are reducing your risk of flare ups by taking your medication.	2014-06-24 09:00:00
111	+447830	You will receive benefits from being in control of your medication.	2014-06-24 09:00:00
122	+447713	Studies have shown that patients' quality of life worsens during relapse.	2014-06-24 09:00:00

Appendix 7- Published Paper- EHP
The European Health Psychology Society (EHP)

Sumira Riaz, City University London, Health Sciences.

Email: [redacted]

Using technological interventions to elicit behaviour change: the development of a text message intervention.

Introduction: Mobile health

The new generation of health interventions are moving towards digitised innovative methods which seek to support people to better manage their health condition or as an educational tool to support change. There are several approaches introduced to date such as web based interventions or mobile 'apps' which are increasing rapidly. Recently the rise of mhealth has given researchers, psychologists and developers a range of examples which portray, 'good' methods of delivering such interventions, but what have we learnt from this and how does this further our understanding of digital health. Although, there is no static method of developing such programmes and each are unique to the sample it is addressing, but there are some basic protocols we need to consider.

As an example, to illustrate this process the discussion will focus on the development of a text message based intervention for patients diagnosed with Inflammatory Bowel Disease (IBD).

Using text messages in health interventions

Tailoring short text messages based on patient's illness and medication beliefs has shown significant improvements in medication adherence.[1] We know that intentional and unintentional medication adherence is problematic for patient's remission and cost of non-adherence is significant.[2] There are several adherence models which attempt to identify different aspects of patient behaviour and the underlying belief structure. Leventhal, (1987)[3] common sense model of illness representation suggests that self-regulation is a function of the representation of health threats and the coping mechanisms adopted by the individual. suggests that patients with the same condition hold disparate views surrounding their illness, which may be explain why some people are adherent and other are not.[4] Similarly, the Necessity Concerns Framework (Hornes, et al, 1999, Hornes, 2006)[5] measures the

individual's illness beliefs and the necessity of medication, which then explains the beliefs associated with non-adherence. Understanding the theory and implementing this into an intervention will help support the robustness of the programme, which we did for the IBD programme.

The process will be explained and hopefully offer readers an understanding of what needs to be done to produce similar interventions. Learning and improving is a significant milestone in Health Psychology research and what we should take away from this is technique to improve future research.

IBD Programme

IBD is a chronic bowel condition and consists of Crohn's and Ulcerative Colitis. Research suggests that identifying an individual's illness beliefs and medication concerns can help shift the beliefs which then improves various other domains such as quality of life, adherence to medication and better overall self-management of the condition.[2] However, what does this look like?

The methodology

Developing a text message initiative is a delicate and timely process, there are many factors to consider, such as types of messages, frequency, personalisation and measurable outcomes. Once these variables were defined, the personalisation process then followed. The important element of the IBD programme was to ensure that it was bespoke to the individual, as it was addressing their personal beliefs and illness perceptions of their condition. Remember, this is unique for everyone, and to successfully understand their need participants completed a pre-screener measure using the validated Brief Illness Perception Questionnaire (B-IPQ) and Necessity-Concern scale assisted the personalisation process, from this we could categories the messages based on the measurement domains. It is important to include some type of measurement within the design; this will ensure that the programmes objectives are in line with the outcomes and aims to elicit a 'real' change.

Measures

A robust measurement strategy was developed which was used to monitor the effectiveness of the programme. This included a list of validated measures which were used with each

participant at the start of the intervention and at the end of the 12 weeks. Text messages were specific to the targeted beliefs as exampled in Tables 1 and 2. Each belief consisted of 7 messages, with a total of 112 messages. Once the bank of messages were developed the next step was to draft the timeline and frequency of these messages. This can be difficult particularly because you don't want to lose the momentum of ensuring that the messages are meaningful and helpful as appose to inconvenient. Therefore, based on habit formation research, it was decided that the frequency would vary over the course of 12 weeks. In fact, this worked considerably well and participants enjoyed the change in frequency and times of when the messages were sent.

Table 1- Example extracts of text messages mapped onto the illness beliefs questionnaire

IPQ Domains	**Example text messages**
Identity (low) Identity (high)	*'Coming off your medication is likely to worsen your symptoms'* *'Abdominal pain, diarrhoea, weight loss and bloody stools can be managed if you follow your treatment plan, this will improve your symptoms'*
Consequences (low) Consequences (high)	*'Crohn's Disease is a condition that needs regular care and attention'* *'Managing your Crohn's Disease means getting on with life'*
Timeline (short) Timeline (long)	*'Your Crohn's Disease is always there even when you don't have symptoms'* *'Your Crohn's Disease will always be there but you can learn to manage and accept it'*

Table 2- Example extracts of text messages mapped onto the BMQ (medication beliefs questionnaire)

BMQ Domains	Example text messages
Personal control (low)	'*Control your Crohn's, don't let it control you'*
Personal control (high)	*'I'm doing my best to cope with my Crohn's'*
Treatment control (low)	'*Using medication reminders can help you control Crohn's Disease'*
Treatment control (high)	*'Being in control of your medication means you are likely to benefit from symptom reduction'*
Concern (low)	*'Studies have shown that patients' quality of life worsens during relapse'*
Concern (high)	*'Worrying rarely helps people to come up with solutions. Your worrying just goes in circles'*

To ensure that the messages were sent to the participants on time, segmentation and timescales were developed which was filtered into the text messaging system. Within this template exact times and days of messages were outlined and to which participant for as outlined in Table 3.

Table 3 process of messages

Participant	Day of the week	Am	Pm	Text message
1	Monday		X	*'Being in control of your medication means you are likely to benefit from symptom reduction'*

This method instilled accuracy and allowed the researcher to monitor which messages were being sent to avoid repetition.

Was this programme useful?

Offering a personalised programme as an alternative to the traditional method of delivering health interventions is beneficial, this was evident from the IBD programme. Participants appreciated the novel method of receiving messages which resonated with them as messages were specific to their needs. The IBD programme was successful and evidenced an increase in medication adherence and a change in illness perception and beliefs. Although the method of personalising is extremely timely the outcome is beneficial.

What are the important things to remember?

1. Mobile interventions should be theoretically driven, therefore offering a robust framework to develop an effective programme.
2. Text messages should be relevant and consistent with the belief they are targeting.
3. Remember to change the frequency of the message and avoid repetition within the same week.
4. Develop a measurement strategy built into your programme this will help record the outcome and determine if a change really occurred.
5. Text message programmes may not always be the best option offered and is dependent on the sample it is targeting. This needs to be considered when deciding on the methodological approach.
6. Text message interventions can be offered as a sole product as we did for the IBD programme or compliment an interventions as an additional tactic.

References

DiMatteo MR, Giordani PJ, Lepper HS and Croghan TW (2002). Patient adherence and medical treatment outcomes: a meta-analysis. Med Care 2002, 40:794–811

Hornes, R (2006). Compliance, adherence and concordance: Implications for asthma treatment. *Chest,* 130, 65S-7

Horne, R., & Weinman, J. (2002). Self-regulation and self-management in asthma: exploring the role of illness perceptions and treatment beliefs in explaining non-adherence to preventer medication. Psychology and Health, 17(1), 17-32.

Leventhal H, Cameron L. (1987) Behavioural theories and the problem of compliance. *Patient Education and Counseling,* 10: 117-138

Leventhal, H., Diefenbach, M., & Leventhal, E. A. (1992). Illness cognition: using common sense to understand treatment adherence and affect cognition interactions. Cognitive therapy and research, 16(2), 143-163.

Section D: SYSTEMATIC REVIEW

Are Smartphone Health Applications Effective in Modifying Obesity and Smoking Behaviours? A Systematic Review

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Abstract

Technological interventions, specifically mobile health application, have risen dramatically in recent years. Individuals prefer to seek support from mobile health applications, which can be effective in delivering health promotion initiatives and interventions. Therefore, we aimed to assess the available mobile apps for smoking and obesity by conducting a systematic review of current mobile app-controlled interventions. Research articles published from 2006 to 2013 were considered, and seven research papers were included within the review. The present review offers an introduction and overview of the current research that seeks to understand the efficacy and development of mobile health apps. In conclusion, this review identifies a need for more comprehensive research within this area. Publishing accurate findings will provide a good basis for understanding whether smoking or obesity can be altered and supported through smartphone mobile applications. Mobile technology has the potential to reach millions, and with the ongoing development of new innovative phones, offering health promotion and interventions through this portal represents the future.

Keywords: smartphone, application, internet, smoking, obesity, prevention, web.

1 Introduction

The World Wide Web (WWW) was first introduced to the public in the mid-nineteenth century, and has since evolved around the world (Gosling, Vazire, Srivastava & John, 2004). Adults and young children alike are utilising the internet for health information, games, sports, shopping, social networking, and educational resources. There are numerous reasons behind the success of this technology, one of which is the convenience of accessing information from your own home. Schools are educating children in how to use computers and employers expect employees to be computer-literate. Given this, we can assume that the next step in health promotion and education can and should be delivered via this avenue.

Until recently, computing has been oriented towards offering more than just an alternative to shopping or games. Surprisingly, the internet has been utilised within healthcare, allowing patients to access packages of support at their own leisure (Swartz, Noell, Schroeder, Ary, 2006). As an alternative to printed health material, healthcare professionals such as psychologists are offering self-help management techniques and cognitive behavioural therapy (CBT) via the internet; this either eliminates or works in conjunction with traditional face-to-face methods of interaction and support (Cuijpers, Straten, Warmerdam, Andersson, 2008). This innovative method of delivery is not rare, and services have already taken the leap in terms of offering support over the web. Evidently, this approach is not only cost-effective, but also reduces therapists' workload and gives the patient more control in terms of managing and learning about their health condition, thereby enhancing their self-efficacy (Cuijpers, et al., 2008). Equally, the internet has additional benefits for researchers, particularly due to the nature of its reach. The internet is able to offer samples of participants which other traditional methods fail to reach (Gosling, et al., 2004).

Although internet interventions are escalating, the use of smartphones has also extended to more than simply communicating on a social level. Similarly, smartphone applications are being developed by healthcare services as an alternative to self-management material (Gasser, Brodbeck, Degen, Luthiger, Wyss & Reichlin, 2006). Research has shown that text message support is effective in altering unhealthy behaviour (Whittaker, Borland, Bullen, Lin, McRobbie, Rodgers, 2009). While this is a relatively new method of offering health interventions, smartphone research is increasing, and the efficacy of this approach needs to be tested. If this method of delivery is a promising substitute and a successful addition to internet support, then we need to understand more about what works and for whom.

1.1 Smoking

We are already aware of the dangers and health consequences of smoking: the habit incurs long term health consequences which can even lead to death (Carbone, Kverndokkb, Røgebergb, 2005). Finding ways to break the smoking habit is beneficial in the long term. Conventional cessation programmes offered via the National Health Trust (NHS) comprise group therapy, face-to-face cessation advice, and nicotine replacement therapy. All of these approaches have been researched, trialled, and tested to be effective in supporting smokers in refraining from their habit, both in cases of long- and short-term abstinence (Carson, Brinn, Labiszewski, Esterman, Chang & Smith, 2011).

The NHS has also introduced web- and smartphone-based smoking cessation applications. In 2010, a systematic review carried out by Civljak, Sheikh, Stead and Car, assessed the suitability of internet-based interventions for smoking cessation. The review concluded that although more evidence is required to make a substantial decision, out of the few trials that were analysed, the only effective support was one which offered tailored individual information to the smoker in comparison to a static website service. Interestingly,

the review found that younger populations and women were more attracted to using internet services than any other group.

1.2 Obesity

Obesity is a nationwide societal epidemic, and is rising daily in the UK. The prevalence of obesity has doubled in the UK in comparison to other European countries (Jebb, Rennie & Cole, 2004). Finding ways to reduce and eliminate obesity is therefore on every agenda (Hilton, Patterson, Teyhan, 2012). Although eliminating obesity may not be realistic, a preventative approach needs to be developed and evaluated. The obese and overweight segments of the population are in danger of developing physical and psychosocial health outcomes such as cardiovascular heart disease, sleep disorder, type 2 mellitus diabetes, depression, and low self-esteem (Kelders, Gemert-Pijnen, Werkman & Seydel, 2010). When considering these negative health outcomes, offering alternative strategies to reduce this epidemic is encouraging. This leads to a vital question: how effective are mobile applications in reducing obesity levels, and can these teach people the self-management skills needed to adopt a healthier lifestyle?

Smartphone applications are being developed every day. If they are shown to be effective, they could truly reshape the way health promotion is delivered. Developing a better understanding of these applications, and of how well they can truly modify these unhealthy behaviours, has become an imperative. There is a large amount of research that examines the effectiveness of a range of applications using a range of research methods, but none have compiled these health areas together into one review.

Therefore, this paper aims to:

1. Review the components of smartphone applications which have shown to be effective in altering and reducing smoking and obesity-related behaviours.

2. Find out the effect size of the effectiveness.
3. Make suggestions for future research in this new field.

2 Method

2.1 Types of studies included in the review

Randomised controlled trails, comparative trials, case-only, and cohort studies were considered.

2.2 Types of participants

There were no exclusion criteria for participants in relation to age, gender, disability, ethnicity, religion, socioeconomic status, employment, or spoken language. Studies with participants with prior mental health diagnoses were excluded from the review, however. Children and adult studies were analysed separately and were compared with one another where appropriate.

2.3 Types of interventions

Smartphone mobile health interventions that carried out a minimum of 50% their activity solely via this method were included in this review. Smoking interventions which utilised pharmacotherapy products such as nicotine replacement therapy (NRT) or varenicline in conjunction with the intervention were analysed separately and compared with one another.

Smartphone health applications offering interactive multimedia health advice were also considered, where a comparison was made between normative self-help material and the actual intervention.

2.4 Types of Outcome

- **Smoking**; abstinence, comparing baseline and post-intervention; this included self-reported outcomes and bio-marker outcomes.
- **Obesity;** a reduction in weight (BMI, waist circumference, kg).
- **Other factors** such as user satisfaction were reviewed.

3 Data Collection and Analysis

3.1 Search methods and selecting articles

A comprehensive literature search was undertaken using central search engines. Figure D1 (below) illustrates the eligibility process for selecting and excluding research articles specific to this review.

The terms used when searching for the articles were, ‘smoking cessation,’ ‘weight management,’ ‘internet weight interventions,’ ‘online weight support,’’ ‘online health interventions’, ‘smartphone applications’, ‘health applications’ , and ‘mobile applications’.

A hand search was also performed using reference lists from the key articles: Civljak, et al., (2010) and Cuijpers, et al., (2008).

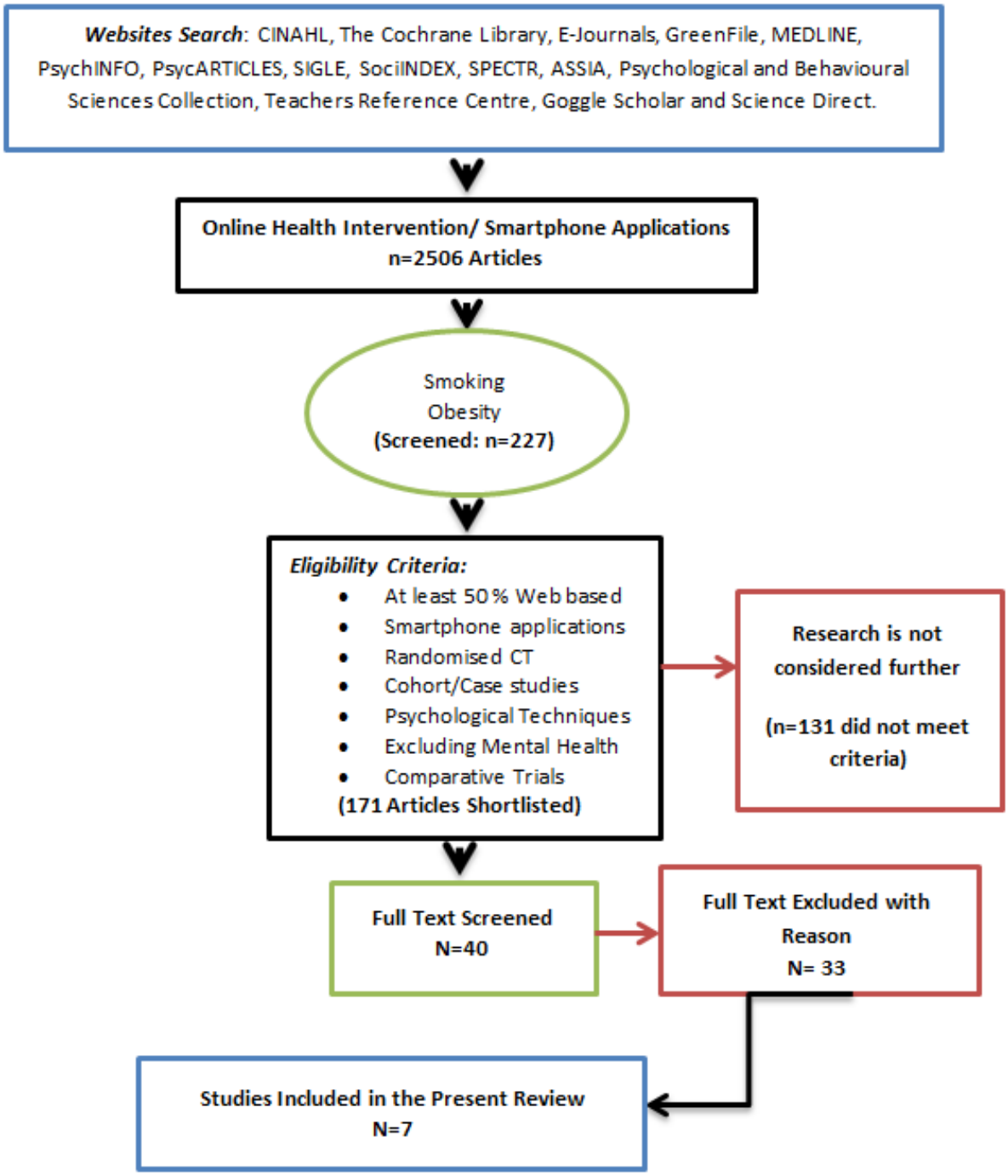


Figure D1: Consort diagram of search process

3.2 Data extraction

The first author independently searched through each article that met the inclusion criteria, and developed a data extraction and summary in Table 1. The information in these tables included:

- Study: *design, measurements, dropouts, and county.*

- Participants: *health condition, recruitment, gender, and age.*
- Intervention and Condition: *conditions, number of participants, duration, intervention, and contact.*
- Summary table: *comparisons and main findings*.

These important characteristics were extracted from each research study, which aided the authors in assessing the quality of the findings.

3.3 Assessment of randomized control trails (RCT)

The Jadad scale (2005) was used to assess each study, adopting the RCT design using a point system. The areas of interest were:

1. Randomisation: Was the study described as randomised? 2 points
2. Blinding: Was the study described as double blind? 2 points
3. Participant dropout/account: Was there a description of withdrawals and dropouts? 1 point

Each study went through this point system and was then given an overall total, which is presented in Table 2 below.

Table 2- Data Extraction **Sheet**

Study Reference Numbers / **Obesity**	**Study**			**Participants**			**Intervention and Condition**				
	Design	**Measurement**	**County**	**Recruitment**	**Gender %**	**Age Group (M)**	**Condition (C)**	**Application Components**	***N***	***D***	**Effect Size**
Gasser, et al (2006)	RCT/ 2 conditions	Pre and Post questionnaires	Switzerland	Social network sites	50% F 50% M	33.7 years.	C1: Internet group (Web interface program) Daily Goals Self-Monitoring	C2: Smartphone App Group: ***Daily Goals/ Self-monitoring Diaries Eating and Physical activity tracker*** (30 mins of moderate exercise, 5 serving of fruit) ***Social Facilitation Modules****:* (Visualisation of the activities of others) ***Program Alerts****:* if no activity is being recorded	40	28 days	N
Maher, (2012)	Case Control	Pre and Post body composition	Korea	Obese Clinic	N/A	28.2 yrs.	C1: Control	C2: Smart Diet app ***My Page:*** calculated weekly/daily calories (graph display) ***Meal Assessment*****:** calculate calories per meal ***Diet Game****:* True/False quiz games (lifestyle and Nutrient) ***Exercise Schedule***: Using the stopwatch record/time daily exercise	36	6 wks	Mean difference 1.4Kg No SD/E

Sherwood, Jeffery, Pronk, Boucher, Hanson & Boyle, (2006)	RCT/2 conditions	Baseline and post	USA	Community	80% F 20% M	44.9 years	C1: Control: Printed material monthly	C2: Phone (Text Message) ***Personalised Interactive SMS/MSM***: msg 2-5 times a day (reminders and alerts) ***Topic Messages:*** i.e.: how to control your potions ***Tips/questions***: tailored to their eating behaviour ***Brief Phone Counselling***: (monthly- 10 mins) ***Printed Material:*** nutrition topics, behavioural strategies, food and exercise journal to support self-monitoring	78	16 wks	-0.61
Carter, Burley, Nykjaer, & Cade, (2013)	RCT/3 conditions	Baseline and post body compositions	UK	Community	76% F 33% M	42.5 years	C1: App (my meal mate) C2: Website group (weight loss resource website) C3: Food diary group	C1: Smartphone App Group ***Goal Setting***: set weight goals ***Self-Monitoring***- daily calories intake ***Feedback***: log items in by selecting food/drink images into s food diary. ***Physical Activity:*** recorded into the users diary: instant feedback on energy expenditure ***Tailored weekly text messages***- triggered based on the users progress	128	6 mths	

Smoking											
Glanz, Rimer & Viswanath, (2013)	RCT/ 2 conditions	Pre & Post Bio chemical (6 mths)	UK	Community	55% M 45% F	36.8 yrs.	C1: Control Random messages	C2: Intervention Group (Text2Stop) ***Messages:*** Daily Motivational and Behavioural Messages (specific issues, quit day, after quit day, crave support, lapse request) ***Personalised Algorism:*** smokers concerns, weight gain data gathered at baseline to personalise messages	5,800	6 mths	SD= 45.6 No Mean
Whittaker, et al, (2009)	RCT/2 conditions	Pre & post (6 months)	Australia & New Zealand	Community (younger adults)	47% F	27 years	C1: Control General Health Video Messages every 2 weeks	C2: Interactive Complex Video Messages ***MSM:*** daily video messages ***Role Model***: 6 role models to choose from (ex-smokers): Modelling and observation will alter health behaviours ***Techniques/Coping Strategies***: Video Dairies ***Behaviour Techniques***: social support, goal setting, triggers, positive reinforcement, cue ***SMS:*** on demand messages: crave, relapse, motivation	226	6 mths	No SD/Mean
Haug, Schaub, Venzin, Meyer & John, (2013)	RCT/2 conditions	Pre and Post measures	Switzerland	Community (young people	48.1% M 51.9% F	18.2 years	C1: text messages C2: control group assessment only	C1: Intervention Group (stages of change theory) ***Weekly text message assessment***: 1 message per week assess smoking related behaviour ***Individually tailored text messages:*** based on their stages of change: eg. Person in the intentional stage would receive 1- risk of smoking, outcomes, and motivators to quit. Messages differed depending on the stage.	755	3 months	

Table 2: Summary of Main Outcomes

Study Reference Numbers	Health Condition	Comparison	Main Outcomes	Jadad Quality Scale
Obesity				
Gasser, et al (2006)	Health behaviours (activity and nutrients) in healthy sample	Internet intervention Vs. Smartphone application	There is no difference between two groups of participants – one working with a mobile application, the other with a web-based application – in terms of their lifestyle goal achievement, nor was there difference in lifestyle goal achievement between a group with social facilitation and a group without. Both groups in web & apps were successful in meeting their goals. Sig differences between woman & men, women were more successful in meeting their food goals than men.	3
Sherwood, et al (2006)	Diet and exercise in obese individuals	Intervention (SmartDiet app) Vs. Control	Participants in the intervention group found the app useful for health information (58%). There was a sig diff in weight, BMI, which decreased in the intervention group. However, with a small sample size it would be difficult to generalise.	Case control
Free, et al, (2011)	Weight Control/Loss techniques in obese and overweight individuals	Usual care Vs. Mobile phone intervention	At the end of 4 months, the intervention group (n = 33) lost more weight than the comparison group (−1.97 kg difference). Intervention participants' adjusted average weight loss was 2.88 kg (3.16%). At the end of the study, 22 of 24 (92%) intervention participants stated that they would recommend the intervention for weight control to friends and family.	3
Carter, et al (2013)	Weight Loss	Smartphone application Vs. website Vs. printed material	At the end of the 6 months there was no statistically powered to detect a difference in weight change among the groups. Completers in the smartphone group had a mean weight loss of -5.0 kg (95% CI -6.7 to -3.3) after 6 months. Adherence to dietary self-monitoring was found to be statistically significantly higher in the smartphone group than the website and paper diary group (P<.001).	4
Smoking			Mobile phoned delivered smoking intervention showed a significant increase of abstinence levels of participants after 6 months.	5
Glanz, et al (2008)	Smoking Cessation via mobile phone messages	Intervention (text2stop) Vs. Control (non-related messages)		

Whittaker et al, (2009)	Smoking Cessation via video messaging	Intervention (complex video messages related to smoking Vs. Control (general health videos)	No sig effect was evident between both conditions: however, participants in the intervention group enjoyed this novel approach and found the video's useful.	5
Haug, et al (2013)	Smoking Cessation via text messages	Intervention (text messages) Vs. Control	The 7-day smoking abstinence rate at follow-up was 12.5% in the intervention group and 9.6% in the control group (ITT: *P*=.92). No differences between the study groups were observed in 4-week. The decrease in the mean number of cigarettes smoked per day from baseline to follow-up was higher in the intervention group than in the control group.	5

4 Results

4.1 Data Extraction

Seven studies were identified and reviewed for this paper; details outlining the description of each study are presented in Tables 1 and 2. The research articles were all published between 2006-2013 and originate from different countries. Gasser, et al. (2006) and Haug, et al. (2013) were conducted in Switzerland; Sherwood, et al. (2006) was conducted in Korea; Free, et al. (2011) was conducted in the United States of America; Glanz, et al. (2008) and Carter, et al. (2013) were conducted in the United Kingdom; Whittaker, et al. (2009) was Australia and New Zealand.

4.2 Study Characteristics - Obesity

The recruitment process differs for Lee, et al. (2010), as they enrolled their sample from a clinical population in comparison to the other studies, which offered their intervention to the community (Gasser, et al., 2006; Free, et al., 2011; Glanz, et al., 2008; Whittaker, et al., 2009; Cater, et al., 2013; Haug, et al;, 2013). In retrospect, this offered a holistic population-based sample. The methodology chosen to compare the interventions also varied, as five studies compared mobile health interventions with either a control group with usual care or no support (Free, et al., 2011; Sherwood, et al., 2006; Carter, et al., 2013; Haug, et al., 2013) or with an internet intervention (Gasser, et al., 2006). Six of these studies were randomised control designs (RCTs) and one was a case control (Sherwood, et al., 2006).

4.3 Study Characteristics- Smoking

The three research studies (Glanz, et al., 2008; Whittaker, et al., 2009; Haug, et al., 2013) identified for smoking were RCT designs, and the sample recruited to test these interventions was derived from the community. These studies opted to compare their mobile interventions with a control group. Glanz, et al. (2008) sent random messages to their control sample,

whereas Whittaker, et al. (2009) opted to send general health video messages every two weeks. Haug, et al. (2013) differed as they personalised text messages for the participants, sending one text message per week.

4.3.1 Sample Characteristics

Collectively, all seven studies had a total sample size of 7,063 participants (282 obesity and 6,781 smoking) with a sample size ranging from 36-5,800 per study. For the obesity interventions, the participants' ages ranged from 28-50 years (Gasser, et al., 2006; Sherwood, et al., 2006; Free, et al., 2011; Cater, et al., 2013) and from 27-36 years for smoking (Glanz, et al., 2008; Whittaker, et al., 2009; Haug, et al., 2013). All the studies included both genders; however, Free, et al. (2011), Gasser, et al. (2006) and Carter, et al. (2013) had considerably more female participants.

4.3.2 Intervention Characteristic and Significance

Of the seven research studies, the duration of the intervention varied, ranging from 28 days to six months. Gasser, et al. (2006) and Sherwood, et al. (2006) opted to test their intervention over a period ranging from 28 days to six weeks, and Free, et al. (2011), Glanz, et al. (2008), Whittaker, et al. (2009), Carter, et al. (2013), and Haug, et al. (2013) tested their approach on a longer-term basis by offering their intervention based on sixteen weeks to six months. All the studies used objective measures to compare the effectiveness of their interventions. Pre and post quantitative data were collated either by questionnaires or physical measures (body mass index, body composition, or biochemical feedback), thereby enabling the results to be comparable.

The theoretical drive for each study ascended from different psychological foundations. Whittaker, et al. (2009) embedded social cognition theory (role-modelling and observation) and Haug, et al. (2013) incorporated the transtheoretical model of change within their

assessment phase and intervention. Conversely, Gasser, et al. (2006), Sherwood, et al. (2006), Glanz, et al. (2008), and Carter, et al. (2013) extracted elements of cognitive behavioural methodology, specifically self-monitoring and behavioural and motivational techniques. All seven studies followed the same principles of behavioural change, and the effectiveness of the interventions in changing the participants' unhealthy behaviour was the main determinant for their studies to be deemed successful.

4.4 Obesity

Gasser, et al. (2006) found no significant changes within their samples in relation to achieving lifestyle goals. Participants using the mobile health apps and internet interventions were successful in meeting their goals; however, a significant difference was evident between both genders, with women being more successful in meeting their food goals than men.

Alternatively, Lee (2010) and Patrick, et al. (2009) established significant results: 58% of the sample using the SmartDiet app found the health information included within it to be useful and informative. Similarly, the intervention group in Patrick, et al. (2009), using mobile phone text messaging support, lost more weight than the comparison group, and a medium effect size was observed.

Carter, et al. (2013) did not detect a significant weight loss difference between participants assigned to the 'My Meal Mate' app and the control group. Participants in the app group had a mean weight loss of 5kg in the six post measurements. These results suggest that participants were significantly more adherent when using the dietary self-monitoring tool in the app group than in the case of the website and paper diary control groups.

4.5 Smoking

Free, et al. (2011) present a significant increase in abstinence levels for their sample, whereas Whittaker, et al. (2009) found no significant results. Their sample, however, enjoyed the novel idea of video messaging, and found this method valuable and diverse.

Haug, et al. (2013) reported no statistically significant abstinence levels for smokers; they did find, however, that participants in the intervention group had significantly lowered their cigarette consumption. The mean number of cigarettes smoked per day decreased between the baseline and the follow up, and was also higher in the intervention group.

When examining all the studies, the end results suggest that although mobile phone interventions are innovative and different with their approach, the end results are not particularly dissimilar to web based interventions. In summary, two of the three obesity apps demonstrated significant differences (Sherwood, et al., 2006 and Free, et al., 2011) and the 'text2stop' initiative (Glanz, et al., 2008 and Haug, et al., 2013) also prompted significant changes within their sample.

5 Discussion

This current review has presented the available literature evaluating mobile health interventions within two significant health areas – smoking and obesity. This review aims to give the reader an overview of the efficacy of mobile health applications.

The first obvious finding is that research in this area is limited. The research conducted to date is interesting, but no research has yet provided cohesive and coherent results.

While smoking cessation services have been expanding in recent years, the development of mobile apps has been slower. From the literature search, three research articles (Free, et al. (2011); Gasser, et al. (2009); Haug, et al. (2013)) were shortlisted for inclusion.

All of these studies are randomised controlled designs, and compared a mobile cessation intervention with a control group. These studies have indeed provided a basis for understanding the processes involved in developing a mobile smartphone app. Free, et al. (2011) in particular found significant changes in abstinence within their sample, and positively appraised the use of text messages in reducing their cigarette intake. Haug, et al. (2013) used personalised text messages to support participants in lowering their cigarette consumption, while Whittaker, et al. (2009) opted to offer complex video messages to their sample, which was unfortunately established to be less effective in encouraging their sample to alter their smoking behaviour. Conversely, Glanz, et al. (2008) and Whittaker, et al. (2009) did not provide standard descriptive statistics such as the Mean and Standard Deviation, making it difficult to calculate the effect size of these studies. Nonetheless, these research studies applied behavioural methods within their interventions, offering motivational messages in particular to their sample. This suggests that developing a smoking cessation app that incorporates elements of positively-driven messages and self-help tools such as smoking diaries and novel approaches such as video messages can shift the normative service currently being offered to the public.

A similar trend is seen in the obesity interventions: evidently, all of these studies choose to offer overweight participants tools to alter their unhealthy habits and increase their levels of physical activity and nutrient intake. Studies like Gasser, et al. (2006), Free, et al. (2011) and Carter, et al. (2012) offered a similar underlying support mechanism via their mobile interventions; all of these opted to offer interactive social features within their apps along with daily alerts to prompt their samples.

Tailored interventions incorporating social support modules such as peer support have been found to be beneficial to users. For years, traditional social support research has emphasised the benefits of developing social networks and support, which aid in buffering individuals with health-seeking behaviour. The social sciences have aimed to understand the

impact of these social relationships on health status, behaviours, and decision-making, and have concluded that tailored social support, which integrates interactive elements such as connectivity to individuals going through a similar situation, is more beneficial than offering a generic social network module within an intervention (Glanz, et al., 2009).

Consequently, Gasser, et al. (2006) incorporated social facilitation support by offering a social support forum to ten participants and comparing this to ten solitary users. Their aim was to compare user satisfaction and usage of the app with the social support module. Although their findings were inconclusive and there was no evidential difference between both 'teams', the intervention did in fact give rise to an evaluation of the benefits and drawbacks of social support within a technological application, which has not been done before.

The methodological qualities of the studies were assessed using the Jadad Scale (2005), as is presented in Table 2. Glanz, et al. (2008), Whittaker, et al. (2009), Carter, et al. (2013), and Haug, et al. (2013) maintained robust standards by providing details of randomisation, blinding, and participant dropout. On the other hand, Gasser, et al. (2006) and Free, et al. (2011) failed to provide clear descriptions of randomisation, blinding, and participants' accounts. Given this missing information, the results of these studies should be read with caution.

5.1 Limitations and Future Research

The sample sizes used were relatively small, excluding Glanz, et al. (2008) and Haug, et al. (2013), which makes it difficult to generalise these results. Similarly, the studies did not offer a comprehensive picture of the content and application components of their interventions. Yet again, more research focusing on comparing mobile health apps with a control group needs to be undertaken, as this will enable a more logical evaluation of the usefulness of this approach. Similarly, four of the research papers failed to offer standard statistics, and so future research should include information to allow researchers to work out the effect sizes.

Further research should also include other health promotion smartphone interventions. For example, supporting people to drink in a safe manner and lowering the consumption of alcohol is a preventative method that is beneficial to society. Recent reviews have suggested that a different approach is required to examine the efficacy and usefulness of mobile health apps, and although our attempts to examine the effectiveness of alcohol apps came to an end due to the non-existent research in this area, Cohn, Hunter-Reel, Hagman & Mitchell (2011) also echoed this need.

5.2 Conclusion

The present review offers an introduction to and overview of the current research available to the researcher seeking to understand the efficacy and development of mobile health apps. In conclusion, this review identifies a need for more comprehensive research within this area. Publishing accurate findings will provide a solid basis for understanding whether smoking or obesity can be altered and supported through smartphone mobile applications. Mobile technology has the potential to reach millions, given the ongoing development of new innovative phones, and offering health promotion and intervention through this portal represents the future.

While the studies discussed above are not sufficient to reach a conclusion as to whether mobile technology is effective, this review should be regarded as a contribution, and as the beginning of an understanding of this quickly growing method of health promotion.

References

Carbone J.C., S. Kverndokkb, O. J. Røgebergb. Smoking, health, risk, and perception. *Journal of Health Economics* 2005;(24):631-358.

Carter, M C, Burley, VJ Nykjaer, C and Cade, JE (2013) Adherence to a Smartphone Application for Weight Loss Compared to Website and Paper Diary: Pilot Randomized Controlled TrialJ Med Internet Res. 2013 April; 15(4): e32. doi: 10.2196/jmir.2283

Carson, K V. Brinn, MP. Labiszewski, N A. Esterman, A J. Chang, AB. Smith, B J. Community interventions for preventing smoking in young people Cochrane Database of Systematic Reviews. *John Wiley & Sons, Ltd* 2011;7.

Cohn AM, Hunter-Reel D, Hagman BT, Mitchell J. Promoting behavior change from alcohol use through mobile technology: the future of ecological momentary assessment. *Alcohol Clin Exp Res* 2011; 12;35(12):2209-

Cuijpers P, van Straten A, Warmerdam L, Andersson G. Psychological treatment of depression: A meta-analytic database of randomized studies. *BMC Psychiatry* 2008;8(1):36.

Civljak M, Sheikh A, Stead LF, Car J. Internet-based interventions for smoking cessation. *Cochrane Database Syst Rev* 2010; 09;(9).

Free C, Knight R, Robertson S, Whittaker R, Edwards P, Zhou W, et al. Smoking cessation support delivered via mobile phone text messaging (txt2stop): A single-blind, randomised trial. The Lancet 2011; 2; 378 (9785):49-55

Gosling SD, Vazire S, Srivastava S, John OP. Should We Trust Web-Based Studies? A Comparative Analysis of Six Preconceptions About Internet Questionnaires. *American Psychologist* 2004;59(2):93-104.

Gasser, R. Brodbeck, D. Degen, M. Luthiger, J. Wyss, R and Reichlin, S. Persuasiveness of a Mobile Lifestyle Coaching Application Using Social Facilitation. *Persuasive Technology* 2006;3962:27-38.

Glanz K, Rimer KB and Viswanath K. Health Behaviour and Health Education: Theory, Research, and Practice. 4th edition. Jossey- Bass, Wiley; 2008. ISBN: 9780787996147

Haug S, Schaub MP, Venzin V, Meyer C, John U (2013) Efficacy of a Text Message-Based Smoking Cessation Intervention for Young People: A Cluster Randomized Controlled Trial J Med Internet Res 2013;15(8):e171 URL: http://www.jmir.org/2013/8/e171/ doi: 10.2196/jmir.2636

Hilton, S. Patterson, P. Teyhan, A. Escalating Coverage of Obesity in UK Newspapers: The Evolution and Framing of the Obesity Epidemic From 1996 to 2010. *Obesity* 2012

Jebb, SA. Rennie, KL. Cole TJ. Prevalence of overweight and obesity among young people in Great Britain. *Public Health Nutrition* 2004;7:461.

Kelders SM, van Gemert-Pijnen J,E.W.C., Werkman A, Seydel ER. Usage and effect of a web-based intervention for the prevention of overweight; a RCT. *Stud Health Technol Inform* 2010; 160: 28-32.

Lee W, Chae YM, Kim S, Ho SH, Choi I. Evaluation of a mobile phone-based diet game for weight control. *J Telemed Telecare* 2010; 07/01;16 (5):270-5.

Maher C. Social media for kids: to tweet or not to tweet?. *Healthy Development Adelaide (HDA) Seminar* 2012

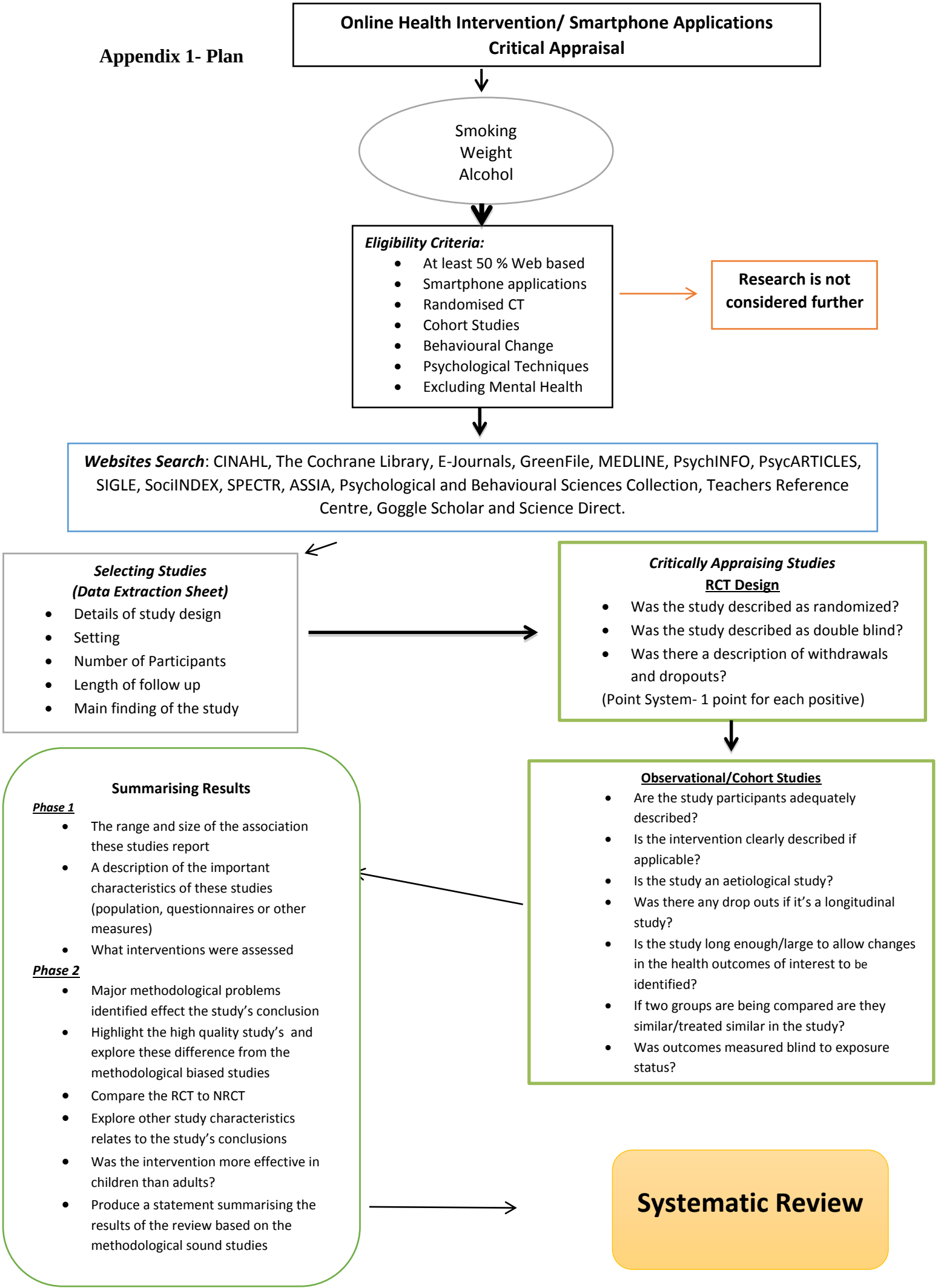
Patrick K, Raab F, Adams MA, Dillon L, Zabinski M, Rock CL, et al. A text message-based intervention for weight loss: Randomized controlled trial. *Journal of Medical Internet Research* 2009; 01;11(1):12-9

Swartz LHG, Noell JW, Schroeder SW, Ary DV. A randomised control study of a fully automated internet based smoking cessation programme. *Tobacco Control* 2006; February 01;15(1):7-12.

Sherwood NE, Jeffery RW, Pronk NP, Boucher JL, Hanson A, Boyle R, et al. Mail and phone interventions for weight loss in a managed-care setting: weigh-to-be 2-year outcomes. *International Journal of Obesity (Formerly International Journal of Obesity and Related Metabolic Disorders)* 2006; 10/01;30(10):1565-73.

Whittaker R, Borland R, Bullen C, Lin RB, McRobbie H, Rodgers A. Mobile phone-based interventions for smoking cessation. *Cochrane Database Syst Rev* 2009; 12;(4).

Appendix 1- Plan



Appendix 2 Research Assessment Stage- only RCT: Jadad Scale
Internet delivered interventions

Obesity

Shortlisted Articles	***Randomization***	***Blinding***	***Account for all participants***	***Total***
Bennett et al. (2010)	2	2	1	5
Chen et al, (2010)	2	1	1	4
Cook et al, (2007)	1	1	1	3
Kelders et al, (2010)	2	1	1	4
Schroder (2010)	2	1	1	4
Van Wier et al, (2009)	2	0	1	3
Harvey- Berino et al, (2010)	2	1	1	4

Smoking

Shortlisted Articles	***Randomization***	***Blinding***	***Account for all participants***	***Total***
Blankers, et al. (2011)	1	1	1	3
Volg et al (2009)	2	1	1	4
Riper et al (2007)	2	1	1	4
Cunningham et al, (2009)	2	1	1	4
Kypri, et al, (2008)	2	2	1	5
Hester et al, (2012)	2	1	1	4

Shortlisted Articles	***Randomization***	***Blinding***	***Account for all participants***	***Total***
Brendryen & Kraft (2008)	2	1	1	4
Kramer et al, (2009)	2	1	0	3
Dahaner et al (2009)	2	1	1	4
McDonnell et al (2011)	2	2	1	5
Norman et al, (2008)	2	0	0	2
Stretcher et al, (2005)	1	1	1	3
Zbikowki et al, (2010)	1	0	1	2
Japuntich et al, (2006)	1	1	1	3
Swartz et al, (2005)	2	1	0	3

Table 3: Research Assessment Scale: Smartphone Application/Mobile Interventions RCT Design Studies

Obesity

Shortlisted Articles	*Randomization*	*Blinding*	*Account for all participants*	*Total*
Gasser, et al. (2006)	1	1	1	3
Sherwood, et al. (2006)	2	1	1	4
Patrick et al, (2009)	2	0	1	3

Smoking

Shortlisted Articles	*Randomization*	*Blinding*	*Account for all participants*	*Total*
Free, et al. (2011)	2	2	1	5
Whittaker et al, (2011)	2	2	1	5

Appendix 3 Effect Size for Smartphone Mobile Health Application

Articles	Outcomes Measured	Effect Size
Gasser, et al. (2006)	Activity and Healthy Nutrition	N/A
Lee et al, (2010)	Body Composition (Fat mass, weight and body mass index)	Mean difference: 1.4kg- NO SD/SE
Sherwood, et al. (2006)	Weight Loss (KG)	-0.05
Patrick et al, (2009)	Weight Loss (BMI, KG) Intervention Vs., Control	-0.61
Free, et al. (2011)	Self-reported smoking abstinences, biochemical reading	I worked out the SD=45.6 But yet again there no mean was thinking to use the % which is highlighted in Table 2 (focusing on the primary outcomes only)
Whittaker et al, (2011)	Self-reported smoking abstinences	No SD/SE it's all in %