Evaluating the implementation of interventions to improve independence in dementia

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Declaration

I, Holly Jane Walton, confirm that the work presented in this thesis is my own.

Where information has been derived from other sources, I confirm that this has been indicated in the thesis.

The following work was carried out at the Department of Clinical, Educational and Health Psychology, University College London (UCL), under the supervision of Professor Susan Michie, Professor Aimee Spector and Doctor Ildiko Tombor. This work formed part of two larger projects: Promoting Independence in Dementia (PRIDE) and Valuing Active Life in Dementia (VALID). This thesis has not been submitted, in whole or in part, for any other degree, diploma or qualification at any other University.

This PhD research was funded by the UCL Economic and Social Research Council Doctoral Training Centre.

This thesis does not exceed the limit of 100,000 words specified by the Degree Committee.

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Date:

Abstract

To understand effects of psychological and social interventions for people with dementia, it is necessary to understand whether interventions are delivered as planned ('fidelity of delivery') and engaged with. This thesis aimed to evaluate the implementation of two interventions for people with dementia: the 'Promoting Independence in Dementia' intervention (PRIDE) and the 'Community Occupational Therapy in Dementia-UK' intervention (COTiD-UK).

Three stages were followed: (i) systematically reviewing measures of fidelity and engagement in complex, face-to-face health behaviour change interventions, (ii) developing and using reliable measures to assess fidelity of PRIDE and COTiD-UK, and engagement with PRIDE, and (iii) identifying factors influencing fidelity and engagement and developing recommendations to improve these behaviours.

Intervention sessions were audio-recorded and reliably rated for fidelity against fidelity checklists developed for PRIDE and COTiD-UK. Additionally, for PRIDE, dementia advice workers (DAWs) and participants completed checklists after each session. To identify factors influencing fidelity of, and engagement with PRIDE, interviews were conducted with DAWs, people with dementia and their supporters and analysed using thematic analysis and content analysis (informed by the COM-B model). The Behaviour Change Wheel was used to develop recommendations to improve fidelity and engagement.

Reliable fidelity checklists were developed for PRIDE and COTiD-UK. Both interventions were delivered with at least moderate fidelity. Participants reported high levels of engagement with PRIDE. Knowledge, providers' attributes, ease of adaptation of PRIDE in relation to participants' needs and logistical considerations influenced fidelity. Participants' attributes, capability and opportunity influenced engagement.

Recommendations to improve fidelity and engagement were developed to target barriers of opportunity and psychological capability.

This thesis provides an applied example of how behavioural science can be used to evaluate and develop recommendations to improve the implementation of dementia interventions. If effective, recommendations may have the potential to improve implementation and help people to live well with dementia.

Impact statement

The research presented in this thesis has potential for impact, both within and outside of academia.

Within academia

This research outlines a systematic, mixed methods process that can be used to evaluate the implementation of complex interventions. This process included: the development of high-quality, reliable measures of fidelity of delivery and engagement, identification of barriers to, and facilitators for fidelity of delivery and engagement, and the development of recommendations to improve fidelity of delivery and engagement. This process can be applied to different complex interventions for people with dementia, mental health or health conditions.

Two fidelity measures were developed in this thesis: The PRIDE fidelity checklist (for use by independent observers, providers and people with dementia) and the COTiD-UK fidelity checklist (for use by independent observers). These specific measures can be used by the PRIDE and COTiD-UK teams to measure fidelity in future versions of the trial or when implementing the trial within other contexts. The novel methodology used to develop these reliable measures can be applied more widely to other interventions for people with dementia, mental health or health conditions.

Outside of academia

This research has clear implications for clinical practice and policy. These findings help to understand whether and how PRIDE and COTiD-UK were effective. Understanding how PRIDE and COTiD-UK were delivered is useful for policymakers deciding whether and how PRIDE and COTiD-UK should be implemented more widely to people with dementia. Furthermore, if PRIDE and COTiD-UK were effective and were implemented in practice, this work could inform the extent to which they might need to be delivered and engaged with in order to be effective.

These studies highlighted components that were not delivered as planned and identified barriers and facilitators to fidelity and engagement. To ensure that healthcare providers are equipped to deliver evidence-based interventions for people with dementia, these findings can inform the improvement of training for healthcare providers delivering PRIDE and COTiD-UK.

The recommendations that were developed in this thesis can also be used to potentially improve delivery of, and engagement with the PRIDE intervention. Some of these findings may also be generalisable to other interventions for people with dementia. For example: findings from the interviews with people with dementia highlighted key environmental barriers to engagement. These findings could be used to consider how best to develop strategies to ensure that communities are accessible for people with dementia to engage in their chosen activities.

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Firstly, I would like to thank Professor Susan Michie for being a brilliant supervisor, for believing in me and for providing me with the opportunity to undertake this PhD research. I have learnt so much from your supervision, support and academic mentoring during the last four years. I would not have developed as much as I have either personally or professionally without your guidance and patience – thank you! I am also extremely thankful to Professor Aimee Spector and Doctor Ildiko Tombor for their guidance, encouragement and mentorship throughout the PhD. I am extremely lucky to have had the opportunity to work with amazing mentors and learn from their expertise. I hope to continue collaborating with, and learning from them in years to come.

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I would also like to thank the UCL Health Psychology Research Group and my fellow PhD students at UCL and in PsyPAG for their support and encouragement throughout the PhD. I have learnt so much from all of you and it has been a joy to work alongside such hard-working and lovely groups of people. I would like to extend a particular thank you to my friends and colleagues who have supported me throughout this PhD, including Olga Perski, Laura Hull, Doctor Charlotte Stoner, Anna Roberts, Jem Bhatt, Hilary Groarke, Morgan Williamson, and Paulina Schenk.

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List of Abbreviations

APEASE – Affordability, Practicality, Effectiveness/cost-effectiveness, Side-effects/safety, Equality

BCT – Behaviour Change Techniques

BCTTV1 – Behaviour Change Technique Taxonomy Version 1

BCW - Behaviour Change Wheel

COM-B – Capability, Opportunity, Motivation – Behaviour

COTiD – Community Occupational Therapy in Dementia

COTiD-UK – Community Occupational Therapy in Dementia – United Kingdom

CST – Cognitive Stimulation Therapy

DAW – Dementia advice worker

DEEP – The Dementia Engagement and Empowerment Project

ESRC – Economic and Social Research Council

GDS – Global Deterioration Scale

HBCP – Human Behaviour Change Project

iCST – Individual Cognitive Stimulation Therapy

MRC – Medical Research Council

NHS – National Health Service

NIHR – National Institute for Health Research

OPHI – Occupational Performance History Interview

OT- Occupational therapist

PABAK – Prevalence and Bias Adjusted Kappa

PICO – ‘Participants’, ‘Intervention’, ‘Control’ and ‘Outcomes’

PPI – Public Patient Involvement

PRIDE – Promoting Independence in Dementia

PRIMROSE – Prediction and Management of Cardiovascular Risk for people with severe mental illnesses

PRISMA – Preferred Reporting Items for Systematic Reviews and Meta-Analyses

RCT – Randomised Controlled Trial

RE-AIM – Reach, Effectiveness, Adoption, Implementation and Maintenance

SMART – Specific, Measurable, Achievable, Realistic and Timed

SD – Standard Deviation

TDF – Theoretical Domains Framework

UCL – University College London

VALID – Valuing Active Life in Dementia

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Contributions

This thesis describes research from two trials: the Promoting Independence in Dementia intervention (PRIDE) and Community Occupational Therapy in Dementia UK intervention (COTID-UK).

Holly Walton (HW) with support from Susan Michie (SM), Aimee Spector (AS) and Ildiko Tombor (IT), designed and conducted all of the research studies outlined in this thesis. HW drafted all chapters, SM, AS and IT provided feedback and guidance throughout this PhD research and for each chapter. HW revised the chapters accordingly.

Chapter 2

HW conducted the review and analysed the data. Jacqui Smith, librarian at University College London helped to build and check the search strategy, Olga Perski helped with screening the identified articles and Charlotte Stoner helped with reviewing the data extraction forms and grouping indicators of quality.

Chapter 3

For PRIDE, HW developed the frameworks and checklists with support and advice from supervisors. Members of the PRIDE team gave feedback on draft checklists and helped to gain informal feedback from Public Patient Involvement (PPI) members. The audio-recordings were transcribed by a professional transcription service (Way with Words). HW ensured that transcripts were anonymised. HW coded transcripts, developed and revised coding guidelines, analysed data and wrote up the report. HW and Jem Bhatt piloted coding guidelines initially. Transcripts were then coded by HW and double coded by Morgan Williamson (MW).

For the COTiD-UK intervention, fidelity data were collected by members of the COTiD-UK team. Members of the VALID team designed the fidelity study for COTiD-UK. HW conducted the fidelity study. This involved the development of a fidelity checklist and analysis of fidelity data. Members of the COTiD-UK team helped to refine the COTiD-UK framework and checklists. The audio-recordings were transcribed by a professional transcription service (Trustytranscriptionists). HW ensured that the transcripts were anonymised before sending to coders. HW initially coded the transcripts, revised and amended the coding guidelines, analysed the data and drafted this report. Six coders were involved in achieving reliability (Laura Hull, Olga Perski, Harveen Kaur, Jane Burgess, Tom Swinson & Hilary Groarke: HG).

Chapter 4

For both interventions, the audio-recordings were transcribed by professional transcription services (PRIDE: Way with Words, VALID: Trustytranscriptionists).

For PRIDE, Emese Csipke and Phuong Leung received and helped to store the data. Researchers at the individual research sites helped to keep track of the data. HW coded all transcripts and MW double coded 10%. HW analysed the data.

For COTiD-UK, Jane Burges, Jennifer Wenborn and Sandra Nolles organised transcription and managed data. HW anonymised all transcripts. Jane Burgess checked transcript labelling. HW coded all transcripts and HG double coded 10%. HW analysed the data.

Chapter 5

HW designed and developed the interview schedules, with support from supervisors. Feedback was sought from members of the Work Package 3 team. Audio-recordings were transcribed by a professional transcription service (Way with Words). HW conducted the thematic analysis. Jem Bhatt helped to double code three transcripts to test the coding frames and reviewed the themes and example extracts. HW and Anna Roberts double coded all extracts according to the COM-B model as a validation exercise. Supervisors helped to review the themes and analysis.

Chapter 6:

HW mapped the interview findings onto the Behaviour Change Wheel to develop recommendations to improve fidelity of delivery and engagement.

Ethical approval

The PRIDE programme of research has received Health Research Authority approval and NHS ethical approval as part of the feasibility trials intervention ethics application (NHS East Midlands – Nottingham 1 Research Ethics Committee, REC reference number: 16/EM/0044).

The programme of research referring to the VALID COTiD-UK intervention has been approved by NHS ethics (NRES Committee London – Camberwell St Giles, Reference number: 14/LO/0736).

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The VALID programme (including the COTiD-UK intervention), which is also reported in this thesis is independent research funded by the National Institute for Health Research (NIHR) under its Programme Grants for Applied Research scheme (RP-PG-0610-10108). The views expressed in this thesis are those of the author and not necessarily those of the NHS, the NIHR or the Department of Health. The VALID research team acknowledges the support of the National Institute of Health Research Clinical Research Network. This research is sponsored by North East London NHS Foundation Trust.

Dissemination

A version of Chapter 2 has been published in a peer-reviewed journal (see Appendix 2-3) and presented at one conference. Details are as follows:

Walton, H., Spector, A., Tombor, I., & Michie, S. (2017). Measures of fidelity of delivery of, and engagement with, complex face-to-face health behaviour change interventions: A systematic review of measure quality. *British Journal of Health Psychology.* DOI: 10.1111/bjhp.12260.

Walton, H., Spector, A., Tombor, I., & Michie, S. (2016). Measures of fidelity of delivery of, and engagement with, complex health behaviour change interventions: A systematic review (Oral Presentation). PsyPAG conference. University of York. 29th July 2016.

Parts of Chapter 3 and 4 have been presented at four conferences. Details are as follows:

Walton, H., Spector, A., Tombor, I., & Michie, S. (2018). Are psychological and social interventions delivered as planned? (Poster presentation). Alzheimer's Society Conference. London. May 2018.

Walton, H., Tombor, I., Burgess, J., Swinson, T., Wenborn, J., Spector, A., Orrell, M., & Michie. S. (2017). Assessing fidelity of delivery of the Community Occupational Therapy in Dementia Intervention (Poster presentation). European Health Psychology Society conference. Padova, Italy. August 2017.

Walton, H., Spector, A., Tombor, I., & Michie, S. (2017). Measuring fidelity of delivery of, and engagement with, the Promoting Independence in Dementia (PRIDE) intervention (Oral Presentation). PsyPAG conference. University of Northumbria. 27th July 2017.

Burgess, J., Swinson, T., Wenborn, J., Walton, H., & Michie, S. (2017). Are we doing it right? Assessing fidelity of delivering a complex intervention: Community Occupational Therapy in Dementia (COTiD-UK) (Poster presentation). COT Annual Conference. Birmingham. June 2017.

Part of Chapter 5 has been presented at one conference:

Walton, H., Spector, A., Tombor, I., & Michie, S. (2018). Achieving engagement with an intervention to support people living with dementia: A qualitative study (Oral Presentation). Centre for Behaviour Change Conference, London. February 2018.

Part of Chapters 5 and 6 have been presented at one conference:

Walton, H., Spector, A., Tombor, I., & Michie, S. (2017). Understanding the factors influencing delivery of the Promoting Independence in Dementia Intervention (Oral Presentation). PsyPAG conference. University of Huddersfield. 25th July 2018.

Thesis summary

Dementia is becoming an increasingly important global health initiative as the number of people being diagnosed with dementia is increasing rapidly. Effective psychological and social interventions are needed to support people with dementia to live independently. To understand the effectiveness of these interventions, researchers need to understand which parts of an intervention are delivered and engaged with as planned and the factors which influence delivery and engagement.

The aim of this PhD thesis was to evaluate the implementation of interventions for people with dementia. The PhD will draw on research from two interventions: (i) Promoting Independence in Dementia (PRIDE) and (ii) Community Occupational Therapy in Dementia (COTiD-UK).

Chapter 1 provides a general introduction to this thesis, including an introduction to: dementia, evidence for interventions which aim to improve independence in dementia, fidelity of delivery and engagement, the factors influencing fidelity of delivery and engagement and the need for behaviour change in relation to fidelity of delivery and engagement. The Chapter concludes with the thesis aims.

Chapter 2 reports the findings from a systematic review which aimed to 1) identify the types of measures used to monitor fidelity of delivery of, and engagement with, complex, face-to-face health behaviour change interventions and 2) describe the reporting of psychometric and implementation qualities. Studies that quantitatively measured fidelity of delivery of, and/or engagement with a face-to-face health behaviour change intervention for adults were included. Data on interventions, measures and psychometric and implementation qualities were extracted and synthesised using narrative analysis. Sixty-six studies were included. Fewer than half of the reviewed studies measured both fidelity of delivery of, and engagement with, health behaviour interventions. Measures covered observation, self-report and

intervention records. Whilst 74% reported at least one psychometric quality, only 26% reported at least one implementation quality. To conclude, interpretation of intervention outcomes from fidelity of delivery and engagement measurements may be limited due to a lack of reporting of psychometric and implementation qualities.

Chapter 3 reports the development of reliable measures that can be used to assess 1) fidelity of delivery of, and engagement with PRIDE and 2) fidelity of delivery of COTiD-UK. Four stages were followed: 1) reviewed previous measures, 2) analysed intervention components and developed a framework of intervention components, 3) developed fidelity checklists of key components and coding guidelines, and 4) obtained feedback about the content and wording of checklists and guidelines. Fidelity checklists and coding guidelines were piloted and refined until good agreement was achieved. After several rounds of piloting and amendments to the checklists and coding guidelines, measures of fidelity of delivery for PRIDE and COTiD-UK, which could be used with good inter-rater agreement, were developed. To conclude, a systematic method involving a number of iterative steps can be used to develop fidelity and engagement checklists for complex interventions, such as dementia interventions.

Chapter 4 reports the measurement of 1) fidelity of delivery of, and engagement with, the PRIDE feasibility trial across sessions, sites and dementia advice workers (DAWs), and 2) fidelity of delivery of, the COTiD-UK intervention across sessions, sites and occupational therapists (OTs). To measure fidelity of delivery of PRIDE and COTiD-UK, all sessions were audio-recorded. For both interventions, sessions were transcribed and rated for fidelity by researchers (PRIDE: 60%, COTiD-UK: 10%). For PRIDE, DAWs and people with dementia self-reported what was delivered. To measure engagement, people with dementia self-reported their levels of receipt and enactment. Findings from audio-recorded data showed that overall, PRIDE and COTiD-UK sessions were delivered moderately well as planned. For PRIDE, there was a discrepancy between ratings of fidelity from audio-recording and self-report data, with findings from self-report indicating high fidelity and high engagement. Delivery varied slightly across sessions, sites and providers. Overall, there can be a reasonable degree of confidence that any intervention effects were likely to be the result of the planned interventions.

Chapter 5 reports the factors influencing 1) fidelity of delivery of, and 2) engagement with, the PRIDE intervention. To identify what helped and hindered delivery and engagement, one-to-one interviews were conducted with eight DAWs, seven people with dementia and seven supporters. Thematic analysis was used to explore the factors which influenced fidelity and engagement, before using content analysis to identify barriers and facilitators of capability, opportunity and motivation using the COM-B model (capability, opportunity, motivation – behaviour). Fidelity of delivery of PRIDE was influenced by DAWs' knowledge, personal attributes and skills required to maintain fidelity whilst tailoring the intervention to the person with dementia and supporter and logistical considerations (including a supportive work environment and social support for delivery). Engagement with PRIDE amongst people with dementia and their supporters was influenced by their attributes, capability and opportunity to engage. Barriers to, and facilitators for fidelity of delivery and engagement were identified. To conclude, fidelity of delivery and engagement are complex behaviours with many interlinked factors and mechanisms influencing behaviour.

Chapter 6 reports the development of recommendations to improve 1) fidelity of delivery of, and 2) engagement with, the PRIDE intervention. Recommendations were developed by following the methodology proposed by the Behaviour Change Wheel. Four steps were followed: 1) understood barriers to, and facilitators for, fidelity of delivery and engagement (Chapter 5), 2) identified intervention functions and policy categories, 3) identified intervention content and 4) selected a mode of delivery. Four potential recommendations could improve fidelity: 1) show a video of how to deliver

PRIDE, 2) give an instruction sheet about how to deliver PRIDE, 3) give DAWs time to practice delivering PRIDE within the training session and 4) provide continued support from researchers for delivery. Four potential recommendations could improve engagement: 1) give participants a session summary document to prompt engagement, 2) give participants an instruction sheet detailing how to do their chosen activity, 3) ensure that there is time within the PRIDE sessions to practice doing the chosen activity, where possible and 4) provide regular, compulsory telephone support from DAW to put their plans into practice. In conclusion, the Behaviour Change Wheel can be used to systematically develop potential recommendations to improve fidelity of delivery of, and engagement with, PRIDE.

Chapter 7 summarises the key findings from this thesis, discusses how findings relate to previous research, provides implications for research, policy and practice, and discusses strengths, limitations and future research ideas.

Chapter 1 General Introduction

1.1 Interventions to improve independence in dementia

1.1.1 Dementia

Dementia is a global health concern. Currently, an estimated 850,000 people in the UK, and 46.8 million people worldwide are living with dementia. By 2050, it is expected that 115.4 million people will have received a diagnosis of dementia (Alzheimer’s Society, 2017). In the latest Diagnostic and Statistical manual, ‘dementia’ is referred to as a ‘major neurocognitive disorder’ (DSM-5; American Psychiatric Association, 2013). In this thesis, the term ‘dementia’ will be used, as it is widely accepted and used in research and practice.

Dementia is characterised by multiple cognitive impairments (including memory) and reduced independence. To diagnose dementia, symptoms should not be primarily explained by other disorders (DSM-5; American Psychiatric Association, 2013). Dementia may also affect other cognitive functions including speech, movement and ability to process and organise information.

Before a person is diagnosed with dementia, thorough assessments are carried out to identify cognitive symptoms, functional impairment, psychiatric and neuropsychiatric conditions and behavioural changes (Camicioli, 2013). The assessments include a full medical history review, physical, cognitive and neurological examinations and possible laboratory tests. Medical professionals can use these assessments to identify the type of dementia, symptoms, onset, severity and co-morbid conditions.

1.1.1.1 Types of dementia

Dementia is an umbrella term used to refer to many conditions, including Alzheimer’s Disease, Vascular Dementia, Dementia with Lewy Bodies, and Frontotemporal dementia (Alzheimer's Society, 2017). Although there are many types of dementia, this section focuses on Alzheimer's Disease and Vascular Dementia. These are the most common types of dementia in older adults (Hoe & Thompson, 2010); thus, the most relevant to this research. Fifty to 60 percent of people with dementia are diagnosed with Alzheimer's disease, and 10-20% of people are diagnosed with Vascular dementia. Other less common types of dementia include Dementia with Lewy body and frontotemporal dementia. Ten to 15 percent of people are diagnosed with Dementia with Lewy body, whereas frontotemporal dementia is diagnosed in 8-15% of all cases (Hoe & Thompson, 2010). A person may also have mixed dementia, in which their symptoms would be indicative of more than one type of dementia (Kaye, 1998; as cited in Zekry, Hauw & Gold, 2002).

Different types of dementia present differently, despite sharing some symptoms. Alzheimer's disease is characterised by a gradual decline in memory and other cognitive domains which may include the ability to perform activities, recognise and identify objects or people and communicate verbally (Hoe & Thompson, 2010; McKhann et al., 1984). Vascular dementia is characterised by a sudden, or stepwise onset of neurological signs and symptoms (Camicioli, 2013). Symptoms may include: behavioural impairments such as rigidity, incontinence and changes in mood (Roman et al., 1993; as cited in Hoe & Thompson, 2010). For vascular dementia, the onset of symptoms most often occur after a stroke. Dementia with Lewy body is characterised by changes in cognition, visual hallucinations and features of Parkinson's disease (Hoe & Thompson, 2010; McKeith et al., 1996). Frontotemporal dementia is characterised by behavioural and affective symptoms, (for example: disinhibition, a change in behaviour, or loss of sympathy) and language impairment (for example: non-fluent speech and loss of knowledge about the meaning of words) (Camicioli, 2013; Englund et al., 1994; Hoe & Thompson, 2010).

All individuals living with a diagnosis of dementia will experience different disease trajectories. Three stages of dementia, each with different symptoms, have been proposed: mild, moderate and severe dementia (Hoe & Thompson, 2010; Kitwood, 1997). For a person living with mild dementia their main symptom is likely to be forgetfulness and problems with recent memory. Other symptoms may also include mood changes and slower completion of complex tasks such as driving. On the other hand, people living with moderate dementia may experience significant memory problems, including recognition of people and places, disorientation, a decline in other cognitive functions such as decision-making and problem solving, communication difficulties, personality and behavioural changes, a lack of interest in hobbies and interests, and difficulties completing everyday tasks. A person living with severe dementia may experience severe problems in memory, disorientation, slow thinking, limited communication, behavioural problems including aggression and wandering, hallucinations, a decline in their physical health and reduced mobility. At this stage, an individual may need continued assistance with activities of daily living (Hoe & Thompson, 2010). Whilst some people with dementia will progress through each stage as the disease progresses, not all people diagnosed with dementia will reach the severe stages (Hoe & Thompson, 2010).

1.1.1.2 Models of dementia

Whilst these assessments help to identify symptoms of dementia, they do not explain why they occur. A number of models have been proposed to explain the symptoms of dementia. These models include: the medical model, social model, and biopsychosocial model.

The medical model proposes that symptoms of dementia can be explained solely by biological factors, such as the progressive deterioration of brain regions that control cognitive functioning (Lyman, 1989). Initially, the medical model was widely accepted. One possible explanation for the acceptance of this model was that a biological perspective of dementia indicated a straightforward medical solution or cure (Lyman, 1989). It is not possible to reduce a complex syndrome, such as dementia, to purely biological factors. If dementia was purely biological, doctors would be able to treat dementia with drugs alone (Lyman, 1989).

Research suggests that neurological factors cannot explain dementia symptoms alone. A longitudinal study which sampled a homogenous sample of 678 Catholic sisters (aged 75-102) found that cognitive functioning and neurological symptoms sometimes suggested different clinical outcomes. For example, they found that one participant showed neurological signs of dementia (vascular lesions) but did not display cognitive symptoms (Snowdon, 2003). These findings suggest that neurological symptoms do not always lead to cognitive symptoms of dementia and vice versa. The medical model is therefore limited and reductionist, as it does not consider psychological and social factors (Lyman, 1989). The implications of a biological model may lead to people feeling unable to control their condition (Hofland, 1988). As such, the medical model does not sufficiently explain dementia, as it does not account for differences in symptoms, the environment, or a person's life choices.

Alternatively, some researchers have proposed that dementia is socially constructed, and that people may develop dementia to avoid facing the reality of old age (Palfrey & Harding, 1997; as cited in Gilliard, Means, Beattie & Daker-White, 2005). This view is not well supported and is refuted by support for the medical model. Nonetheless, it may be useful to view dementia care from a social perspective. For example, some researchers propose that dementia care fits within a social model of disability (Gilliard et al., 2005). The social model of disability proposes that societies should aim to include everyone within society (Tregaskis, 2002). For people with dementia, an inclusive society would include a focus on the person's abilities, rather than losses, identify discrimination and acknowledge the importance of personal experience and environmental influences (Marshall, 2000; as cited in Gilliard et al., 2005).

Furthermore, Kitwood (1997b) challenged the notion of the medical model of dementia by proposing that a person with dementia cannot fully be understood without considering five factors. These were: a person's social relationships, life history and biography (including their personal history, culture, gender, social class, lifestyle and interests), personality, neurology and health (Kitwood, 1997b). Kitwood suggests that personhood is both psychological and neurological and that it is necessary to develop a framework that incorporates all five aspects to understand dementia. This model has been termed the 'Enriched model of dementia' (Brooker & Latham, 2016). Furthermore, the Enriched model is included within the VIPS definition of person-centred care. The VIPS definition of person-centred care consists of four elements: (i) Valuing people with dementia regardless of cognitive impairment or age, (ii) Treating people as Individuals and understanding that everyone has unique life stories, personalities, physical, psychological, social and economic resources, (iii) Viewing the world from the perspective of the person with dementia and (iv) Acknowledging that all human life is grounded in relationships and that people need an enriched social environment (Brooker, 2003; Brooker & Latham, 2016).

As many health conditions cannot be explained purely by biological or social factors, the biopsychosocial model of health was introduced (Engel, 1978). From this model, a biopsychosocial model of dementia was developed. The biopsychosocial model proposes that biological, psychological and social factors contribute to dementia (Spector & Orrell, 2010). It suggests that factors in a person's life may or may not be possible to change. Factors which can be changed include: a person's coping strategies, social environment, mental stimulation, physical health and pain. Factors that cannot be changed include: a person's background, life events, education, personality, age and genetics. To date, this model has received some support. For example, one study tested the biopsychosocial model in relation to awareness in early stage dementia. They found that awareness of memory functioning, functional ability and social functioning were associated with a range of psychological, social, and biological factors (Clare et al., 2012).

Although promising, some researchers argue that this model of dementia is incomplete, as it does not highlight the importance of physical factors. Support from a collective case study design generated five themes, including: physical wellbeing, physical health and examination, physical care, physical treatment and physical environment (Keady et al., 2012). Based on these findings, they proposed the need for a bio-psycho-social-physical model of dementia. These findings suggest that whilst the biopsychosocial model is more comprehensive than the medical model, it does not yet provide a holistic explanation of dementia.

Together the Enriched model of Dementia and the biopsychosocial model of dementia propose that we must view the diagnosis of dementia within the lens of social, psychological and biological factors and not just as the result of biological changes. These models also offer an explanation as to why people with dementia may experience dementia differently.

1.1.1.3 Perspectives in dementia research

Whilst evidence has contributed to our knowledge on the aetiology of dementia, there has also been a shift in the perspectives used in dementia research. Previously, dementia research focused more on the caregiver or healthcare professionals' perspective, rather than the person with dementia's point of view (Bamford & Bruce, 2000; Nolan, Ryan, Enderby & Reid, 2002). Furthermore, some researchers used 'proxy' scores to measure people with dementia's quality of life and outcomes (Brod, Stewart, Sands & Walton, 1999).

Research now follows the person-centred care approach (Kitwood, 1993), which proposes that communities should respect and include people with dementia (Boersma, van Weert, Lakerveld & Dröes, 2015). Findings may be limited if researchers do not consider the individuals with the most expertise in their condition (Nolan et al., 2002; Reid, Ryan & Enderby, 2001).

In parallel, healthcare has evolved to incorporate a ‘No decision about me, without me’ stance (Department of Health, 2012), moving towards a shared decision model. This stance has supported an increase in research which focuses on the person with dementia’s expertise and views. It is important to enable the person with dementia to take part in research, and help contribute towards evaluating services, such as psychological and social interventions that they receive.

1.1.2 Independence

1.1.2.1 Importance of independence

Many healthcare interventions aim to maintain and improve independence (Haak, Fänge, Iwarsson & Ivanoff, 2007), yet independence has been defined in numerous ways. Some definitions of independence include: controlling, coping with and making decisions about daily life (World Health Organisation, 2001), and not relying on others for guidance (Leece and Peace, 2010; Secker, Hill, Villeneau & Parkman, 2003). To be independent, a person must be self-reliant, autonomous, able to function unaided, have the desired level of choice and contribute to society (Secker et al., 2003). This view is consistent with findings from qualitative interviews with 17 healthcare providers and 55 older adults in an assisted-living facility on the defining characteristics and meaning of independence. These included: self-reliance, continuity of identity, meaningful activity, valued roles, maintenance of function and autonomy (Ball et al., 2004). Making decisions and not relying on others are consistently important characteristics, despite subtle differences in definitions of independence.

Independence is important for health and well-being (Haak et al., 2007; World Health Organisation, 2001), but maintaining independence in older age is complicated and requires support. An interview study of 40 older adults (aged 80-89) found that they struggled to maintain their independence, in terms of managing and making decisions about their activities (Haak et al., 2007).

1.1.2.2 The impact of dementia on independence

In recent years, there has been a focus on the desire to achieve earlier diagnosis for people living with dementia. For example, the National Dementia Strategy aimed to achieve good quality early diagnosis and intervention for all (Department of Health, 2009), with the view that this would enable people with dementia and their family carers to maximise their quality of life and continue to make choices for themselves. Furthermore, research has suggested that early diagnosis can improve quality of life for people with dementia and their carers (Banerjee et al., 2007; Department of Health, 2009). This has led to people being identified and diagnosed at a much earlier stage in which the maintenance of their individual independence is achievable.

The stage of dementia may influence the impact of dementia on independence. Research suggests that early symptoms (Global Deterioration Scale; GDS stage < 3) can lead to social withdrawal, decreased time spent carrying out hobbies and reading, a loss of self-control and meaningless conversation. Stages three to five may lead to panic over caregiver absence, inability to use common objects, less travelling alone and sleep disturbance. Severe stages (GDS five to seven) may lead to an increased dependency on caregivers, injury to self, inability to carry out self-care and distress over changes in routine (Potkin, 2002). Kitwood (1997b) proposed that it possible to retain independence during the mild stages of dementia. Support with activities of daily living can also enable someone with moderate dementia to maintain independence, but continual help and support may be needed once an individual reaches the severe stages of dementia (Kitwood, 1997b). Therefore, an early diagnosis of dementia can help people with dementia to access the right support at the right time and make choices about decisions that affect them (Department of Health, 2009).

As dementia progresses, a person may gradually lose the cognitive ability to carry out tasks that they were previously able to do, for example getting dressed. This gradual decline in cognitive ability can make it difficult for a person to live independently (Potkin, 2002; Spector, Orrell & Goyder, 2013). Independence is important for maintaining a high quality of life and self-esteem for people with dementia (Andersen, Wittrup-Jensen, Lolk, Andersen & Kragh-Sorensen, 2004; Jing, Willis & Feng, 2016). Maintaining independence can also slow the progression of cognitive decline, as some research suggests that symptoms of dementia may worsen if a person does not use their cognitive abilities (Kitwood, 1997a).

Whilst it is important to support people with dementia to live independently, ‘independence’ may take different forms depending on the individual and their needs. Instead, dependence and interdependence may also be key aspects of maintaining independence for people with dementia. Dependency (characterised as a need for assistance) is often perceived as the opposite of independence (Fine & Glendinning, 2005). Researchers in the field of disability have proposed that independence should be understood within the context of being able to exercise control over whatever help is needed to achieve their individual aims (Brisenden, 1989; as cited in Fine & Glendinning, 2005). Therefore, interdependence has been defined as a reciprocal relationship which helps people to achieve their goals (Kitwood & Bredin, 1992).

Kitwood and Bredin (1992) proposed that personhood exists within the context of relationships and that because people are social beings, nobody is always fully independent; with or without a diagnosis of dementia. For example, a case study of a person with dementia and their spouse found that doing things together, agreeing and discussing differing but complementary roles helped the person with dementia to remain active (Hellstrom et al, 2005). It has therefore been argued that considering a person with dementia as 'independent' does not provide a holistic view (Hellstrom, Nolan & Lundh, 2005), and that the person's needs can only be fulfilled if viewed within the context of their relationships (Clark, 2002; Hellstrom et al, 2005).

As the trajectory and stage of dementia can affect a person's ability to maintain independence, support from family members and professional support is important (Department of Health, 2009). However, the levels of support required for each person may vary across different individuals and across the different stages of dementia. For example, some people in the early stages of dementia may want to access routine services already available within society, whereas other people may need more support to maintain their homes or their physical health. As the condition progresses, other people may need intensive support (Department of Health, 2009). Research indicates that support from other people can help the person with dementia to maintain a sense of self and personhood (Coleman & Mills, 2001; as cited in Hellstrom et al, 2005; Whitlatch, 2001; Hellstrom et al, 2005). Whilst support is important, a diagnosis of dementia should not be viewed by others as an inability to make decisions and choices for themselves (Fetherstonhaugh, Tarzia & Nay, 2013; Kim, Karlawish & Caine, 2002; Tyrell, Genin, and Myslinsk, 2006). For example, a qualitative study by Fetherstonhaugh et al (2013) found that people with dementia wanted to remain central in decision-making and wanted support and help from others to make their own decisions, instead of having decisions taken off them. Therefore, these studies indicate that an appropriate balance between dependence, interdependence and independence may be key to supporting the person with dementia to live well (Hellstrom et al, 2005; Ronning, 2002; as cited in Hellstrom et al, 2005).

Cognitive beliefs must be considered when trying to maintain independence in dementia. Various studies suggest that self-perceptions of aging may predict many health outcomes and life satisfaction (Kotter-Grühn; Kleinspehn-Ammerlahn, Gestorf & Smith, 2009; Wurm, Warner, Ziegelmann, Wolff & Schüz, 2013; Wurm, Tomasik & Tesch-Romer, 2008). Some researchers suggest that when the cause of an illness is attributed to aging, people perceive the illness as less treatable and controllable (Wurm et al., 2013). This could be viewed within a cognitive behavioural model, which indicates that beliefs influence behaviour, which in turn influences further beliefs. Early research termed this as a 'self-fulfilling' prophecy (Merton, 1948).

There is some evidence that perceptions of cognitive abilities in old age influence peoples' capability to complete relevant tasks. For example, a study found decreased memory performance in people who were primed with words relating to old age (Levy, 1996). Once a person receives a diagnosis of dementia, caregivers may interpret their normal behaviour as a symptom of dementia (Gubrium and Lynott, 1987; Lyman, 1989). This in turn, may lead the caregiver to treat the person with dementia differently. Therefore, if people with dementia believe they cannot make decisions due to their diagnosis, independence could be affected (Kitwood & Bredin, 1992; Kitwood, 1993).

All of these factors demonstrate the importance of trying to support people with dementia to maintain independence. This view is advocated by the person-centred approach. The person-centred approach proposes that through interaction with others, people with dementia can maintain positive self-esteem, independence and the confidence to participate in social situations (Kitwood & Bredin, 1992; Kitwood, 1993). The biopsychosocial model of dementia (Spector & Orrell, 2010) suggests that people with dementia can be supported to maintain their independence by focusing on the factors which can be changed; thus, supporting the person-centred approach. To improve and maintain a person's independence, we need to develop and evaluate effective psychological and social interventions to improve quality of life and independence in dementia.

1.1.3 Psychological and social interventions

1.1.3.1 Introduction to psychological and social interventions

Throughout this thesis, the term ‘intervention’ will be used to refer to psychological and social interventions for people living with dementia; unless otherwise specified.

Interventions that are designed to improve health and well-being in dementia often include activities that aim to address participants’ cognitive, biological, behavioural or emotional responses (intrapersonal factors), relationships (interpersonal factors) and environment (Moniz-Cook, Vernooij-Dassen, Woods, Orrell & Network, 2011; Pincus & England, 2015). There are many types of interventions for people with dementia, including occupational therapy (Graff et al., 2006), psychodynamic interventions, reminiscence and life review therapy, support groups, reality orientation, memory training, cognitive behavioural approaches (Kasl-Godley & Gatz, 2000), music, dance and animal therapy (Lawrence, Fossey, Ballard, Moniz-Cook & Murray, 2012). These interventions can be delivered in group or one-to-one sessions (Kasl-Godley & Gatz, 2000).

1.1.3.2 Effectiveness of psychological and social interventions

Interventions have generally focused on outcomes for people living with dementia, family members and staff members. This thesis will focus only on those interventions aiming to improve quality of life for people living with dementia.

Systematic reviews of reviews show promise for the effectiveness of interventions for people living with dementia. A recent review of 22 reviews (197 studies) found that group cognitive stimulation interventions and multicomponent exercise interventions were beneficial for physical and cognitive function and completion of activities of daily living. On the other hand, there was not enough evidence to determine whether interventions improved mood or behaviour (e.g. wandering or falling; McDermott et al., 2018). Secondly a review of 28 reviews found evidence for positive effects of behavioural interventions on people's behaviour, physical health condition and depression (Vernooij-Dassen, Vasse, Zuidema, Cohen-Mansfield & Moyle, 2010).

Both reviews also showed promise for other types of interventions (e.g. physical activity interventions, music therapy and reminiscence), but due to methodological limitations including small sample sizes, definitive conclusions could not be drawn.

1.1.4 Interventions in this research

This thesis will draw upon research conducted as part of two interventions: Promoting Independence in Dementia (PRIDE) and Community Occupational Therapy in Dementia-UK (COTiD-UK). Both interventions were designed to support people with dementia and their family members to improve quality of life and independence. In order to understand how effective these interventions are, we need to understand whether they are delivered as planned.

1.1.4.1 Promoting Independence in Dementia (PRIDE)

PRIDE (Promoting Independence in Dementia, 2016) is an ongoing Economic and Social Research Council (ESRC) funded programme grant (Grant reference: ES/L001802/2) which aims to improve independence in dementia by promoting an active healthy lifestyle and enabling people with mild dementia to maintain their cognitive activities and social roles. PRIDE has four work packages, which together aim to identify factors relating to dementia, understand what dementia and maintaining independence means to participants and develop and evaluate the feasibility of an intervention to improve independence in dementia. The intervention was based on work of Mountain and Craig (2012), which identified key topics for delivery in self-management programmes for people living with dementia.

This thesis will contribute to the development and evaluation of the intervention and the findings will be used to inform improvements to the randomised controlled trial (RCT). In the PRIDE feasibility trial, people with dementia and their supporters (jointly referred to as ‘dyads’; n=34) participated in three intervention sessions (60-90 minutes long) delivered by dementia advice workers (DAWs) (n=12) across four sites in the UK (Csipke et al., 2018; Protocol for Work package 3 of PRIDE, unpublished). In this study, the term ‘DAW’ collectively refers to staff working in or alongside memory clinics (health, social care or voluntary sector), including dementia advisors, memory nurses and researchers. ‘Supporter’ refers to either a family member or friend of the person with dementia.

The intervention is a manualised, tailored intervention. Dyads chose three of the following topics to work on: 1) Keeping mentally active, 2) Keeping physically active, 3) Keeping socially active, 4) Making decisions, 5) Getting the message across, 6) Receiving a diagnosis of dementia and 7) Keeping healthy. During the first session, DAWs provided information on ‘finding a balance’, ‘social connections’ and ‘keeping going’ before encouraging participants to choose three topics and plan at least one activity they wanted to work on. In the second and third sessions, these plans were reviewed and barriers, facilitators and solutions were identified. New plans and topics were then covered.

1.1.4.2 Community Occupational Therapy in Dementia, UK (COTiD-UK)

The COTiD-UK intervention is part of the Valuing Active Life in Dementia (VALID) programme (Grant: RP-PG-0610-10108). VALID is included in a current NIHR-funded programme grant that aims to facilitate independence, meaningful activity and quality of life among people living with dementia and their family carers (jointly referred to as ‘dyads’) (Wenborn et al., 2016). One aspect of the VALID programme was to evaluate the effectiveness of the COTiD-UK intervention.

COTiD-UK was evaluated in a multi-centre, pragmatic, single blind RCT (COTiD-UK vs treatment as usual) of 468 dyads, which started in September 2014 and finished in September 2017 (Wenborn et al., 2016). In COTiD-UK, 249 dyads of people with dementia and their family carer received 10 hours of home-based occupational therapy over approximately 10 weeks. Participants in the control group (n=219 dyads) received treatment as usual, which varied across and within research sites. Occupational therapists (OTs) and dyads could choose how the 10 hours were distributed. Thirty-one OTs delivered seven key sessions during the intervention.

During the COTiD-UK intervention, seven key sessions were delivered: 1) Introduction (the OT introduced self and the COTiD-UK format), 2) Occupational Performance History Interview (OPHI: Kielhofner et al., 2004), in which the OT interviewed the person with dementia about their life, experiences and activities, 3) Ethnographic Interview (the OT interviewed the family carer about their life and experience providing care), 4) Summaries of interviews and observations (the OT summarised the information gathered from the interviews, together with their own observations made within the context of an environmental and activity assessment), 5) Goal-setting (the OT facilitated the dyad to create Specific, Measurable, Achievable, Realistic and Timed (SMART) goals), 6) Consultation and advice (the OT enabled the carer to develop problem solving skills and provided other relevant advice and information), and 7) Evaluation (the OT, person with dementia and family carer reviewed their progress in achieving the set goals). These six or seven sessions (depending on whether Summaries and Goal-setting were delivered separately or together) were collectively referred to as a ‘set’.

This version of the intervention was adapted from the COTiD intervention, which was developed and delivered initially in the Netherlands (Graff et al., 2006; Graff et al., 2008). In the Netherlands, both the person with dementia and the family carer benefitted from the intervention. For example, at 12 weeks after the intervention, participants' mean (Standard deviation; SD) deterioration in daily activities were significantly lower for those who had received the COTiD intervention (Intervention: 13.6 (6.0), control: 27.2 (8.9), $p<0.0001$). Family carers' sense of competence was significantly higher than the control group at 12 weeks' post intervention (12 weeks: mean 107.3; SD 13.6 vs 89.4; SD 14.4, $p<0.0001$) (Graff et al., 2006; Graff et al., 2008). Yet, when replicated in Germany, no differences were found between the treatment and control groups across a range of time points from six weeks to 52 weeks' post intervention (Voigt-Radloff et al., 2011a, Voigt-Radloff et al., 2011b). For example, 16 weeks after the intervention, control group participants' mean (SD) deterioration in daily activities were only marginally lower than those in the intervention group (Intervention: 15.8 (10.1), control: 14.8 (10.1)). Voigt-Radloff et al. (2011a; 2011b) proposed that the difference in outcomes may have been explained by poor delivery of some components and an active control group. This suggests that contamination may have been an issue. This could be because the intervention was translated, but not adapted, before being put into practice in Germany. The difference in intervention outcomes across countries also highlights the need to identify exactly which intervention components have been delivered.

Differences in the effectiveness of COTiD could be attributed to differing cultural contexts, translation, differences in measures used or differences in control groups. In one version of COTiD, participants received a leaflet and a consultation visit from an OT (Voigt-Radloff et al., 2011a), whereas participants in the control group in the Netherlands did not receive any occupational therapy (Graff et al., 2006). It is also possible that differences could have been a result of how the intervention was implemented.

1.2 Problems in implementing interventions

1.2.1 Definition of intervention implementation

Implementation research aims to increase the use of healthcare research findings in practice (Durlak, 1998; Eccles et al., 2009; Kegeles, Rebchook, Tebbetts, Arnold & Team, 2015). The RE-AIM framework proposes that research can be implemented into practice more effectively, if five dimensions are considered during the research process (Glasgow, Vogt & Boles, 1999). These are: reach (how to reach the intended population), effectiveness (how to tell if intervention is effective), adoption (how to develop organisational support to deliver intervention), implementation (how to ensure the intervention is delivered properly) and maintenance (how to incorporate delivery of the intervention in the long term). The term ‘Intervention implementation’ refers to how well an evidence-based intervention is delivered in practice (Breitenstein et al., 2010a). This research will focus on the implementation aspect of the RE-AIM framework, and evaluate how well interventions for people living with dementia are delivered and engaged with.

1.2.2 The problem of implementation

Even when interventions to improve health and well-being are effective, the findings are often not used in practice (Chalmers & Glasziou, 2009). A key problem of assessing intervention implementation is that intervention developers may not specify exact intervention components. Therefore, it is difficult to tell whether interventions are delivered as planned.

1.3 Fidelity of delivery and engagement

1.3.1 Introducing fidelity of delivery and engagement

1.3.1.1 Definitions and frameworks of fidelity of delivery and engagement

The research in this thesis focuses on fidelity of delivery, intervention receipt and intervention enactment. Fidelity of delivery is defined as the extent to which the intervention components were delivered as planned (Bellg et al., 2004; Borrelli, 2011; Burgio et al., 2001). Intervention receipt is defined as the extent to which participants understand and are able to perform the required skills (Borrelli, 2011; Burgio et al., 2001; Lichstein, Riedel & Grieve, 1994). Intervention enactment is defined as the extent to which participants use these skills in their daily lives (Borrelli, 2011; Burgio et al., 2001; Lichstein et al., 1994).

Although there are many frameworks of intervention fidelity, the definitions used in this thesis are based on Bellg et al's (2004) comprehensive National Institutes of Health Behaviour Change Consortium framework. The framework suggests that five areas of fidelity should be considered: 1) study design, 2) training providers, 3) delivery of treatment, termed 'fidelity of delivery' 4) receipt of treatment, termed 'intervention receipt' and 5) enactment of treatment, termed 'intervention enactment'.

Many terms have been used interchangeably to refer to the extent to which an intervention is delivered as planned (Dusenbury et al, 2003; Gearing et al, 2011). These include fidelity of delivery, integrity, compliance and adherence. The terms fidelity of delivery and adherence are both commonly used in relation to previous research. Adherence is used in relation to both delivery of components and participants' engagement with interventions and treatment (e.g. medication adherence). To be consistent with previous research (e.g. Lorencatto et al, 2013; Lorencatto et al, 2014), and to maintain a distinction between fidelity and engagement, the term 'fidelity of delivery' will be used in this thesis.

Many conceptualisations of engagement have been proposed (Angell, Matthews, Barrenger, Watson & Draine, 2014). Given that participants must engage with an intervention in order to receive the intervention components and enact the skills, receipt and enactment will be collectively referred to under the umbrella term: ‘participant engagement’ in this thesis. In collectively referring to receipt and enactment as engagement, a clear distinction is made between provider behaviours (fidelity of delivery) and participant behaviours (engagement). It is necessary to focus on both fidelity of delivery and engagement, as face-to-face interventions require the provider to deliver the intervention as planned but also active participation.

1.3.1.2 Key studies on fidelity of delivery and engagement

Key research in this field suggests that studies do not always report whether health interventions were delivered as planned or received (Glasziou, Meats, Heneghan & Shepperd, 2008; Glasziou et al., 2010; Greaves, 2015; Michie, Fixsen, Grimshaw & Eccles, 2009). For example: in a review of primary and secondary prevention programs, only 29/162 studies reported having measured fidelity of delivery (Dane & Schneider, 1998). In a review of psychotherapy intervention evaluations, fidelity of delivery was only addressed in 3.5% of the included studies (Perepletchikova, Treat & Kazdin, 2007). The lack of considering and reporting fidelity of delivery has implications for translating intervention findings into ‘real life’ settings. If intervention developers report the intervention and measure delivery transparently and clearly, this could be used to improve intervention implementation.

A range of behavioural interventions, including smoking cessation interventions (Lorencatto, West, Christopherson & Michie, 2013a; Lorencatto, West, Bruguera & Michie, 2014), physical activity interventions (Hardeman et al., 2008), a national project for severe mental illness (Bond, Drake, McHugo, Rapp & Whitley, 2009) and self-management interventions (Toomey, Currie-Murphy, Matthews & Hurley, 2015) have measured fidelity of delivery. They found that interventions are often not delivered as planned, with often less than half of the planned content being delivered. Knowledge about the extent to which these interventions were delivered helps us to understand their intervention effectiveness.

1.3.2 Fidelity of delivery, engagement and dementia

1.3.2.1 Importance of fidelity of delivery and engagement within dementia research

There are some promising interventions for people with dementia, but the evidence is currently limited by methodological weaknesses (McDermott et al., 2018; Vernooij-Dassen et al., 2010; more detail can be found in Section 1.1.3.2). Few studies have tested interventions using RCT methodology, small samples have been used and intervention components are not always clearly reported. For example: one program provided personalised post-diagnostic support for people with dementia and their family carers. Participants received very different levels of support, ranging from one hour to 182 hours (Kelly & Innes, 2014). This suggests that delivery of intervention content (and therefore fidelity of delivery) may have differed across participants. Although the findings suggest that the program was effective, it is difficult to know exactly how the intervention was delivered, and therefore, how effective the intervention was.

The effects of many dementia interventions may not be fully understood as it is not clear whether these interventions were delivered as planned and engaged with (Vernooij-Dassen & Moniz-Cook, 2014). This is because many interventions for people living with dementia have not measured fidelity of delivery or engagement alongside the trial.

Some interventions for people with dementia have measured fidelity and/or engagement. High fidelity (78% intervention, 80% control), self-reported by OTs, was achieved for COTiD, when delivered in Germany (Voigt-Radloff et al., 2011a; Voigt-Radloff et al., 2011b). High fidelity (90% of participants received both components of the intervention) was also achieved for a behavioural intervention for people with advanced dementia (Hanson et al., 2016). Both fidelity and engagement were measured in an intervention for anxious patients with dementia (Stanley et al., 2013). Their findings for fidelity suggested an adequate mean (SD) adherence to the protocol of 5.6 (1.5), on a scale of none (no adherence) to eight (optimal adherence). For engagement, they measured the completion of skills, homework exercises and the use of intervention skills (e.g. breathing exercises and coping self-statements) and found that completion of different skills ranged from 28.6%-100%, and on average 3.5 homework exercises were completed each week. Eighty-one percent of participants reported using at least one intervention skill.

1.3.2.2 Rationale for studying fidelity of delivery and engagement alongside dementia trials

Although fidelity of delivery and engagement have been measured in some interventions for people with dementia, few interventions have measured both fidelity of delivery and engagement alongside the delivery of a trial. There is therefore not enough evidence to determine how interventions for people with dementia are delivered and engaged with. Thus, concrete conclusions cannot be drawn regarding intervention effectiveness.

1.3.2.2.1 Importance of fidelity of delivery

As previously discussed, the interpretation of intervention outcomes is subject to errors. These include ‘Type 1 errors’, and ‘Type 2 errors’. ‘Type I errors’ refer to finding a false positive result, and ‘type II errors’ refer to finding a false negative result (Borrelli, 2011). Type I and II errors may occur if intervention outcomes were influenced by factors other than the intervention content. In intervention research, these errors may occur if the intervention is not delivered as planned (Borrelli, 2011).

Evidence of intervention fidelity is needed to determine whether the effectiveness or ineffectiveness of an intervention can be attributed to the intervention content (Borrelli, 2011). If an intervention was effective, but the intervention was not delivered as planned, factors other than the intervention may be responsible for outcomes ('type I error'). If an intervention was not effective, and fidelity of delivery was not monitored, it is difficult to determine the extent to which the intervention may have been effective if delivered as planned. Researchers may then wrongly reject the intervention and accept a false negative outcome ('type II error') (Borrelli, 2011).

Fidelity of delivery is also important for ethical reasons. If an intervention is implemented in practice, but the outcomes are not fully understood, interventions which may not be effective and/or delivered as planned could be implemented on a wider scale, which could lead to concerns for patient safety. Participants may receive content that is not evidence-based, which in the worst-case scenario, could be harmful. Resources may be wasted on interventions that are not effective. Fidelity of delivery is therefore useful for assessing the extent to which participants are receiving evidence-based treatments and for identifying problematic delivery. Fidelity research may also have implications for providers, as there are questions about whether providers who deviate from an evidence-based protocol too much should continue delivering an intervention or therapy (Barber, Triffleman & Marmar, 2007).

There is currently a lack of consensus regarding the role that fidelity of delivery plays in moderating intervention outcomes. It is not yet known whether high fidelity (Durlak & DuPre, 2008; Ellis, Naar-King, Templin, Frey, & Cunningham, 2007; Haynes et al., 2016; Henggeler, Melton, Brondino, Scherer & Hanley, 1997; Hogue, Dauber, Samuolis, & Liddle, 2006; Johnson-Kozlow et al., 2008; McHugo, Drake, Teague, & Xie, 1999), or moderate fidelity (Barber et al., 2006; Hogue et al., 2008; Webb, DeRubeis & Barber, 2010) are optimal for intervention effectiveness in complex health behaviour change interventions. It has also been proposed that fidelity decreases intervention effectiveness through rigidity of delivery (Barber et al., 2008; Castonguay, Goldfried, Wiser, Raue, & Hayes, 1996; Henry, Strupp, Butler, Schacht & Binder, 1993).

1.3.2.2.2 Importance of engagement

In addition to understanding how an intervention is delivered, understanding the extent to which participants engage with an intervention is crucial for interpreting intervention outcomes.

Without measuring engagement and understanding the extent to which participants understand and use the intervention skills in daily life, researchers cannot tell if engagement or lack of engagement contributed to intervention effects (Lichstein et al., 1994). If participants do not understand the intervention content or cannot perform the required skills, they may not use the intervention skills in their daily life (Borrelli, 2011). If participants do not use the skills, the planned intervention may not be able to explain changes in outcomes. This is demonstrated by studies on health interventions which show a link between engagement and effectiveness (Manwaring et al., 2008; McHugh, Murray & Barlow, 2009).

A participant's ability to engage with an intervention may be reduced by the symptoms associated with dementia. Therefore, engagement may be a particularly important concern for studies which are aimed at improving outcomes of people with dementia. Research suggests that engagement is especially important when participants have cognitive impairments or low levels of literacy (Borrelli, 2011); areas which are affected by dementia symptoms. Studies suggest that older adults may have difficulties understanding information provided by their healthcare professionals (Safeer & Keenan, 2005; Williams, Davis, Parker & Weiss, 2002) and retaining information following an appointment (Ong, de Haes, Hoos & Lammes, 1995). Living with dementia may enhance this difficulty, as dementia is characterised by cognitive impairments.

These impairments may make it difficult for participants to understand and use the information that they have received in an intervention session, therefore intervention receipt may be a particular challenge. These findings highlight the importance of using strategies to improve intervention receipt and enactment.

Research suggests that engagement increases intervention effectiveness. One study found that in a weight loss intervention, the use of behaviour change techniques (BCTs) was associated with weight loss (Hankonen et al., 2015). This study also found that the more a participant engaged with an intervention, the better their weight loss, as individuals who used all 16 BCTs lost more weight than those who used 10 or less. Other studies have also found that higher levels of engagement were associated with better treatment outcomes (Kazantzis, Deane & Ronan, 2000; Trockel, Karlin, Taylor & Manber, 2014; Manwaring et al., 2008). Together, these findings suggest that engagement may be associated with better intervention outcomes.

1.3.2.2.3 Limitations of evidence on fidelity of delivery and engagement

The relationship between fidelity of delivery and engagement is not yet known as they are rarely measured simultaneously. Understanding the effectiveness of dementia interventions and the ability to implement these on a wider scale requires fidelity, engagement and intervention outcomes to be measured together.

Secondly, the relationship between fidelity and intervention outcomes, particularly in dementia interventions has not been explored. To measure relationships between fidelity, engagement and effectiveness for any intervention, it is necessary to evaluate whether interventions have been delivered as planned and engaged with. Measuring fidelity of delivery could help us to determine which intervention components work for whom, and in which settings; a question which the Human Behaviour Change Project (HBCP) (Michie et al., 2017) is currently attempting to answer using artificial intelligence. Therefore, to measure fidelity of delivery and engagement, high-quality methods and measures of fidelity and engagement are needed.

1.3.3 Measuring fidelity of delivery and engagement

1.3.3.1 Methods used to monitor fidelity of delivery and engagement

1.3.3.1.1 Fidelity of delivery

Most of the evidence, to date, regarding fidelity and engagement measures relate to applied psychology and behavioural interventions. Few interventions for people with dementia have measured fidelity of delivery and engagement. Therefore, fidelity and engagement measures are discussed in relation to evidence from applied psychology and behavioural interventions.

Researchers use many different types of measures to monitor fidelity of delivery, including observational measures and self-report measures. A study of 55 after-school programmes found that self-report measures, observation, and interviews were most commonly used to measure fidelity of delivery (Maynard, Peters, Vaughn and Sarteschi, 2013).

The gold standard method for monitoring fidelity of delivery involves audio-recording all intervention sessions and using multiple, independent researchers to rate a random proportion of these sessions against the standardised intervention content, in the form of a checklist (Bellg et al., 2004; Borrelli, 2011; Breitenstein et al., 2010a; Lillehoj, Griffin & Spoth, 2004; Lorencatto, West, Seymour & Michie, 2013b). It is recommended that 20-40% of sessions are rated objectively for fidelity of delivery (Schlosser, 2002). Other observational measures include video-recording (Wodarski, Feldman & Pedi, 1974) and direct observation (Burgio et al., 2001). Audio-recording, unlike video observation and direct observation, cannot capture non-verbal cues, but is cheaper and less invasive (Breitenstein et al., 2010a). Previous research has suggested that observation of providers and participants may change their behaviour (Moncher & Prinz, 1991). This relates to the concept of measurement reactivity which proposes that measurement may change a person's behaviour, emotions and cognitions (French & Sutton, 2010).

Previous studies have also asked providers and participants to self-report what intervention components were delivered to measure fidelity of delivery (McKenna, Flower & Ciullo, 2014; Miller & Rollnick, 2014). Although self-report measures are time-efficient and easy to use (Breitenstein et al., 2010a; Ward et al., 2013), they may result in less accurate responses than observational measures (Durlak, 1998; Jobe, 2003; McKenna et al., 2014). For example, providers and participants may not remember what they have delivered or received, or may inflate their responses to please the researcher (Schinckus, Van den Broucke, Housiaux & Consortium, 2014).

Previous research found that there is poor agreement between observer and provider ratings. For example: in an RCT to reduce alcohol and substance dependence, therapists reported higher levels of adherence on 71% of occasions, the same adherence on 23% of occasions and lower adherence on 6% of occasions (Carroll et al., 2000). Toomey, Matthews and Hurley (2017) found that in a feasibility trial of a complex self-management intervention for people with osteoarthritis and low back pain, self-reported fidelity (92.7%) was consistently higher than other measures (direct observation: 82.7%, audio-recordings: 81.7%). This suggests that providers may consistently report higher levels of fidelity. It is recommended that provider self-report should not be the sole measure used to measure fidelity of delivery. Therefore, triangulating multiple methods is recommended to overcome the limitations of each type of measure (Keller-Margulis, 2012; McKenna et al., 2014; Moncher & Prinz, 1991; Munafo & Smith, 2018). Sampling from across different sessions, time points, providers and sites ensures that findings can be generalised across the intervention data (Durlak, 1998; Moncher & Prinz, 1991; Ward et al., 2013).

1.3.3.1.2 Engagement

There is currently no consensus regarding the gold standard method to measure engagement in face-to-face interventions. Engagement can be measured using self-report measures (Bellg et al., 2004; Borrelli, 2011; Burgio et al., 2001; Resnick et al., 2005), attendance records (Gearing et al., 2011) and by asking participants to demonstrate skills (Burgio et al., 2001). Different aspects of engagement can be measured in different ways. In a review of 55 studies, intervention receipt was referred to in relation to intervention content, satisfaction, engagement and attendance (Rixon et al., 2016). Most studies used quantitative measures (76%), but some (42%) measured receipt qualitatively. Receipt was measured by intervention recipients (50%), providers (28%) and recipients and providers (22%). The most common way of measuring receipt was to measure participants' understanding of the intervention content (47.3%).

Intervention enactment has also been measured by identifying how many of the intervention's BCTs were used by participants and how this linked to outcomes (Hankonen et al., 2015). Some researchers propose that measuring intervention enactment is the most complicated aspect of engagement, as it can easily be confused with intervention outcomes. To measure intervention enactment, it is important that the measures are specific to intervention skills that need to be performed, rather than the target behaviour (Resnick et al., 2005). This helps to distinguish between intervention enactment and intervention outcomes.

1.3.3.2 Measures used to monitor fidelity of delivery and engagement

1.3.3.2.1 Identifying content of interventions

Intervention components have been used to refer to identifiable elements of the intervention content, such as the BCTs identified in the Behaviour Change Technique Taxonomy version one (BCTTV1; Haynes et al., 2016; Lorencatto et al., 2013a; Michie et al., 2013). Once intervention components have been identified, they can be used to identify what has been delivered in an intervention.

Measuring fidelity of delivery and engagement requires measures that clearly identify and outline the intervention components. These components can be identified from intervention materials, preferably manuals, which outline intervention content (Lorencatto et al., 2013b). For example, intervention manuals can be coded for BCTs. Once intervention components are identified, a checklist of key components for each intervention session can be developed and used to assess fidelity of delivery. Checklists can be completed by researchers, participants and providers and can also be used to assess participants' understanding and use of intervention components to monitor engagement (Bellg et al., 2004; Borrelli, 2011; Burgio et al., 2001; Resnick et al., 2005).

1.3.3.2.2 Type of measures

Fidelity measures can either be developed for a specific intervention or within fidelity frameworks, which can be applied to multiple interventions. Some examples of fidelity frameworks are in the fields of education (Century, Rudnick & Freeman, 2010) and addiction (Carroll et al., 2000). The strengths of these type of measures are that they use a consistent approach (Carroll et al., 2000), and minimise time and costs associated with developing individual measures. These measures can be used to differentiate between and compare fidelity across different interventions, investigate the relationship between components and identify acceptable levels of adaptation (Century et al., 2010). On the other hand, specific measures enable researchers to develop measures which capture the exact content of an intervention (Dusenbury, Brannigan, Falco & Hansen, 2003). This is relevant when measuring fidelity of a new intervention that has not been tested before, but, these measures cannot be applied to other interventions (Breitenstein et al., 2010a).

1.3.3.2.3 Quality of measures

To accurately measure fidelity of delivery and engagement, measures must be psychometrically robust (reliable and valid) (Gearing et al., 2011; Glasgow et al., 2005; Lohr, 2002; Stufflebeam, 2000). Reliability of a measure refers to the extent to which the measure produces consistent results in different situations or times (Roberts, Priest & Traynor, 2006) and validity refers to whether the measure captures the concept(s) that it aims to measure (Roberts et al., 2006).

Previous research shows that the reliability or validity of measures are often not reported (Baer et al., 2007; Breitenstein et al., 2010a; Maynard et al., 2013; Rixon et al., 2016). Research recommends that to develop a reliable and valid checklist, various steps are needed, including: 1) identifying, operationalising and ordering intervention components, 2) developing a checklist, 3) obtaining feedback from experts and potential users on the content and ease of use of the checklist, 4) revising the content of the checklist, if needed, 5) evaluating the psychometric qualities of the checklist and 6) finalising the checklist (Stufflebeam, 2000).

To be used alongside an intervention by researchers, providers and participants, measures must also be easy to implement (acceptable and practical to use; Glasgow et al., 2005; Holmbeck & Devine, 2009; Lohr, 2002). To be acceptable, a checklist has to meet the needs of the intended audience in terms of formatting and language use (Lohr, 2002). To be practical, checklists should be short, easy to use in healthcare settings and should minimise administrative burden (Lohr, 2002). This need is highlighted by the finding that missing responses are common in health-care self-report research (Shrive, Stuart, Quan & Ghali, 2006).

In this thesis, the term ‘psychometric qualities’ is used to refer to the quality of the measures and the term ‘implementation qualities’ is used to refer to descriptions of how the measures were implemented in practice.

1.3.3.3 Things to consider when measuring fidelity of delivery and engagement

When measuring fidelity of delivery and engagement, there are a few challenges to consider. The first is tailoring, defined as information or change strategies that are specific to a person's individual characteristics and their outcomes, which were developed through a personal assessment (Kreuter & Skinner, 2000). Increasingly, interventions are tailored to the person with dementia's needs. Tailoring is an individualised approach based on setting and circumstances (Lewin et al., 2017). In tailoring intervention content, the intervention can target each person's individual needs and concerns, thus helping to improve their quality of life. This raises challenges in terms of knowing exactly what should be delivered.

The second challenge is the complexity of the intervention. Interventions are often complex in nature. Complex interventions have several possible interacting structural components and active ingredients (Carroll et al., 2007; Horner, Rew & Torres, 2006; Möhler, Kopkhe & Meyer, 2015) and are also often delivered by multiple providers across multiple sites (Carroll et al., 2007; Horner et al., 2006; Möhler et al., 2015). The more complex an intervention is, the more difficult it can be to outline the content in a standardised and usable form. It therefore may be more difficult for providers to deliver multiple components skilfully whilst remaining sensitive to participants' individual needs. When taking part in complex interventions, participants must also be ready and able to understand and use more strategies and components. This suggests that complex interventions may be more difficult to engage with.

A new conceptual approach to characterising complex interventions has been proposed by Lewin et al (2017), who suggested that intervention complexity should be defined with respect to multiple constructs, including the intervention, implementation, context and participant characteristics. They proposed assessment criteria to categorise intervention complexity. The criteria has 10 dimensions including: number of active components, number of behaviours of recipients, range and number of organisational levels, degree of tailoring, level of skill to deliver the intervention, level of skill required by participants, interaction between components, degree to which components are context dependent, degree to which effects are changed by recipient or provider factors and the nature of the causal pathway (Lewin et al., 2017). This definition and criteria support clear reporting of future complex interventions.

Another challenge is contamination, which occurs when control participants receive some or all of the intervention components (Torgerson, 2001). For example, if a participant in the control group found out about the intervention and enacted some of the components themselves. If contamination occurs, the comparison of intervention vs control group may not lead to an accurate representation of effectiveness (Torgerson, 2001). Contamination may be more likely when providers deliver an intervention across multiple conditions, which is why cluster randomisation is often recommended to overcome contamination (Torgerson, 2001). Measuring fidelity of delivery and engagement in all conditions helps to document the risk of contamination.

1.4 Factors influencing fidelity of delivery and engagement

To successfully implement an intervention, providers must deliver the intervention as planned and participants must engage with the intervention. Therefore, fidelity of delivery and engagement can be framed as behaviours. Behaviour is:

> *"Anything a person does in response to internal or external events. Actions may be overt (motor or verbal) and directly measurable or, covert (activities not viewable but involving voluntary muscles) and indirectly measurable; behaviours are physical events that occur in the body and are controlled by the brain".* (P.327, Davis, Campbell, Hildon, Hobbs & Michie, 2015).

If there are problems with fidelity of delivery and engagement during an intervention, it is possible that these behaviours can be improved by refining the intervention using behavioural science.

1.4.1 Potential challenges to delivering an intervention with fidelity

Two challenges to delivering an intervention with fidelity which have been identified in dementia research include therapeutic alliance and the lack of development and use of treatment manuals.

‘Therapeutic alliance’ may be particularly important for people with dementia when receiving an intervention. Therapeutic alliance is defined as the ‘collaborative bond’ between a patient and a therapist or a healthcare professional (Krupnick et al., 1996; Raue, Goldfried & Barkham, 1997; Strunk, Brotman & DeRubeis, 2010).

One factor that is useful for therapeutic alliance is effective communication (Jootun & McGhee, 2011). Effective communication can help to build trust, and help people to maintain their quality of life whilst ineffective communication can lead to anxiety and frustration for the participant (Jootun & McGhee, 2011). When working with people with dementia, effective communication ensures that the person is comfortable and that their individual needs are considered (Jootun & McGhee, 2011). Therefore, it is possible that a provider delivering an intervention may be concerned with building a relationship, rather than focusing on delivering the intervention as planned. It, therefore, may take more skill to deliver the intervention as planned.

The second challenge is that intervention studies do not always develop and use treatment manuals. Research suggests that treatment manuals help intervention developers and service providers to standardise intervention content and deliver interventions as planned (Bellg et al., 2004; Carroll et al., 2007; Lorencatto et al., 2014; Schinckus et al., 2014). However, research also shows that manuals are not consistently used in dementia interventions (Spector et al., 2013). Thus, interventions may be difficult to replicate. The lack of manual usage could be explained by the flexible, tailored nature of many interventions. This may make it more difficult for researchers to develop manuals and measure fidelity of delivery. The lack of manuals may indicate that an intervention may not be as standardised as it could be and, therefore, it may be more difficult to measure and understand its effectiveness.

1.4.2 Barriers and facilitators in dementia research

To gain more information about intervention delivery and engagement as behaviours, both quantitative and qualitative methods are needed. This is consistent with the Medical Research Council (MRC) guidance, which recommends that mixed methods should be used to conduct process evaluations (Moore et al., 2015). This is also consistent with other evaluations that have used a combination of quantitative and qualitative methods to measure fidelity of delivery (Toomey et al., 2017). The use of mixed methods in RCTs or pilot trials can facilitate recruitment, acceptability and contribute towards understanding of behaviour change and intervention effectiveness (Cooper et al., 2014). From clinical reflections of 15 studies, considerations of conducting qualitative research as part of an RCT were raised. These considerations included maintaining confidentiality, preventing unwanted change in intervention delivery from qualitative feedback, and reporting findings without influencing delivery (Cooper et al., 2014). To understand what factors influence behaviour, qualitative interviews can be used to identify factors that help (facilitators) and factors that hinder (barrier) the desired behaviour.

1.4.2.1 Fidelity of delivery

Some research has investigated the barriers and facilitators to the delivery of, and engagement with, dementia intervention research. For delivery, systematic reviews of qualitative studies outline the challenges to implementing dementia interventions (Dugmore, Orrell & Spector, 2015; Lawrence et al., 2012). Another study has explored the barriers and facilitators to delivery, receipt and enactment in an intervention which aimed to improve behavioural symptoms and caregiver self-efficacy for people with dementia (Mahoney, Trudeau, Penyack, & MacLeod, 2006).

Some of the barriers identified in these studies included: organisational factors, such as the environment and lack of safety equipment (Mahoney et al., 2006), resource issues (including extra work, reallocation of staff time and flexibility, and time pressures), institutional philosophy including avoiding risk, and priority activities (Dugmore et al., 2015; Lawrence et al., 2012). Provider characteristics were also found to be barriers. Characteristics included skills, prioritisation of healthcare tasks, attitudes and beliefs (including confidence, personality and communication strategies), views that delivering the intervention was not real work, and fear of causing harm (Dugmore et al., 2015; Lawrence et al., 2012).

On the other hand, facilitators included social factors, such as relying on staff, interacting with family members, delivering the intervention in a tailored, flexible way, providing access, and getting to know the person. Furthermore, nurse training and knowledge were also found to be facilitators (Lawrence et al., 2012; Mahoney et al., 2006).

Whilst many of the factors that may influence fidelity are individual, previous research also indicates that organisational factors and wider environmental factors influence the extent to which an intervention is delivered as planned (e.g. Bearman et al., 2013; Bond et al., 2009; Damschroder et al., 2009). For example, organisational factors may include the level of support provided to staff to deliver an intervention. This should include facilitative environments which enable providers to work effectively whilst also minimising differences in dementia care (Kitwood, 1997b). Kitwood outlined optimal conditions of a supportive work environment, including suitable pay and conditions, staff induction, the creation of a team who have similar values to achieve a shared aim, supervision, training, individual staff development to acknowledge staff differences, accreditation, promotion and quality assurance (Kitwood, 1997b). This suggests that for staff to provide high-quality person-centred care, they should be sufficiently supported by their employing organisation (Kitwood, 1997b).

The barriers and facilitators found to influence delivery of dementia interventions are generally consistent with barriers and facilitators to implementation of interventions outside of dementia research. These studies proposed that: 1) intervention factors (e.g. how program fits needs of providers, amount of support, benefits of intervention), 2) provider factors; (e.g. knowledge, skills, motivation, time, experience), 3) participant factors (e.g. enthusiasm, willingness to attend), 4) organisational factors (e.g. availability of resources, staff turnover), and 5) the wider community (e.g. politics and funding) affect delivery (Bearman et al., 2013; Bond et al., 2009; Damschroder et al., 2009; Dariotis, Bumbarger, Duncan & Greenberg, 2008; Durlak & DuPre, 2008, Greenberg, Domitrovich, Graczyk & Zins, 2005; Toomey et al., 2017).

These findings suggest that a combination of organisational, provider, participant and intervention factors influence delivery of both dementia interventions and interventions in general. Some of these findings refer to barriers and facilitators to delivery in general, and not specifically fidelity of delivery. Therefore, although they provide some insight into potential barriers of fidelity of delivery of dementia interventions, further research is needed.

1.4.2.2 Engagement

For engagement with dementia interventions, barriers to understanding information included personal characteristics. For example: hearing impairments, a person's history, relationships, motivations, caregiver health and a history of mental illness. For enactment, barriers included fatigue, lack of practice and perceived success (Mahoney et al., 2006). In addition, cognitive ability has also been found to influence engagement (Dugmore et al., 2015).

Barriers to engagement reported by carers in an individual Cognitive Stimulation Therapy (iCST) programme included difficulties fitting the activities in due to time constraints, physical health problems and difficulties communicating the sessions to the person with dementia. Facilitators included having peer support and views on the importance of mentally stimulating activities (Leung, Yates, Orgeta, Hamidi & Orrell, 2017).

Barriers and facilitators to engagement with health interventions also show similarities to those found in dementia research. Barriers to engagement in health interventions have included psychological factors, environmental factors, motivation, cognitive factors and a lack of knowledge (Boulton, Horne & Todd, 2018; Bunn, Dickinson, Barnett-Page, Mcinnes & Horton, 2008; Rimmer, Riley, Wang, Rauworth & Jurkowski, 2004; Roberts & Bailey, 2011). Facilitators to engagement included support, encouragement, understanding the benefits of the intervention, health and self-efficacy (Boulton et al., 2018; Bunn et al., 2008; Roberts & Bailey, 2011).

As with fidelity, the ability to engage with a behaviour is not solely down to the individual, but is also a result of the wider environment. Environmental factors which may influence engagement could include physical and financial resources or levels of support. Kitwood's Enriched Model of Dementia (Kitwood, 1997b; Brooker & Latham, 2016) and the biopsychosocial model of dementia (Spector & Orrell, 2010) highlight the importance of social environments for enabling people with dementia to maintain independence. This is a key example of the way in which environmental factors and the wider support system can facilitate or hinder a person from carrying out their chosen activities. These models suggest that if a person has the necessary support and a supportive social and psychological environment, they will be more able to engage in their chosen activities and maintain their independence, whereas if a person does not have the necessary support from their environment, or experiences 'malignant social psychology' (Kitwood, 1997b), they may be unable to engage with their desired behaviours. 'Malignant social psychology' may include: disempowerment, infantisation, labelling, stigmatisation, ignoring and mocking (Kitwood, 1997b).

Combined, these findings suggest that the environment, psychological, social, physical and cognitive factors may affect engagement for both people living with dementia and participants of health interventions more generally. As such, further research into the perspectives of people living with dementia and their supporters on what helped and got in the way of them engaging with an intervention and its activities is needed.

1.4.3 Evaluating current evidence base

Identifying barriers and facilitators can support researchers to identify the factors that need to be targeted to change behaviour. The use of qualitative interviewing provides more in-depth insight into people's behaviours than insights generated by quantitative measures. However, this type of research has some limitations. When interviewed, people may respond in a socially desirable way or provide answers that they believe researchers want to hear (Nederhof, 1985; Podsakoff, MacKenzie, Lee & Podsakoff, 2003). Using qualitative interviews to seek insight into behaviour may be limited, as social cognitive psychologists propose that people may often not understand why they behaved in a certain way (Bargh, Chen & Burrows, 1996; Dijksterhuis & Van Knippenberg, 1998; Nisbett & Wilson, 1977). The research in this field is limited as studies do not always use measures that are reliable, relevant, immediate or sensitive (Newell & Shanks, 2014).

1.5 Changing behaviour

1.5.1 Introducing behaviour change

Following the identification of factors which influence specific behaviours, behavioural science can be used to develop strategies to change behaviour. For example: developing recommendations to improve fidelity of delivery or engagement. Changing behaviour is challenging (Michie, Atkins & West, 2014) and researchers should, but do not always, use theories to develop behaviour change interventions for target behaviours (Atkins & Michie, 2015; Michie, Van Stralen & West, 2011a).

1.5.2 Behaviour change theories

Many theories have been developed to change behaviour (See Michie, West, Campbell, Brown & Gainforth, 2014 for a review). A theory is:

> *"A set of concepts and/or statements with specification of how phenomena relate to each other. Theory provides an organising description of a system that accounts for what is known, and explains and predicts phenomena"* (p.327, Davis et al., 2015).

These theories include: motivational models that predict why we behave, behavioural enactment models that aim to explain the intention-behaviour gap and multi-stage theories that aim to improve performance and maintenance of behaviour (Armitage & Conner, 2000).

Choosing which theory to use is difficult, as many theories overlap (Michie et al., 2005) and it is not always clear which theory is the most appropriate. Furthermore, not all theories consider intrapersonal, interpersonal and environmental factors. These factors may all be necessary to change providers' and participants' behaviour in relation to fidelity of delivery and engagement, as demonstrated by previous research.

Individual theories may be useful in changing aspects of behaviour, but it is unlikely that one theory alone could address all necessary aspects of these complex behaviours. Therefore, the application of a framework of behaviour change, such as the Behaviour Change Wheel (BCW; Michie et al., 2011a) is more appropriate.

1.5.3 Behaviour Change Wheel (BCW)

The BCW is an integrated framework of behaviour change, which considers intrapersonal, interpersonal and environmental factors (Michie et al., 2011a). The BCW was developed systematically from 19 frameworks and can be applied to a range of individuals, groups and populations and behaviours (Michie et al., 2014). This framework suggests that researchers must understand the target behaviour, identify intervention options and then identify content in the form of BCTs when developing an intervention (Michie et al., 2014). The BCW has three levels: The COM-B (Capability, Opportunity, Motivation – Behaviour) model, intervention functions and policy categories.

The COM-B model proposes that, for a behaviour to occur, an individual must have physical and psychological capability, social and physical opportunity and reflective and automatic motivation (Michie et al., 2014). Capability refers to whether a person has physical or psychological skill, strength or stamina to carry out the behaviour. Opportunity refers to whether a person has appropriate physical environmental resources (E.g. time, locations, and cues) or social interpersonal influences (e.g. social cues, cultural norms). Motivation refers to whether a person has reflective processes (plans/evaluations) and automatic processes (Emotions, desires, impulses, inhibitions, and drives) which enable them to carry out the behaviour. All of these factors were evident in the literature that has outlined barriers and facilitators to fidelity of delivery and engagement (see Section 1.4).

The COM-B model proposes how capability and opportunity influence motivation (Michie et al., 2014) and highlights the need to consider capability, opportunity and motivation together rather than alone (Hendriks et al., 2014). The COM-B model can also be linked with the Theoretical Domains Framework (TDF; Cane, O'Connor & Michie, 2012) to provide a more in-depth behavioural diagnosis. The TDF proposes fourteen domains which influence behaviour: 1) Knowledge, 2) Skills, 3) Social/professional role and identity, 4) Beliefs about Capabilities, 5) Optimism, 6) Beliefs about consequences, 7) Reinforcement, 8) Intentions, 9) Goals, 10) Memory, attention and decision processes, 11) Environmental context and resources, 12) Social influences, 13) Emotions, and 14) Behavioural regulation.

The nine intervention functions include: 1) Education, 2) Persuasion, 3) Incentivisation, 4) Coercion, 5) Training, 6) Restriction, 7) Environmental restructuring, 8) Modelling, and 9) Enablement (Michie et al., 2014). These intervention functions are designed to help intervention developers to choose appropriate functions which can work together to help change behaviour.

The policy categories can be mapped with the intervention functions to provide strategies for implementing the behaviour change strategies in daily life, on a wider scale. These include: 1. Communication/marketing, 2) Guidelines, 3) Fiscal measures 4) Regulation, 5) Legislation, 6) Environmental and social planning, and 7) Service provision (Michie et al., 2014).

The BCW can inform all stages of the behaviour change process, from evaluating barriers and facilitators to developing and selecting BCTs and evaluating interventions (Michie et al., 2013). In this thesis, the BCW will be used to develop recommendations to improve fidelity of delivery of, and engagement with PRIDE, once barriers and facilitators to delivery and engagement have been identified using the COM-B model.

1.6 Research gap

Previous research demonstrates the importance of fidelity of delivery and engagement, and recommends ways to measure them. However, little research in this area has focused on 1) the quality of measures, 2) the development of measures that are psychometrically robust but also acceptable and practical for use by different audiences (including researchers, providers and people with dementia), 3) the assessment of fidelity of delivery using these methods for complex tailored interventions for people with dementia, 4) the barriers and facilitators to delivery, and engagement from multiple perspectives including providers, people with dementia and supporters and 5) the development of recommendations to improve fidelity of delivery of, and engagement with PRIDE based on these findings.

The research outlined in this thesis focuses on fidelity of delivery of, and engagement with dementia interventions from multiple perspectives, including the person with dementia. Attention to the perspective of the person with dementia is important as we need to identify not only what they thought of the intervention but what they thought they received. Therefore, the methodology outlined in this thesis provides a novel and interesting contribution to both implementation and dementia research.

1.7 Aims of thesis

The aims of this PhD thesis are to:

1. Review the measures used to measure fidelity of delivery of, and engagement with, complex health behaviour change interventions (see Chapter 2).
2. Develop and evaluate measures of (i) fidelity of delivery of, and engagement with, the PRIDE intervention, and (ii) fidelity of delivery of the COTiD-UK intervention (see Chapter 3).
3. Assess fidelity of delivery of PRIDE and COTiD-UK (see Chapter 4).

For the PRIDE intervention:

4. Assess participants' engagement with the intervention (see Chapter 4).
5. Investigate the similarities and differences in perspectives of fidelity of delivery between independent observers, DAWs and participants (see Chapter 4).
6. Identify barriers to, and facilitators for, fidelity of delivery and engagement from the perspectives of DAWs, people with dementia and their supporters (see Chapter 5).
7. Develop recommendations to improve fidelity of delivery of, and engagement with PRIDE (see Chapter 6).

Chapter 2 A systematic literature review of the measures used to monitor fidelity of delivery of, and engagement with, complex health behaviour change interventions

2.1 Introduction

Fidelity of delivery has previously been assessed using self-report measures (Bellg et al., 2004) and by audio-recording, which is the gold standard (Bellg et al., 2004; Borrelli, 2011; Lorencatto et al., 2014). Methods used to assess engagement have included self-report measures (Bellg et al., 2004; Burgio et al., 2001; Carroll et al., 2007), observation of skills (Burgio et al., 2001) and homework reviews (Bellg et al., 2004) (See Chapter 1, Section 1.3.3.1 for further details).

Psychometric and implementation qualities are important indicators of the reliability, validity and usability of measures used to monitor fidelity of delivery and engagement (further details are reported in Chapter 1, Section 1.3.3.2.3). Understanding which intervention components have been delivered and engaged with requires high-quality measures, yet little research has focused on the reporting of the quality of these measures (Maynard et al., 2013; Rixon et al., 2016).

Reporting the psychometric and implementation qualities of measures of fidelity of delivery and engagement allows one to determine whether the findings are trustworthy and representative. Without this information, it is difficult to draw conclusions with high certainty about how well interventions have been delivered or engaged with. This, in turn, makes it difficult to draw conclusions about intervention effectiveness. In terms of measures of fidelity of delivery, aspects of psychometric qualities can include: i) using multiple, independent researchers to rate fidelity of delivery; ii) calculating inter-rater agreement of measurements and iii) randomly selecting data (Bellg et al., 2004; Borrelli, 2011; Breitenstein et al., 2010b; Lorencatto et al., 2013b). Aspects of implementation qualities for fidelity of delivery can include: i) time constraints; ii) cost, and iii) reactions to measurements (Breitenstein et al., 2010a). Similar qualities may be pertinent for engagement, including the validity and reliability of the measure and the ease of use for completion by the target audience. However, the qualities of engagement measures have not been investigated as thoroughly as that of fidelity of delivery measures.

Measures used to monitor fidelity of delivery and engagement, and the reporting of psychometric and implementation qualities of these measures in complex, face-to-face health (physical, mental and social well-being; World Health Organisation, 2017) behaviour change interventions have yet to be systematically identified. Although this thesis focuses on fidelity of delivery of, and engagement with, interventions specifically for dementia, it was deemed necessary to review face-to-face health behaviour change interventions to gain a more comprehensive overview of relevant measures and their qualities. Face-to-face health behaviour change interventions have similar characteristics to interventions for people with dementia, in that they have many interacting components and are complex to deliver. Therefore, the findings from this review can be applied to specific interventions for people with dementia.

This review aimed to: 1) identify the types of measures used to monitor a) the fidelity of delivery of, and b) engagement with, complex, face-to-face health behaviour change interventions, and 2) describe these measures as reported in terms of both psychometric and implementation qualities.

2.2 Methods

The search and screening strategies were developed using methods advocated by the Cochrane Collaboration (Higgins & Green, 2011; Lefebvre, Manheimer & Glanville, 2011). Eligibility criteria for considering studies were specified using the

‘Participants’, ‘Intervention’ and ‘Outcomes’ criteria from PICO (O’Connor, Green & Higgins, 2011).

2.2.1 Inclusion criteria

(1) Participants: adults aged 18 and over.

(2) Intervention: Complex, face-to-face behaviour change interventions aimed at improving health behaviours. Health is defined as physical, mental or social well-being (World Health Organisation, 1946; as cited in World Health Organisation, 2017). Other modes of intervention delivery, such as digital interventions, may have different issues in relation to fidelity of delivery and engagement; therefore, these were not included in this review.

(3) Outcomes: Studies which described measures to monitor fidelity of delivery and/or engagement and reported outcomes for fidelity of delivery and/or engagement and intervention effectiveness using quantitative measures. Only quantitative studies were included to increase the ability to compare across studies.

2.2.2 Exclusion criteria

(1) Review articles, articles not written in English or not peer-reviewed.

(2) Articles in which the intervention outcome could not be clearly distinguished from the engagement or fidelity of delivery outcome.

2.2.3 Search strategy

Five electronic databases (PubMed, ScienceDirect, PsycInfo, Embase and CINAHL plus) were searched from the inception of each database up to November 2015. *Implementation Science* was searched and reference lists of relevant known reviews (Carroll et al., 2007; Durlak & DuPre, 2008; Toomey et al., 2015) were screened to identify additional studies. After the initial search, reference lists of reviews identified from the search (Clement, Ibrahim, Crichton, Wolf & Rowlands, 2009; Conn, Hafdahl, Brown & Brown, 2008; Gucciardi, Chan, Manuel & Sidani, 2013; Reynolds et al., 2014; Smith, Soubhi, Fortin, Hudon & O'Dowd, 2012), relevant protocols (Gardner et al., 2014), and forward and backwards searching of included studies were screened to identify further articles. The articles generated by this search strategy were sent to 21 experts to ask if they knew of relevant articles that were missing from the search results.

Initial search terms were piloted and refined iteratively with sequential testing to identify false positive and negative results and ensure that the search captured all relevant key words. A subject librarian was consulted in the development of the search terms.

Free and mapped searches (using Medical Subject Heading Terms) were conducted. Boolean operators were used to construct a search incorporating all search terms when combination searches were not possible. Search outputs were filtered for English full texts, peer-reviewed articles, adult participants and health topics. The final search strategy is in Figure 2-1.

To access articles not available through the university library database, the authors were contacted or articles were accessed through library services.

This search strategy was not exhaustive, but was instead used to identify as many papers that measured and reported fidelity of delivery and/or engagement in sufficient depth to provide insight into the measures used.

The initial search strategy used to identify records

1. “Fidelity of delivery” OR “Treatment fidelity” OR “Treatment delivery” OR “Delivery” (In title and abstract)
2. “Engagement” OR “Treatment receipt” OR “Treatment enactment” (In title and abstract)
3. “Program evaluation” OR “Process evaluation” (abstract)
4. Complex intervention OR Multicomponent intervention OR Multiple intervention components
5. “Behavior change” intervention OR “Behaviour change” intervention
6. Health or “healthcare” (In title and abstract)
7. Combine 1 and 2 with OR
8. Combine 7 and 3 with OR
9. Combine 4 and 5 and 6 with AND
10. Combine 8 and 9 with AND

Figure 2-1. Search strategy

2.2.4 Data collection and analysis

2.2.4.1 Study selection

One reviewer conducted the electronic searches and screened the reference lists of relevant articles. All identified titles and abstracts were downloaded and merged using EndNote. Duplicates were removed. Two reviewers independently screened all 1) titles, 2) abstracts and 3) full texts against inclusion and exclusion criteria. Reviewers met after each stage to determine agreement and resolve discrepancies. Any articles which reviewers were unsure of were retained until data extraction, when more information was available (Higgins & Deeks, 2008). Inter-rater agreement was assessed using percentage agreement and kappa statistics. Scores from both the initial search screening and additional search screening were combined to calculate agreement scores. For the title screening, researchers achieved 64.9% agreement (n=802, 2 missing responses. Kappa 0.49, PABAK 0.47). For the abstract screening, researchers achieved 68% agreement (n=425, 3 missing responses. Kappa 0.36, PABAK 0.36). For the full text screening, researchers achieved 71.8% agreement (n=266. Kappa 0.46, PABAK 0.58). The full-text kappa scores (Cohen, 1960) indicated fair agreement (Orwin, 1994; as cited in Higgins & Deeks, 2008). This might reflect the difficulty identifying relevant articles due to differences in terminology in studies. Information on fidelity of delivery and engagement were often reported in separate articles than those reporting intervention outcomes.

2.2.4.2 Data extraction

A data extraction form was developed using a combination of standardised forms: Guidelines International Network-Evidence Tables Working Group intervention template (Guidelines International Network, 2002-2017) and the Oxford Implementation Index (Montgomery, Underhill, Gardner, Operario & Mayo-Wilson, 2013). Data on the measures used to monitor fidelity of delivery and engagement and results were extracted, along with any qualities of measures that were reported. Psychometric qualities and implementation qualities were not pre-specified before data extraction; therefore, any information that was reported in the results and discussion section of the original articles in relation to the quality of the measures were extracted. As a minimum quality check (Centre for Reviews and Dissemination, University of York, 2009), an independent researcher checked 20% of data extraction forms. Minor errors of punctuation were identified; however, no further details were extracted, and therefore one researcher extracted data from all studies.

2.2.4.3 Data synthesis

Narrative analysis was used to summarise the fidelity of delivery and engagement measures and the reporting of psychometric and implementation qualities by one researcher. If authors specified the type of engagement that they measured, e.g. ‘intervention receipt’ or ‘intervention enactment’, these were reported separately within engagement. One researcher synthesised the information on methods. The extracts from the text that included descriptions of qualities were summarised and the part of the procedure that the quality related to was recorded. Psychometric qualities included: reliability (achieving consistent results in different situations; Roberts et al., 2006) and validity (measures what it aims to measure; Roberts et al., 2006). Implementation qualities included: acceptability (appropriate for those who will use it; Bowen et al., 2009), practicality (can be used despite limited resources; Bowen et al., 2009) and cost. Researchers were open to other categories that may have emerged if qualities did not fit into these categories. Due to the heterogeneity of studies, a descriptive rather than quantitative synthesis of data was conducted (Deeks, Higgins & Altman, 2008; Popay et al., 2006).

Two researchers were involved in the categorisation of psychometric and implementation qualities. One researcher coded 10% of the qualities and asked another researcher to check responses. Disagreements were identified and both researchers independently coded an additional 10% of qualities. Researchers met after each round to discuss disagreements. This process was repeated, until 80% agreement on the categorisation of features was reached, as recommended by Lombard, Synder-Duch & Bracken (2002). After four rounds (40% of qualities were independently coded), reliability was achieved with 80.1% agreement between coders. One researcher coded the rest of the qualities, based on discussions with the second researcher. Following this, the second researcher checked a further 10% of the coding and any qualities that the first researcher was unsure how to code.

2.3 Results

After duplicates were removed, 809 records were identified. Sixty-six articles were included in the analysis (See Figure 2-2).

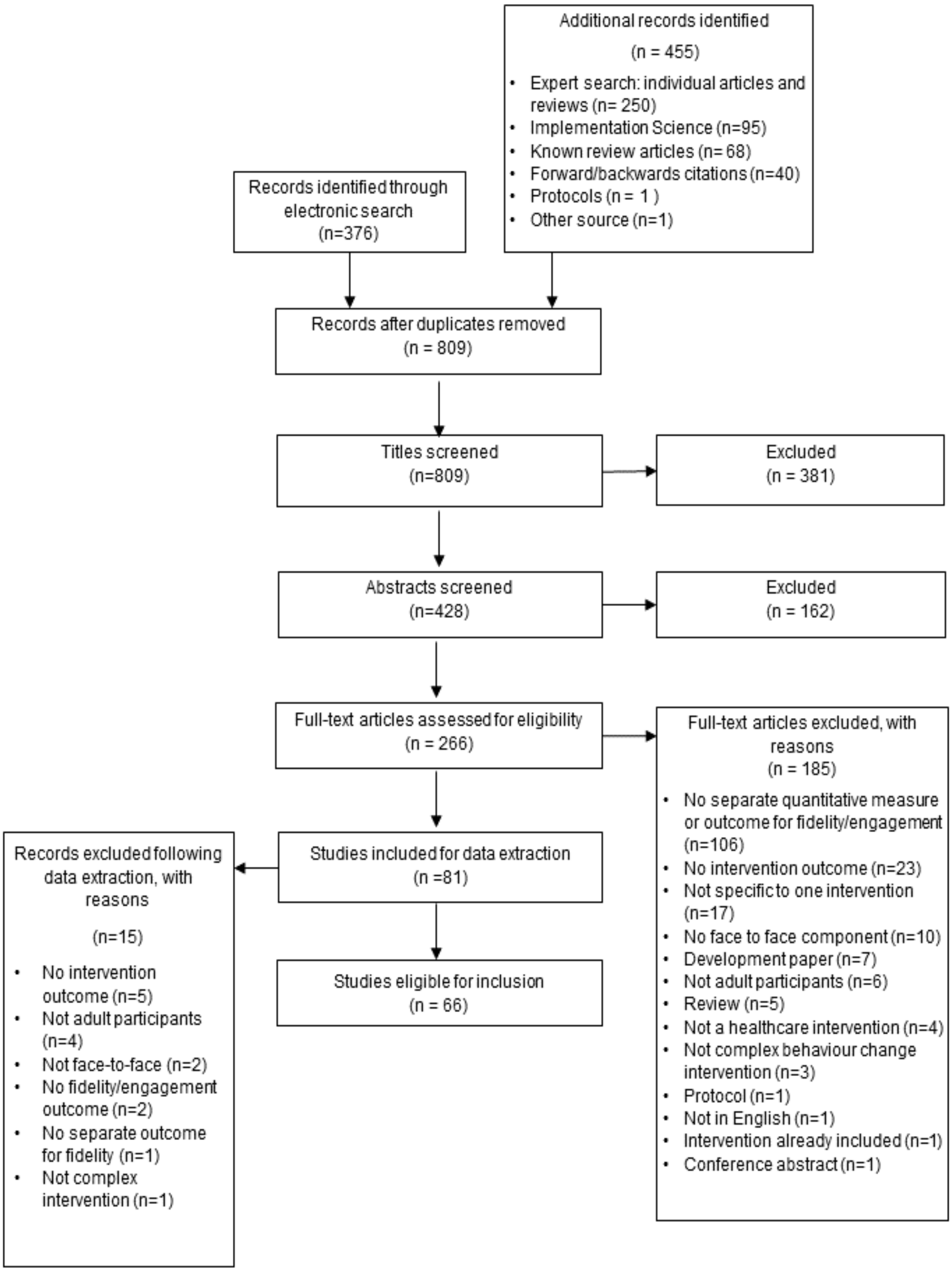


Figure 2-2. A flow diagram of the paper selection process (based on Moher, Liberati, Tetzlaff, and Altman's (2009) PRISMA flow diagram)

2.3.1 Study characteristics

Sixty-six studies (100%) were included (for a list of studies, study numbers with corresponding citations, and their characteristics, see Appendix 2-1). All of the included studies described fidelity of delivery and/or engagement measures, in relation to a complex, face-to-face health behaviour change intervention. Forty-six studies (69.7%) were RCTs and 20 (30.3%) used non-randomised designs. Settings included medical settings (n=40; 60.6%), community settings (n=20; 30.3%) and companies (n=1; 1.5%). Five studies (7.6%) did not specify their setting. Intervention recipients were patients (n=31; 47%), members of the public (n=17; 25.8%), healthcare professionals and practices (n=11; 16.7%), caregivers and care recipients (n=4; 6.1%), and workers (n=3; 4.5%). Target behaviours included multiple health behaviours (n=35; 53%), self-management skills (n=11; 16.7%), clinician behaviours (n=10; 15.2%), anxiety-reducing behaviours (n=3; 4.5%), work sickness absence (n=2; 3%), caregiver skills (n=2; 3%), treatment adherence (n=1; 1.5%) patient resource use (n=1; 1.5%) and activities of daily living (n=1; 1.5%). Interventions were delivered by healthcare professionals (n=33; 50%), people trained especially for the intervention (e.g. community mediators and outreach visitors) (n=11; 16.7%), pharmacists (n=2; 3%), postgraduate students (n=2; 3%) and researchers (n=4; 6%). Fourteen studies (21.2%) did not specify who delivered the intervention.

2.3.2 Measures used to monitor fidelity of delivery and engagement

Of all included studies, 44 (66.7%) assessed fidelity of delivery and 46 (69.7%) assessed engagement. Of these, 24 studies (36.4%) measured both fidelity of delivery and engagement, 20 (30.3%) measured fidelity of delivery only and 22 (33.3%) measured engagement only (see Table 2-1).

Table 2-1. The proportion of studies which measured fidelity of delivery, engagement, or both

Measured	**Number of studies (%)**	**Study reference numbers***
Fidelity of delivery and engagement	24 (36.4)	2,5,6,10,11,14,16,19,21,23,24,29,30,35,36, 38,39,40,41,42,48, 51, 55, 64
Fidelity of delivery	20 (30.3)	1,7,20,22, 26,27,28,31,33,34,45,49,50, 57,58,59,60,62,63,66
Engagement	22 (33.3)	3,4,8,9,12,13,15,17,18,25,32,37,43,44,46,47,52,53,54,56,61,65
Total	66 (100)	

Note. Please see Appendix 2-1 for details of study citations

Table 2-2 provides an overview of the methods, including a summary of what was measured, the measures used, who completed the measures, the sample, analysis method and the number of studies that used a framework/model and provided definitions for fidelity and engagement. For further details about methods and a summary of results, please see Appendix 2-2.

Table 2-2. A summary of the measures used to monitor fidelity of delivery and engagement

	Fidelity (n=44; 100%)	Engagement (n=46, 100%)
What was measured?	- Delivery of intervention components compared with intervention protocol (n=20; 45.5%)[1,5,6,10,11,16, 20 (specifically BCTs) 26, 28, 29, 30,31,35,39,40,51,55,59,60,66] - Motivational interviewing adherence/fidelity/infidelity (n=6; 13.6%)[7,22,57,58,63,64] - Dose delivered and fidelity (n=6; 13.6%) [2,14,23,36,42,49,] - Fidelity of delivery but unclear which aspect as results not reported (n=2; 4.5%) [19,21,] - Dose of intervention components (n=2; 4.5%)[24,62] - Competence and success delivering behaviour change strategies (n=1; 2.3%)[41,] - Treatment integrity/demonstration of skills (n=1; 2.3%)[25] - Extent to which environmental changes made (n=1; 2.3%)[50] - Consistency and quality of use of innovation (n=1; 2.3%)[33,] - Motivational interviewing fidelity, dose and context (n=1; 2.3%)[38] - 'Quality of counselling' – use of skills and therapeutic alliance (n=1; 2.3%)[27] - Number of times skills were modelled & telephone fidelity (n=1; 2.3%)[34] - Clinician competence/demonstration of intervention method (n=1; 2.3%)[48]	- Adherence to target behaviour (n=7; 15.2%)[3,4(+Skills),13,15,19,37,43] - Attendance (n=7; 15.2%) [9,40,44,46, 54, 56,65] - Understanding (receipt) and use of intervention skills (enactment) (n=3; 6.5%) [6,35,48] - Understanding and engagement (n=2; 4.34%)[42,51] - Compliance and attendance (n=2; 4.34%)[18,47] - Adherence to target behaviour & attendance (n=2; 4.34%)[17,52] - Completion of study visits (n=2; 4.34%)[21,41,] - Intervention enactment – use of BCTs (n=1; 2.17%)[25] - Receipt, enactment, homework compliance and attendance (n=1; 2.17%) [39] - Dose received/exposure – assignments completed (n=1; 2.17%) [2] - Dose received - Intervention receipt and compliance (n=1; 2.17%) [14] - How much learned/adopted, helpfulness and current use (n=1; 2.17%) [11] - Effectiveness of intervention - trying practices, participating, influencing practice, comprehension, future participation (n=1; 2.17%)[16] - Adoption of intervention and maintenance (n=1; 2.17%)[29] - Dose of intervention received (n=1; 2.17%) [36] - Receipt and reaching goals (n=1; 2.17%)[30] - Participation in activities, dose and checklist completion (n=1; 2.17%)[5] - Activity adherence, sessions delivered, telephone contact (n=1; 2.17%)[12] - Adherence to target behaviour & diary (n=1; 2.17%)[38] - Adherence to target behaviour, attendance and diary (n=1; 2.17%)[53] - Exposure to intervention –

		attendance/receipt of calls (n=1; 2.17%)[32] - Uptake of intervention – attendance/use of modules (n=1; 2.17%)[8] - Attendance, reading materials, usefulness, meeting goals (n=1; 2.17%)[61] - Attendance and completion of diaries (n=1; 2.17%)[64] - Completion of diaries (n=1; 2.17%)[10] - Completion of home assignments, self-monitoring, attendance (n=1; 2.17%)[23] - Homework adherence & commitment (n=1; 2.17%) [24] - Completion of homework, receipt of information, telephone calls (n=1; 2.17%)[55]
Type of measures used	**Observational measures (n=17; 38.6%)** - Video (n=2; 4.55%)[27, 51] - Audio (n=13; 29.5%)[7, 19, 21, 22, 38, 40, 45, 48, 55, 57, 58, 63, 64] - Non-specific (n=2; 4.55%)[1, 34] **Self-report measures (n=15; 34%)** - Provider (hand) (n=7; 15.9%)[6, 10, 14, 16, 41, 42, 59] - Provider (computer) (n=3; 6.8%)[24, 23, 36] - Participant (hand) (n=2; 4.6%)[11, 28] - Participant (computer) (n=1; 2.3%)[49] - Non-specific (computer) (n=2; 4.6%)[62, 66] **Multiple measures (n=11; 25%)** - Provider and participant self-report (n=4; 9%)[2, 30, 35,50] - Audio and provider self-report (n=3; 6.8%)[20, 26,39] - Video + provider self-report (n=1; 2.3%)[5] - Observation and exercise log	**Self-report measures (n=18; 39.1%)** - Participant (n=14; 30.4%)[11,13,14(R),16,19,25,30,35,36,37,38,43, 48, 55] - Provider (n=4; 8.7%)[10, 41,42,51] **Multiple measures (n=17; 37%)** - Provider and participant self-report (n=3; 6.5%)[2, 3, 5,] - Participant self-report and attendance records (n=3; 6.5%) [18,23,32,] - Provider and participant self-report and attendance (n=2; 4.3%)[17,47] - Attendance records and behaviour monitoring (n=2; 4.3%)[53,64] - Direct observation and provider and participant self-report (n=1; 2.2%)[12] - Non-specific observation and provider self-report (n=1; 2.2%)[4] - Provider self-report, attendance, homework review (n=1; 2.2%)[39(R&E)] - Participant self-report and verbal verification (n=1; 2.2%)[6(R&E)] - Provider self-report and homework review (n=1;

	(participant) (n=1; 2.3%)[31] - Direct observation and rating (n=1; 2.3%)[29] - Participant self-report and patient files (n=1; 2.3%)[60] **Other measures (n=1; 2.3%)** - Quantitative rated interviews with providers (n=1; 2.3%)[33]	2.2%)[24] - Participant self-report and objective verification (n=1; 2.2%)[15] - Provider self-report and attendance records (n=1; 2.2%)[52] **Intervention records (n=11; 24%)** - Attendance/referral records (n=10; 21.7%)[8,9,29,40,44,46,54,56,61,65] - Study completion (n=1; 2.2%)[21]

More details about measures	**Who completed the measures?**
	- Researcher (n=18; 40.9%) [1, 7, 21, 22, 27, 29, 33, 34, 38, 40, 45, 48, 51, 55, 57, 58, 63, 64]
	- Provider (n=11; 25%) [6, 10, 14, 16, 19, 23, 24, 36, 41, 42, 59]
	- Provider and participant (n=4; 9.1%) [2, 30, 35 ,50]
	- Provider and researcher (n=4; 9.1%) [5, 20, 26, 39]
	- Participant (n=3; 6.8%), [11, 28, 49]
	- Participant and researcher (n=2; 4.55) [31, 60]
	- Not specified (n=2; 4.55) [62, 66]
	
	Development of measures
	- Not specified (n= 31; 70.45%) [1, 5, 11, 14, 16, 19, 23, 24, 27, 28, 29, 30, 31, 33, 35, 36, 38, 39, 40, 41, 42, 48, 49, 50, 51, 55, 59, 60, 62, 64, 66]
	- Used a previously developed measure (n=8; 18.18%)
	  - Motivational Interviewing treatment integrity code (Moyers et al., 2003; as cited in [57,58,] 2007 as cited in
		Who completed the measures?
		- Participant (n=14; 30.4%)[11,13,14(R),16,19,25,30,35,36,37,38, 43,55,48]
		- Researcher (n=13; 28.3%) [8,9,21, 29,40,44,46,53, 54,56,61,64, 65]
		- Participant and researcher (n=6; 13%) [6(R&E),15,18, 23, 24, 32,]
		- Provider (n=4; 8.7%)[10,41,42,51]
		- Provider and participant (n=3; 6.5%) [2, 3, 5,]
		- Provider and researcher (n=3; 6.5%) [4, 39(R&E), 52]
		- Provider, participant, researcher (n=3; 6.5%) [12, 17,47]
		
		Development of measures
		- Not specified: (n=42; 91.3%) [2, 3, 5, 6, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 21, 23, 24, 25, 29, 30, 32, 35, 36, 37, 38, 39, 40, 41, 42, 44, 46, 47, 48, 53, 54, 55, 56, 61, 64, 65]
		- Used previously developed measure (n=3; 6.5%)
		  - DASH adherence index: (n=1; 2.17%) [43]
		  - Pittsburgh Rehabilitation Participation scale (n=1; 2.17%) [51] (engagement, understanding not specified)
		  - Participation scale and the

[22]): (n=3; 6.8%) [22, 57, 58] - MITI + Motivational interviewing skill code (Miller, Moyers, Ernst & Amrhein, 2003) (n=2; 4.5%) [7, 63] - Behaviour Change Counselling Index (Lane et al., 2005) (n=2; 4.5%) [21, 45] - Flanders Interaction Analysis Technique (n=1; 2.3%) [34] - Developed own measure (n=5; 11.36): [2, 6, 10, 20, 26]	participation scale and recovery practice scale (n=1; 2.17%) [52] - Developed own measure and used measures that were previously developed: (n=1; 2.2%) [4]
Responses on measures - Not specified (n=23; 52.3%) [1, 6, 7, 10, 16, 19, 21,22, 23, 24, 31, 34, 35, 38, 39, 40, 42, 48, 49, 51, 62, 64, 66] - Rating scales (n=12; 27.3%) - 3-point scale (completely covered, partially covered, not covered) (n=1; 2.27%) [5] - 4-point scale (n=1; 2.27%) [45] - Two 4-point rating scales (unsatisfactory, doubtful, satisfactory, good', 'not at all, hardly, slightly, considerably, strongly' + Not applicable (n=1; 2.27%) [27,] - Two 4-point scales ('Excellent, good, fair, poor' and 'used well, used well but not often, used well and not well, not	**Responses on measures** - Not specified: (n= 29; 63%) [2, 3, 5, 6, 8, 9, 12, 13, 15, 17, 18, 19, 21, 23, 29, 30, 32, 35, 37, 38, 40, 42, 44, 48, 53, 54, 56, 61, 65] - Rating scales (n=12; 26.1%) - 3-point scale adherence (poor, fair, excellent), others not specified (n=1; 2.17%) [4] - 3-point scales: perceived helpfulness (0 not at all, 2 very much) + currently using (0 not at all, 2 very much) (n=1; 2.17%) [11] - 3-point scale (0 = effectively non-compliant, 0.5 = uncertain or partly compliant, 1=compliant) (n=1; 2.17%) [47] - 3-point scales (yes/no/don't know and 'very helpful, neither helpful nor unhelpful, very unhelpful'), 4-point scale (most, all, some, none), (n=1; 2.17%) [36] - 3-point scale (Better than target range (>1), 0-1 within target range, worse than target range (<0)):

used or not used well) (n=1; 2.27%)[29]
  - 5-point scale (Totally disagree – totally agree) (n=1; 2.27%)[2]
  - 5-point scale ('Never, most of the time, often, always, do not remember') (n=1; 2.27%)[30]
  - 5-point scale ('Non-use, low compliance, compliant use, high compliance, committed use') (n=1; 2.27%)[33]
  - 7-point scale (low (1), 7 high) + behaviour counts (n=2; 4.5%)[57, 58]
  - 7-point scale (n=1; 2.27%)[63]
  - Eight point scales (no adherence – optimal adherence and no competence to excellent competency) (n=1; 2.27%)[55]
  - 10-point scale (very bad to very good) + three point scale (yes/partly/not implemented) (n=1; 2.27%)[14]
- Dichotomous scale: (n=8; 18.2%)
  - Yes/no (n=5; 11.4%)[11, 28, 41, 59, 60]
  - Applied (1)/not applied (0) or completed (1)/ not completed (0) (n=2; 4.5%)[20, 26]
  - Completed) (1)/not completed(0) (n=1; 2.27%)[36]
- Rating scale and

(n=1; 2.17%)[43]
  - 3-point Likert scale (very low to very high) (n=1; 2.17%)[52]
  - 3-point scale (n=1; 2.17%)[64]
  - 4-point scale (dissatisfied to very satisfied) (n=1; 2.17%)[55,]
  - 4-point scale (1 missed most, 4 missed none) and 10-point scale (1 none, 10 complete) (n=1; 2.17%)[24]
  - 5-point Likert scale: (n=1; 2.17%)[16]
  - 6-point Likert scale (1 no engagement, 6 excellent engagement) and 3-point scale (1 minimal understanding, some understanding, good understanding) (n=1; 2.17%)[51]
  - 7-point scale (Never, less than 3 months ago, 4-6 months ago, 7-9 months ago, 10-12 months ago, 1-2 years ago, less than two years ago) (n=1; 2.17%)[46]
- Dichotomous scales (n=3; 6.5%)
  - Yes/no: (n=3; 6.5%)[10, 25, 41]
- Rating scale + dichotomous scale (n= 2; 4.4%)
  - 3-point scale (yes/no/don't know) and dichotomous scale (yes/no): (n=1; 2.17%)[14]
  - 3-point scale (0 not at all, fully) – measure receipt. 5-point scale (1 not at all, 5 extremely) measure willingness, interest and supportiveness and dichotomous scale (attempted, not attempted) – to measure enactment (n=1; 2.17%)[39]

	dichotomous scale (n=1; 2.3%) - 4-point scale (rarely (1), sometimes (2), often (3), most/all of the time (4) and yes (1)/no (0) (n=1; 2.3%)[50]	
Sample	**How many participants were sampled?** - Not specified (n=23; 52.3%) [1, 2, 5, 7, 11, 14, 16, 19, 21, 22, 23, 28, 34, 35, 41, 42, 49, 50, 57, 58, 60, 62, 66] - Subsample (n=16; 36.4%) [10 26, 27, 29, 30, 31, 33, 36, 38, 40, 45, 48, 51, 55, 63, 64] - Reported number of sessions sampled (n=4; 9%) [26,27,31,63] - Reported number of clinicians/sites data was sampled from (n=4; 9%) [10,29,30,33] - Reported the percentage of sessions sampled (n=6; 13.6%) [36, 38, 40, 45, 51, 55] - Reported sampling some but not all but did not specify how many (n=2; 4.5%) [48,64] - All (n=5; 11.4%): [6, 20, 24, 39, 59]	**How many participants were sampled?** - Not specified (n= 45; 97.8%) [2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 21, 23, 24, 25, 29, 32, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 46, 47, 48, 51, 52, 53, 54, 55, 56, 61, 64, 65] - Subsample (n=1; 2.2%) [30] - Reported sampling a number of participants (n=1; 2.2%) [30]
	How were participants sampled? - Not specified: (n=25; 56.8%) [1, 2, 5, 7, 11, 14, 16, 19, 21, 22, 23, 28, 29, 30, 34, 35, 36, 38, 41, 42, 49, 50, 60, 62, 66] - Random (n=8; 18.2%) [31, 40, 51, 55, 57 (random segment), 58 (random segment), 63, 64,] - N/A (sampled all: n=5; 11.4%) [6, 20, 24, 39, 59]	**How were participants sampled?** - Not specified: (n=46; 100%) [2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 21, 23, 24, 25, 29, 30, 32, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 46, 47, 48, 51, 52, 53, 54, 55, 56, 61, 64, 65]

	- Purposive: (n=3; 6.8%) [26, 27 (previously defined days), 33,] - Self-selected (n=1; 2.3%) [48,] - Opportunity: (n=1; 2.3%) [45] - Stratified: (n=1; 2.3%) [10]	
	Which conditions were participants sampled from? - Not specified (likely intervention only): (n=38; 86.4%) [1, 5, 6, 10, 11,14, 16, 19, 20, 21, 22, 23, 26, 27, 28, 29, 30, 31, 33, 34, 35, 36, 38, 39, 40, 41, 42, 45, 49, 55, 57, 58, 59, 60, 62, 63, 64, 66] - All: (Explicitly reported) (n=4; 9.1%) [7, 48, 50, 51] - Intervention(s) (n=2; 4.5%) [2, 24,]	**Which conditions were participants sampled from?** - Not specified (likely intervention only): (n= 35; 76.1%) [5, 6, 8, 9, 10, 11, 12, 14, 15, 16, 19, 21, 23, 29, 30, 32, 36, 37, 38, 39, 40, 41, 42, 43, 44, 46, 47, 48, 52, 54, 55, 56, 61, 64, 65] - All (explicitly reported): (n= 9; 19.6%) [2, 3, 18, 35, 4, 13, 17, 51, 53] - Intervention(s) (n=2; 4.3%) [24, 25]
Analysis method	- Descriptive statistics (n=29; 65.9%)[1, 5, 6, 10, 11, 14, 16, 22, 23, 27, 28, 29, 30, 31, 33, 34, 36, 38, 39, 41, 42, 45, 49, 55, 57, 58,59, 60, 66] - Descriptive and inferential statistical techniques (n=11; 25%)[2, 7, 20, 24, 26, 35, 48, 50, 62, 63, 51 (inferential not specified)] - Not reported (n=4; 9.1%)[19, 21, 40, 64]	- Descriptive statistics (n=37; 80.4%)[3,4, 5, 6, 8, 9, 10, 11, 12, 14, 15, 16, 18, 19, 21, 23, 29,30, 32, 35, 36, 37, 38, 40, 41, 42, 44, 46, 47, 48, 52, 54, 55, 56, 61,64, 65] - Descriptive statistics and Inferential statistical techniques (n=9; 19.6%)[2, 13 (inferential stats not specified) 17, 24, 25, 39, 43, 51, 53]

Framework/model	- Framework not specified/mentioned (n=53; 80.3%) [1, 3, 4, 5, 7, 8, 9, 11 (mentioned in discussion), 12, 13, 15, 16, 17, 18, 19,21, 23, 24, 25, 27, 28, 30, 32, 33, 34, 35, 36, 37, 38, 40, 41, 43, 44, 45, 46, 47, 48, 49, 51, 52, 53, 54, 55, 56, 57, 58, 59, 61, 62, 63, 64, 65, 66]
	- Used a framework (n=13; 19.7%) [2, 6, 10, 14, 20, 22, 26, 29, 31, 39, 42, 50, 60]
	  - Steckler and Linnan's (2002; as cited in [2,14,42,50]) framework (n=4; 6.1%)[2, 14 (adapted version), 42, 50]
	  - NIH Treatment fidelity model/NIH Behaviour change Consortium framework (Bellg et al., 2004) (n=6; 9.1%) [6, 10, 20, 22, 26, 39]
	  - RE-AIM framework (n=1; 1.5%) [29]
	  - Resnick et al (2005) (n=1; 1.5%)[31]
	  - Baranowski & Stables (2000): (n=2; 3.3%) [42, 50]
	  - Saunders, Evans & Joshi (2005) (n=1; 1.5%) [42]	

	- Hasson (2010) based on Carrol et al (2007) (n=1; 1.5%) [60]
Definitions	- Provided definitions (n=18; 27.3%) [2, 5, 6, 12, 14, 16, 17, 20, 22, 23, 25, 31, 33, 38, 39, 41, 42, 50] - Fidelity (constructs that fit into fidelity): (n=15; 22.7%) [2, 5, 6, 14, 16, 20, 22, 23, 31, 33, 38, 39, 41, 42, 50] - Engagement (constructs that fit under engagement): (n=9; 13.6%) [2, 6, 12, 14, 17, 23, 25, 39, 42] - Did not provide definitions (n=48; 72.7%) [1, 3, 4, 7, 8, 9, 10, 11, 13, 15, 18, 19, 21, 24, 26, 27, 28, 29, 30, 32, 34, 35, 36, 37, 40, 43, 44, 45, 46, 47, 48, 49, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66]

Note: (R)=Receipt

(E)=Enactment

(R&E) = Receipt and enactment

2.3.2.1 What was measured?

The majority of studies that reported measuring fidelity of delivery did so by measuring the delivery of intervention components against the intervention protocol (n=20; 45.5%), adherence to motivational interviewing techniques (n=6; 13.6%) and a combination of dose delivered and fidelity (n=6; 13.6%). For engagement, there were a wide variety of measures, including adherence to the target behaviour (n=7; 15.2%), attendance (n=7; 15.2%), understanding and use of intervention skills (n=3; 6.5%), understanding and engagement (n=2; 4.4%), compliance and attendance (n=2; 4.4%), adherence to the target behaviour and attendance (n=2; 4.4%) and completion of study visits (n=2; 4.4%). Please see Table 2-2 for a full list of what was measured.

2.3.2.2 Measures

Measures of fidelity of delivery were categorised into observational measures (n=17; 38.6%), self-report measures (n=15; 34%), quantitatively rated qualitative interviews (n=1; 2.3%) and multiple measures (n=11; 25%). Of the studies that used multiple measures, six (14%) used at least one type of observational measure and nine (20.5%) used at least one type of self-report measure. In total, 23 (52%) studies used at least one type of observational measure and 24 (55%) used at least one type of self-report measure (see Table 2-2 for details).

Measures of engagement were categorised into self-report measures (n=18; 39.1%), intervention records (n=11; 24%), for example attendance monitoring, and multiple measures (n=17, 37%). Of the studies that used multiple measures, 15 (32.6%) used at least one type of self-report measure. In total, 33 (76.7%) studies used at least one type of self-report measure (see Table 2-2 for details). Two studies reported measuring receipt and enactment (Black, 2014; McCurry, LaFazia, Pike, Logsdon & Teri, 2012) and one study reported measuring receipt only (Driessen, Proper, Anema, Bongers & van der Beek, 2010).

2.3.2.3 Details of measures, sampling and analysis

For fidelity of delivery, measures were completed either by the researcher (n=18; 40.9%), provider (n=11; 25%), or participant (n=3; 6.8%); or both the provider and participant (n=4; 9.1%), provider and researcher (n=4; 9.1%), and participant and researcher (n=2; 4.55%). It was not specified who completed the measures in two studies (4.55%).

For engagement, measures were completed either by the participant (n=14; 30.4%), researcher (n=13; 28.3%) or provider (n=4; 8.7%); or both the participant and researcher (n=6; 13%), provider and participant (n=3; 6.5%), provider and researcher (n=3; 6.5%), and the provider, participant and researcher (n=3; 6.5%).

The majority of studies (fidelity of delivery, n=31; 70.45%; engagement, n=42; 91.3%) did not report whether they developed their own measure or used a previously developed measure. For fidelity of delivery, eight (18.18%) used a previously developed measure and five (11.36%) developed their own measures. For engagement, three (6.5%) studies used previously developed measures and one (2.2%) developed own measures and used measures that were previously developed.

Many studies did not specify the type of scales used to quantify fidelity of delivery (n=23; 52.3%) or engagement (n=29; 63%). For fidelity of delivery, 12 studies (27.3%) reported using rating scales (which ranged from three-point scales to 10-point scales), eight (18.2%) reported using dichotomous scales and one (2.3%) used rating scales and dichotomous scales. For engagement, 12 studies (26.1%) reported using rating scales (which ranged from three-point scales to 10-point scales), three (6.5%) reported using dichotomous scales and two (4.4%) reported using a combination of rating scales and dichotomous scales.

For both fidelity of delivery (n=23; 52.3%) and engagement (n=45; 97.8%), many studies did not specify how many participants they sampled. Five (11.4%)

measured fidelity of delivery of all participants and 16 (36.4%) measured fidelity of delivery in a subsample of participants. Of those studies that measured fidelity of delivery in a subsample, four reported the number of sessions that they sampled, four reported the number of clinicians/sites data was sampled from, six reported the percentage of sessions that they sampled, and two did not specify how many but reported sampling some but not all participants. One (2.2%) study reported measuring engagement in a subsample of participants.

The sampling strategy used to measure fidelity of delivery included: random sampling (n=8; 18.2%), purposive sampling (n=3; 6.8%), opportunity sampling (n=1; 2.3%), stratified sampling (n=1; 2.3%), self-selected sampling (n=1; 2.3%), not specified (n=25; 56.8%) and not applicable for the studies that measured all participants (n=5; 11.4%). No studies specified a sampling strategy for measuring engagement.

The majority of studies did not specify whether they measured fidelity of delivery (n=38; 86.4%) or engagement (n=35; 76.1%) in all conditions; therefore, it is likely they measured the intervention group only. Four (9.1%) reported measuring fidelity of delivery in all intervention groups and two (4.5%) reported measuring fidelity of delivery in the intervention group only. Nine (19.6%) reported measuring engagement in all intervention groups, two (4.3%) reported measuring engagement in the intervention group only.

For fidelity of delivery, 29 studies (65.9%) reported descriptive statistics, 11 (25%) reported descriptive and inferential statistics and four (9.1%) did not report how they analysed the data. For engagement, 37 studies (80.4%) reported descriptive statistics and nine (19.6%) reported descriptive and inferential statistics.

Across all 66 studies, 13 (19.7%) reported using a fidelity framework.

2.3.3 Reporting of psychometric and implementation qualities

2.3.3.1 Studies

Of all included studies, 51 (77%) reported at least one psychometric or implementation quality of their measures (38 fidelity of delivery; 86.4%, 23 engagement; 50%).

Forty-nine studies (74.2%) reported at least one psychometric quality and 17 studies (25.8%) reported at least one implementation quality (See Table 2-3 for details).

Table 2-3. Number of studies reporting psychometric and implementation qualities, across all studies (N=66) and by studies reporting fidelity of delivery (N=44) and engagement (N=46)

	Psychometric qualities			**Implementation qualities**			
	Reported at least one quality	Validity	Reliability	**Reported at least one quality**	Practicality	Acceptability	Cost
All studies; N (%)	49 (74.2)	41 (62)	34 (52)	17 (25.8)	14 (21)	6 (9)	2 (3)
Fidelity of delivery; N (%)	37 (84.1)	31 (70.5)	29 (65.9)	12 (27.3)	11 (25)	5 (11.4)	0 (0)
Engagement; N (%)	21 (45.7)	16 (34.8)	10 (21.7)	9 (19.6)	6 (13.4)	2 (4.3)	2 (4.3)

2.3.3.2 Psychometric and implementation qualities

In total, 261 (100%) reported qualities were identified (see Table 2-4 for details). Of these, 215 (82.4%) psychometric qualities were reported, 41 (15.7%) implementation qualities and five (1.9%) that were both psychometric and implementation qualities; 213 qualities were reported in relation to fidelity of delivery measures and 58 qualities for engagement measures.

Table 2-4. Number of times qualities were reported in total, and for fidelity of delivery and engagement

Quality	**Total number of times (%)**	**Category**	**Total number of times**	**Fidelity of delivery**	**Engagement**
Psychometric quality	215 (82.4)	Validity	129	100	33
		Reliability	85	75	14
		Reliability and validity	1	1	0
Implementation quality	41 (15.7)	Practicality	30	25	6
		Acceptability	8	7	1
		Cost	2	0	2
		Acceptability and practicality	1	1	0
Psychometric and Implementation quality	5 (1.9)	Reliability and practicality	1	1	0
		Validity and practicality	3	2	1
		Validity and acceptability	1	1	1
Total	261 (100)				

Note: the fidelity of delivery and engagement columns do not add up to 261 because 10 qualities were reported for both fidelity of delivery and engagement

The most frequently reported psychometric qualities concerned: the use of multiple researchers (n=21: three data collection, two data analysis, one data entry, three develop measures, 11 coding, one validate coding frame), the validity of measures (n=17: nine valid, eight not valid), the use of independent researchers (n=16: 14 used independent researchers, two did not use independent researchers), reliability of measures (n=11: five reliable, six not reliable), the random selection of data (n=11: nine randomly selected data, two did not randomly select data) and inter-rater agreement (n=9: three high inter-rater agreement, two did not report inter-rater agreement, two poor to fair, one fair to excellent, one no coder drift). Please see Table 2-4 for a detailed list of all psychometric qualities.

The most frequently reported implementation qualities concerned resource challenges (n=10: one sharing dictaphones, four time restrictions, two financial restrictions and three technical difficulties) and providers' attitudes (n=7: one dislike paperwork, one fear of discouraging participants, one nerves, one report participants behaving differently, one positive attitudes, one additional work) (See Table 2-5 for a list of all qualities).

Table 2-5. Qualities, category and number of studies qualities were reported in

Group of quality	Quality	Category	Number of studies reported in	Fidelity studies	Engagement studies
Psychometric qualities					
Use of multiple researchers	Coding	R	11	20, 26, 27, 29, 33, 34, 45, 51, 58, 64	47
	Data collection		3	6, 29, 31	
	Develop measures		3	14, 26, 60	
	Data analysis		2	10, 42	
	Data entry		1	26	
	Validate coding frame		1	26	
Validity of measures	Validated	V	9	21, 22, 34, 48, 51	4, 17 25, 51
	Not validated		8	2, 10, 34, 35, 41, 42, 50	13
Use of independent researchers	Used – coding	R	12	20, 22, 26, 27, 29, 34, 38, 45, 51, 55, 63, 64	
	Not used - coding		1	58	
	Used - develop measures		1	14	
	Used - analysis		1	42	
	Not used	V	1	20	
Measurement of conditions	All conditions (result output)	V	8	7, 50	4, 13, 17, 18, 51, 53
	All conditions (reported)		5	2, 48, 51	2, 3, 35
	Intervention only		3	2, 24	24, 25
Reliability of measures	Reliable	R	6	21, 22, 48	4, 17, 51
	Not reliable		5	2, 14, 23, 34 50	2, 23
Random selection of data	Randomly selected	V	9	31, 40, 51, 55, 57, 58, 63, 64	52 (data entry)
	Not randomly selected		2	45, 48	
Reporting of inter-rater agreement	Reported – high	R	3	26, 59	17
	Not reported		2	29, 33	
	Reported – poor to fair		2	27, 58	
	Reported – fair to excellent		1	58	
	Reported – no coder drift		1	26	
Coding of sessions	A percentage	V	7	33, 45, 51, 55, 57, 58, 63	
	All		1	27	
Calculated		R	8	20, 26, 27, 29,	17

interrater agreement				33, 58, 59	
Use of experts	Coding	V	5	10, 21, 22, 36, 38	
	Develop measures		1	27	
	Not used - coding		1	27	
	Checked % of data input	R	1	10	
Blinding	Coders	V	3	7, 26, 48,	
	Not blinded		2	2	52
	Researchers		1		15
	Participants		1	2	
Measurement of content of intervention	Some aspects of intervention	V	3	20, 38	36, 38
	All aspects of intervention		2	33, 63	
Problems with scoring criteria	Scoring criteria not sensitive	V	2	20, 26	
	No success cut off point		1	14	
	Dichotomised responses reduce variability		1		25
	Measures may capture different aspects of fidelity		1	26	
Standardisation of procedure	Script	V	2	34, 66	
	Data entry		1		52
	Coding guidelines		1	64	
	Not used standardised procedure		1	33	
	Not used standardised measure		1		52
Self-report bias		V	4	10, 26, 26, 30	
		R	2	5	4
Sampling	Across all providers	V	2	27, 45	
	Across all sites		1	10,	
	Across all sites (purposively)		1	33	
	Across all participants		1	27	
	Balanced facilitator and gender (purposively)		1	26	
Audit	Data collection	R	1	6	
	Data analysis		1		6
	Coding		1	20	20

	Data entry	V	1	23	
	Recordings		1	40	
Missing responses	Missing responses	V	1		15
Trained researchers	Trained coders	V	3	7, 27, 58	
	Trained researcher (data collection)		1		52
Observation effects		V	4	22, 26, 27, 34	
Use of one researcher	Coding	R	1	38	
	Trained observers		1	34	
Revised coding guidelines		R	3	20, 26, 48,	
		V	1	33	
Team meetings		R	4	1, 6, 23, 36	23
Recording of sessions	All sessions	V	2	40, 55	
	% of sessions		1	35	
Triangulation	Method	V	2	34, 42	
	Researcher		1	42	
Problems with analysis plan	Did not control for provider	V	1	36	
	Missing responses excluded		1	10	
Social desirability		V	3	22	13, 52
Objective verification		V	2		15, 43
		R	1		12
Used coding guidelines		R	2	20, 27	
Analysis consideration - coded missing responses as no adherence		V	1		15
Independently validated coding frame		V	1	26	
Measurement differences – observation and self-report		V	1	26	
Measurement period – year after intervention		V	1		25
Piloted coding guidelines		V	1	26	
Practice period before recording		V	1	27	
Pre-specified dates for recordings		V	1	27	
Statistician involved in sampling (stratified)		V	1	10	

Training before recording may overestimate adherence		V	1	58
Piloted measure		V	1	34
Provided a reason for interrater agreement		R	1	27
Supervision	R	R	1	58
Measures were internally consistent indicating content validity		R+V	1	27
Implementation qualities				
Resource challenges	Time restrictions	P	4	5, 20, 27, 62
	Technical difficulties	P	3	5, 5, 58
	Financial restrictions	P	2	5, 27
	Sharing Dictaphones	P	1	45
Providers' attitudes	Dislike paperwork	A	1	10
	Fear of discouraging participants	A	1	27
	Nerves	A	1	27
	Report participants behaving differently	A	1	27
	Positive attitudes	A	1	42
	Additional work	A	1	62
	Not enthusiastic	A	1	62
Measurement of content of intervention	Telephone calls not assessed due to difficulty	P	1	38
	Measure cannot capture nonverbal data	P	1	20
Problems with documentation	No record of responses	P	2	10, 58
	Providers did not document everything		1	10
	No record of refusals	A+P	1	27
Missing responses	Missing responses	P	1	10 , 10 (different aspects)
Problems with sampling	Low recruitment	P	1	60
Problems with analysis plan	Analysis not feasible	P	1	10
Incentives	Incentives used	P	2	52, 15

	Incentives required	P	1	62	
Feedback to providers		P	2	21, 27	
Feedback delay		P	1	38	
Forgetting to return data		P	1		15
Logbook showed that not all steps were applied		P	1	42	
Paper and digital version of measures given		P	1		5
Need simpler coding guidelines to achieve agreement		P	1	27	
Reviewed fidelity after trial		P	1	45	
Participants – dislike paperwork		A	1		15
Did not do a cost-analysis		C	1		13
Cost of materials		C	1		37
Both psychometric and implementation qualities					
Problems with scoring criteria	Lack of clarity on items	V+P	1		25
Missing responses	Missing responses	V+P	1	58	
Use of one researcher	Data collection	R+P	2	5	52
Problems with sampling	Selection bias	V+A	1	2	2
	Not randomly selected	V+P	1	27	

Note: This table is ordered by the number of studies that reported a quality that fits into the 'group of quality' column (e.g. 'use of multiple researchers'). Most frequent -> Least frequent.

The numbers in this table will not add up to the total number of studies included, as some studies included information on multiple qualities.

R = Reliability, V= Validity, A=Acceptability, P=Practicality, C=Cost

2.4 Discussion

2.4.1 Key findings

Fewer than half of the reviewed studies measured both fidelity of delivery of, and engagement with complex, face-to-face health behaviour change interventions. Measures covered observation, self-report and intervention records. Whilst 74% reported at least one psychometric quality, only 26% reported at least one implementation quality.

2.4.2 How findings relate to previous research

2.4.2.1 Measures of fidelity of delivery and engagement

The measures used to monitor fidelity of delivery of, and engagement with, complex, face-to-face health behaviour change interventions were consistent with previous recommendations of using observational or self-report measures to monitor fidelity of delivery, and self-report measures to monitor engagement (Bellg et al., 2004; Borrelli, 2011; Burgio et al., 2001; Carroll et al., 2007; Schinckus et al., 2014). A similar percentage of studies used observational and self-report measures to measure fidelity of delivery, despite observational measures being recommended as the gold standard and the reported limitations of self-report measures (Bellg et al., 2004; Borrelli, 2011; Breitenstein et al., 2010a; Lorencatto et al., 2014; Schinckus et al., 2014). Intervention records (e.g. attendance or homework) were also used to measure engagement. Intervention records can be considered an objective measure of receipt (Gearing et al., 2011; Rixon et al., 2016) and participation (Saunders et al., 2005). However, these measures are limited by their inability to monitor how much participants understand and use the intervention. Other recommended and potentially more objective measures, for example asking participants to demonstrate skills (Burgio et al., 2001), were not adopted by any study in this review. Perhaps these findings demonstrate that measures need to be easy to use and acceptable to respondents and researchers to be selected for use. This explanation is consistent with previous studies which suggest that observational measures are perceived to be more expensive, time-consuming and difficult to use (Breitenstein et al., 2010a; Schinckus et al., 2014). Many studies used measures of fidelity of delivery and engagement specific to one intervention and therefore generalisability is limited (Breitenstein et al., 2010a).

2.4.2.2 Reported quality of measures

This review found that three quarters of studies reported at least one quality of their measures. This finding demonstrates that the reporting of psychometric qualities in the complex, face-to-face health behaviour change interventions included in this review may not be as rare as previously suggested (Baer et al., 2007; Breitenstein et al., 2010a; Maynard et al., 2013; Rixon et al., 2016; See Chapter 1, Section 1.3.3.2.3 for further details). However, not all studies reported psychometric qualities, and fewer reported implementation qualities (Gearing et al., 2011; Glasgow et al., 2005; Holmbeck & Devine, 2009; Lohr, 2002; Stufflebeam, 2000).

The psychometric qualities that were most frequently reported were those recommended by previous research; examples of these are the use of multiple, independent researchers to reliably rate a random percentage of sessions for fidelity of delivery (Bellg et al., 2004; Borrelli, 2011; Lorencatto et al., 2014). However, some qualities which are recommended by research were not frequently reported; an example of this is routine audio-recording (Gresham, Gansle & Noell, 1993; Miller & Rollnick, 2014). The implementation qualities that were most frequently reported were those concerning resources (including time constraints, financial constraints and technical difficulties) and providers' attitudes towards measures. These findings could explain why missing responses were reported in some of the studies included in this review (Arends et al., 2014; Chesworth et al., 2015; Dubbert, Cooper, Kirchner, Meydrech & Bilbrew, 2002; Thyrian et al., 2010) and healthcare research (Shrive et al., 2006). Providers may not return audio-recordings (Weissman, Rounsaville & Chevron, 1982) or checklists, if they feel uncomfortable with audio-recording or if they are overwhelmed with paperwork.

2.4.3 Limitations

The aim of this review was to identify a range of studies that met the criteria and reported fidelity of delivery and/or engagement in enough depth to be able to draw conclusions about the reporting of fidelity of delivery and/or engagement measures. To identify as many studies as possible, a comprehensive search was conducted, which included contacting experts and authors to identify further relevant articles that may have been missed by the search strategy. However, articles that did not report monitoring fidelity of delivery or engagement in titles, abstracts or key words were not identified. A further reason why relevant articles may have been missed is that many terms are used interchangeably in fidelity research (e.g. adherence, integrity, compliance). Some of these terms were not captured in the search strategy. This review only included articles that reported a clear fidelity of delivery or engagement measure or outcome. As is the case with many systematic reviews, the search is inevitably limited to its date cut-off. Future use of natural language processing, ontologies and machine learning (Larsen et al., 2016) will enable more ongoing updating when aggregating review evidence (Michie et al., 2017). Furthermore, the search was limited by the lack of ‘marker papers’ (i.e. key papers that the authors expected to find using the search terms). Together, these limitations in the search strategy may have led to some papers being omitted. It is possible that some missing papers may have reported implementation and psychometric qualities in detail, thus the findings from this review may underestimate the overall reported quality of measures.

Secondly, this review focused more generally on complex health behaviour change interventions, rather than focusing specifically on dementia interventions. This was because only a few dementia interventions have measured fidelity and/or engagement. Therefore, it was deemed necessary to gain a more comprehensive overview of relevant measures and their qualities, which could then be applied to dementia. Because of this, some of the intervention target behaviours included in the review may not be directly applicable to dementia interventions (e.g. smoking cessation interventions).

The findings from this review consider the reporting of qualities and not the actual quality of measures. The review findings do not consider strengths or weaknesses of these qualities nor how much weighting should be given to each quality when designing fidelity of delivery and engagement measures. This is an area that could be investigated, building on the current review.

2.4.4 Implications

There are three main implications of these findings for researchers and intervention developers:

1. The need to fully report details of fidelity of delivery and engagement measures. The findings from this review demonstrated that many studies did not specify details about the sampling or analysis method used in developing measures of fidelity of delivery and/or engagement. If this information is not available, evaluation and replication are difficult to achieve.
2. The need to report both psychometric and implementation qualities for fidelity of delivery and engagement measures. The reporting of psychometric and implementation qualities would be helpful to researchers who are aiming to measure fidelity of delivery or engagement. This information would allow evaluations of what measures and procedures may be feasible.
3. The need to develop high-quality measures of fidelity of delivery and engagement that are acceptable and practical to use but also reliable and valid.

Both psychometric and implementation qualities of measures are relevant when selecting, developing and reporting measures.

If implemented, these steps could help to strengthen the quality of fidelity of delivery and engagement data and the interpretation of intervention effectiveness.

2.4.5 Future research

The development of high-quality measures of fidelity and engagement for the PRIDE intervention and high-quality fidelity measures for the COTiD-UK intervention are described in Chapter 3. Chapter 4 reports how these measures were used to measure fidelity of delivery of, and engagement with interventions for people with dementia.

Further research is needed to evaluate the importance and weighting of each quality when designing fidelity of delivery and engagement measures. One way to do this could be to conduct a Delphi study with experts in intervention fidelity and engagement. This systematic method could be used for building a consensus (Hsu & Sandford, 2007) regarding which psychometric and implementation qualities are most important, and which qualities should be given the most weighting when developing and evaluating fidelity of delivery and engagement measures. This information could then be used to inform the development of measures of fidelity of delivery and engagement that are reliable, valid, acceptable and practical. Future systematic reviews could explore the qualities of fidelity and engagement measures reported in qualitative studies.

2.5 Conclusion

Fewer than half of the reviewed studies measured both fidelity of delivery of, and engagement with complex, face-to-face health behaviour change interventions. Measures covered observation, self-report and intervention records. Whilst 74% reported at least one psychometric quality, only 26% reported at least one implementation quality. Findings suggest that implementation qualities, are reported less frequently than psychometric qualities. Findings from this review highlight the need for researchers to report measures of fidelity of delivery and engagement in detail, report psychometric and implementation qualities and to develop, use and report high-quality measures. This would strengthen the quality of fidelity of delivery and engagement data and the interpretation of intervention effectiveness.

Chapter 3 Developing measures to assess fidelity of delivery of, and engagement with, dementia interventions

3.1 Introduction

Researchers have previously measured fidelity of delivery of complex, face-to-face health behaviour change interventions using observation and/or self-report measures, and engagement using self-report measures and/or intervention records (Walton, Spector, Tombor & Michie, 2017; For more information, see Chapters 1 and 2).

In order to strengthen the quality of fidelity of delivery and engagement measures and facilitate the interpretation of intervention outcomes, there is a need for researchers to report measures of fidelity of delivery and engagement in detail, and report psychometric and implementation qualities (See Chapter 2; Walton et al., 2017). The systematic review described in Chapter 2 indicated that authors do not always report psychometric or implementation qualities of fidelity or engagement measures (Walton et al., 2017).

The reliability of measures is often assessed by calculating inter-rater agreement (French et al., 2015; Hardeman et al., 2008; Lorencatto et al., 2014). This method helps to identify whether two independent researchers can use measures consistently. Acceptability and practicality of the measures for the people using them may also be assessed. Missing responses are common in healthcare self-report research (Shrive et al., 2006). If measures are to be used by healthcare providers who have limited time and resources, measures must be easy to use; otherwise some data may be incomplete or not returned. If measures are to be used by people with dementia, measures must be clear and easy to understand and use (Dementia Engagement and Empowerment Project (DEEP) Guide, 2013). It is therefore necessary to consider both psychometric and implementation qualities when developing fidelity measures.

To measure fidelity of delivery or engagement, intervention components need to be identified. Intervention components can be identified from intervention manuals (Lorencatto et al., 2013a) and a checklist of key components can be developed and used to assess fidelity of delivery. A key consideration for developing fidelity measures for tailored interventions is whether measures clearly demonstrate which components are standardised and thus deliverable to all participants, and which components are tailored to participants (Haynes et al., 2016). As PRIDE and COTiD-UK are both tailored interventions, the development of these fidelity measures for both interventions must account for tailoring.

This study aimed to develop (i) a reliable measure for assessing fidelity of delivery of, and engagement with the PRIDE intervention and (ii) a reliable measure for assessing fidelity of delivery of the COTiD-UK intervention.

3.2 Methods – PRIDE

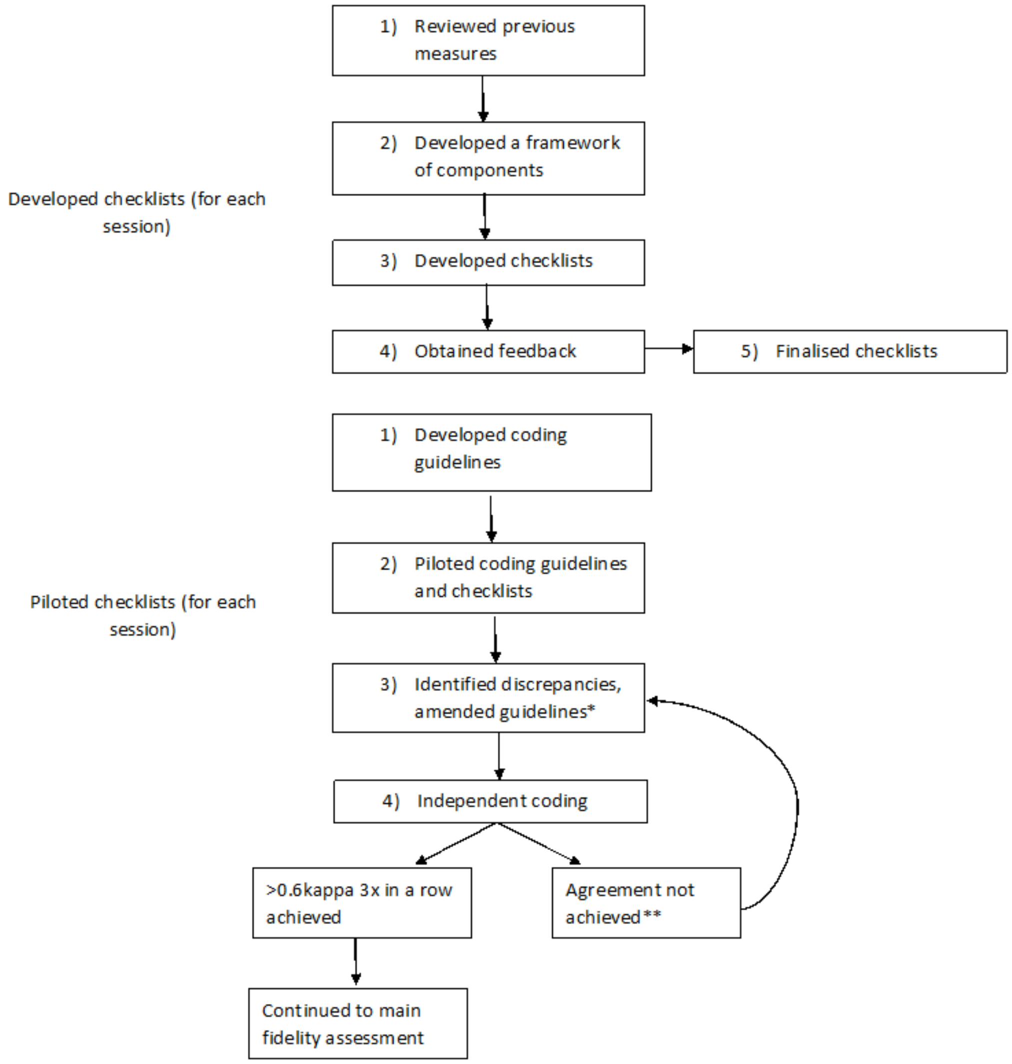
3.2.1 Development of checklists

Fidelity of delivery of, and engagement with, the PRIDE intervention were measured using checklists. These were developed iteratively and included the following steps: 1) reviewed previous measures; 2) analysed intervention inter-components and developed a framework of intervention components; 3) developed reliable fidelity checklists of key components and coding guidelines; and 4) obtained feedback about the content and wording of the checklists and guidelines from the intervention team. The role of contributors involved in the development of these checklists and their tasks are outlined in Table 3-1.

Table 3-1. Outline of the roles and tasks involved in developing and assessing the reliability of PRIDE checklists

Role	**Task**
Researcher (HW)	Developed the checklists and coding guidelines
Behavioural scientists (SM & IT)	Gave feedback on the framework, checklist content and wording, and coding guidelines
Intervention team members (Work Package 3)	Gave feedback on the framework, checklist content and wording
Public Patient Involvement (PPI) group, DAWs and a person with dementia working in a PPI type role.	Gave feedback on the checklist wording and clarity
Coding pair 1 (HW & JB)	Coded set 1 to pilot coding guidelines
Coding pair 2 (HW & MW)	Coded sets 1-18 to determine reliability

The procedure used to develop and pilot the checklists used in the PRIDE and COTiD-UK study is described in Figure 3-1.



*Note: Identified discrepancies after each set. Then periodically identified overall difficult to code components (PRIDE and VALID). Also identified style and delivery components after Set 2 (VALID).

**For two consistently difficult to code sessions, amended checklists (VALID)

Figure 3-1. A summary of the procedure used to develop and pilot fidelity checklists in both the PRIDE and COTiD-UK studies

1) Reviewed previous measures

Previous fidelity measures that were known to the delivery team were reviewed to inform the development of the PRIDE checklists. For example: the checklists used in the Prediction and Management of Cardiovascular Risk for people with severe mental illnesses (PRIMROSE) project (Osborn et al., 2016).

2) Analysed intervention inter-components and developed a framework of intervention components

Key components of each intervention session were identified by coding the PRIDE intervention manual. BCTs were identified using the BCTTV1 (Michie et al., 2013); a taxonomy of 93 BCTs. The framework was developed alongside the development of the PRIDE manual, and so key components were reviewed and refined iteratively to reflect changes. Components were grouped into three main categories: 1) necessary basic information, 2) tailoring and assessment, and 3) PRIDE activities. The identified key components were used to develop an initial intervention framework (See Appendix 3-1). The framework outlined: 1) key targets, 2) key components, 3) session number, 4) target behaviour, 5) BCTs, and 6) PRIDE objectives. Redundant components were identified and removed from the framework by a team of behavioural scientists (SM, IT, HW).

3) Developed checklists

From the framework, a checklist of key components was developed for each of the three intervention sessions. Two versions of the three checklists were created: one version to be completed by DAWs and researchers, and one version to be completed by people with dementia. All checklists were reviewed by the behavioural science team (SM, IT, HW) to identify and remove redundant components and jargon terminology. Guidelines which explained how DAWs and people with dementia should complete these checklists were developed. The checklists were tailored and worded for the target audience. For example: participant checklists were phrased in relation to receipt, and DAW checklists were phrased in relation to delivery. As the person with dementia chose which topics to work on, an additional grid was included in the DAW checklists to identify which tailored components were delivered for the participants' chosen topics. The participant checklist contained questions on whether participants understood the information, knew how to put their plan into action, and practiced and used these skills between sessions. These questions were developed based on the definitions of 'intervention receipt' and 'intervention enactment' (see Chapter 1, Section 1.3.1).

4) Obtained feedback from the intervention teams

To ensure that the checklist and guideline items were relevant, accurate and worded appropriately for use by DAWs and people living with dementia, the PRIDE Work Package 3 team were asked to provide feedback on content and wording of the checklists and guidelines. Six members of the Work Package 3 team provided feedback. Feedback was also sought from the intervention's Public Patient Involvement (PPI) group, DAWs and a person with dementia working in a PPI type role. This feedback was used to refine the checklists. To determine whether the checklists were easy to read, Flesch readability statistics (Flesch, 1948) were reviewed following feedback. It is recommended that Flesch scores should be between 60 and 70 for the general population (Vahabi & Ferris, 1995).

3.2.2 Piloted and refined checklists and coding guidelines to assess and improve reliability

3.2.2.1 Procedure

Coding guidelines were developed to provide guidance on how to code transcripts for fidelity, with illustrative examples of what would be included in the categories 'done', 'done to some extent' and 'not done' (see Appendix 3-2). To maximise researchers' agreement on fidelity measurements, the fidelity components were operationalised in the form of provider behaviours. DAWs and people with dementia received basic instructions on how to complete the checklists but the instructions did not have the same behavioural specificity in terms of the coding guidelines.

To test the coding guidelines and pilot the coding task, an initial set of three transcripts (Session one, Session two and Session three) were transcribed and coded by an independent researcher and HW; who developed the checklists. See Table 3-1 for a list of coders and their involvement in piloting the checklists.

Discrepancies between coders were identified and reliability was calculated. Feedback on the coding guidelines, discrepancies and time taken to code were used to amend the coding guidelines and improve reliability of future coding.

After the initial piloting, 17 further sets of transcripts were coded independently by two researchers using the checklists and coding guidelines until good agreement was achieved (>.61 three times in a row). To ensure that instructions were clear, HW met with coders prior to coding to discuss coding guidelines. It is recommended that the researcher who developed the checklists should not participate in initial coding (Lombard et al., 2002); however, due to limited resources this was not possible.

To code the transcripts, transcripts were annotated for evidence of each key component being delivered. Completed checklists and annotated transcripts were sent to HW, who calculated inter-rater agreement for coding pairs. Discrepancies were highlighted and discussed between coders. The coding guidelines were iteratively amended to improve clarity and reliability. Overall discrepancies, reasons for discrepancies and difficult to code components were identified where necessary and coding guidelines were amended. Coding guidelines were finalised once saturation was reached and no further changes were necessary.

3.2.2.2 Analysis

Coder's scores for each transcript and key component were inputted into a data spreadsheet. For each transcript, inter-rater agreement was calculated (Gisev, Bell & Chen, 2013). Percentage agreement and Cohen's weighted kappa statistic (Cohen, 1968; Gwet, 2014) were calculated for each session. For standardised components, agreement was assessed using weighted kappa. For tailored components and individual topics, agreement was assessed using percentage agreement. To account for the ordinal nature of data and partial agreements, weighted kappa was used (Gwet, 2014). For example, a disagreement of ‘done’ and ‘done to some extent’ would be more of a partial agreement than one of ‘done’ and ‘not done’. Therefore, the use of unweighted kappa would have underestimated reliability (Gwet, 2014). Weighted kappa was calculated using resources from Gwet (2014). Linear weights (agreements = 1.0, partial agreements = 0.5, disagreements = 0.0) were selected instead of quadratic weights. Linear weights were chosen as they provide equal spacing between options, and do not overestimate reliability as much as quadratic weights (Gwet, 2014).

A higher kappa score indicated better agreement (<0.00 is poor (less than chance), 0-0.2 is slight, 0.21-0.40 is fair, 0.41-0.60 is moderate, 0.61-0.80 is good (substantial) and 0.81-1 is excellent (almost perfect) agreement; Gisev et al., 2013; Landis & Koch, 1977; Viera & Garrett, 2005). To ensure high agreement, a threshold of >0.8 kappa (excellent) was originally selected. However, it was deemed more suitable to lower the threshold to $\kappa > 0.61$ (good) to be consistent with the methods used in the COTiD-UK research (see Section 3.1). Coders needed to achieve $\kappa > 0.61$ for three consecutive transcripts per session. Kappa is a conservative estimate of reliability (Lombard et al., 2002); therefore, lower thresholds ensured that chance agreements were accounted for, and thus was deemed suitable.

If there were any missing responses, they were clarified with the coder prior to agreement calculations. If responses were clarified, these were included in the analysis. If responses were not clarified (e.g. the coder could not decide which response they would have chosen), these were included in the weighted kappa analyses as missing responses.

3.3 Results – PRIDE

3.3.1 Development of checklists

3.3.1.1 Content of checklists

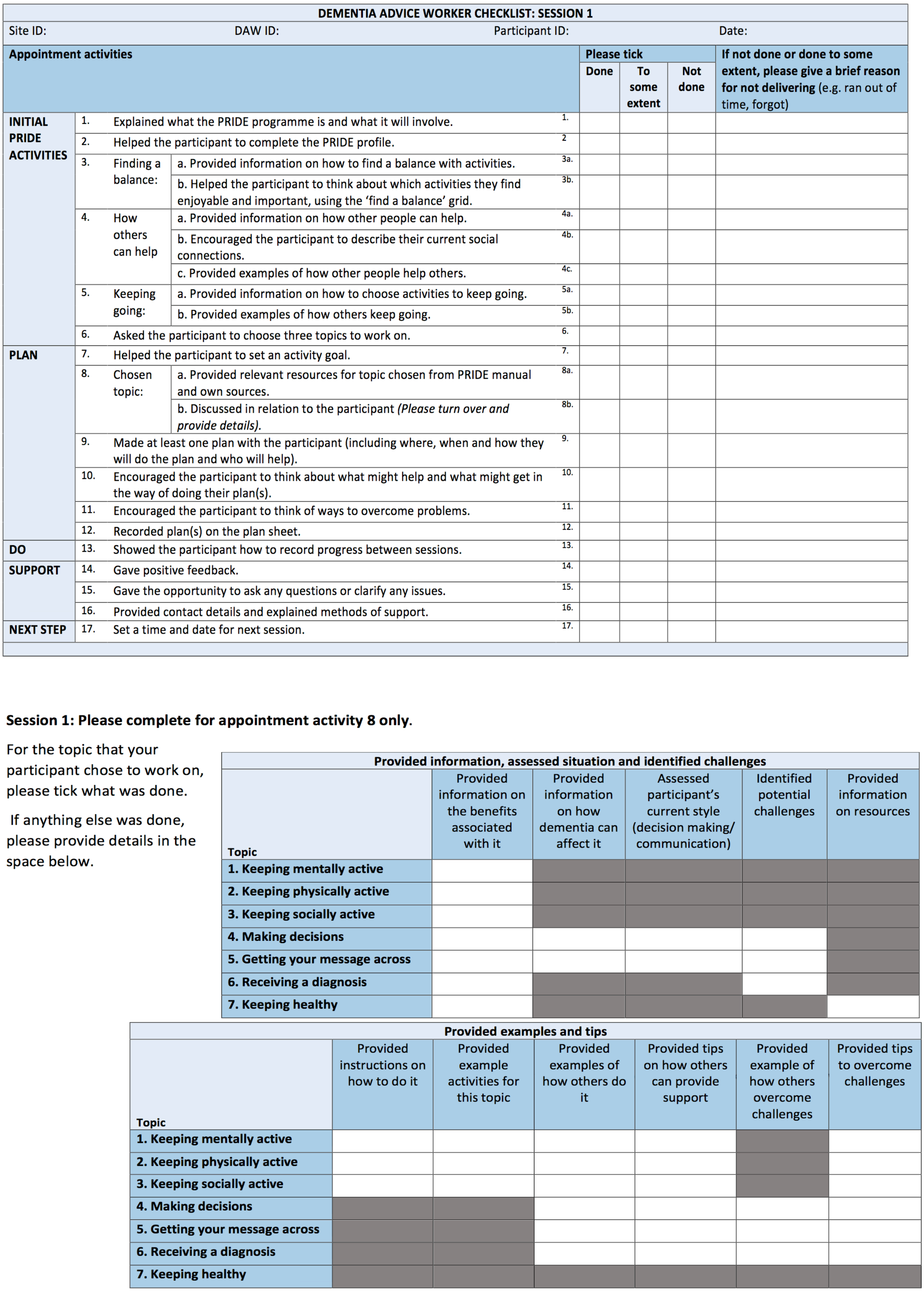
Three fidelity checklists (Session one, Session two and Session three) were developed. Both the DAW checklists and the participant ‘your experience’ checklists contained the same key components. A summary of the key components included in the final checklists is shown in Table 3-2. Checklists contained standardised intervention components (Session one: n=22, Session two: n=18, Session three: n=12). DAW checklists also contained an additional grid for tailored components.

Table 3-2. Number of key components to be delivered in each of the three PRIDE sessions

Content outline	**Session 1**	**Session 2**	**Session 3**
Initial PRIDE activities	10	N/A	0
Plan	7*	7*	0
Do	1	1	0
Review	0	6	6
Plan going forward	0	0	4
Support	3	3	2
Next steps	1	1	0
Total number of key components in session checklist	22*	18*	12

Note: *Indicates that the tailored grid was also included

An example of the DAW checklists (Session one), developed for providers and researchers is shown in Figure 3-2 (see Appendix 3-3 for all three checklists). An example of the participant 'your experience' checklists (Session one) is shown in Figure 3-3 (see Appendix 3-4 for all three checklists).



DEMENTIA ADVICE WORKER CHECKLIST: SESSION 1

Site ID: DAW ID: Participant ID: Date:

Appointment activities					**Please tick**			**If not done or done to some extent, please give a brief reason for not delivering** (e.g. ran out of time, forgot)
					Done	**To some extent**	**Not done**	
INITIAL PRIDE ACTIVITIES	1.	Explained what the PRIDE programme is and what it will involve.		1.				
	2.	Helped the participant to complete the PRIDE profile.		2				
	3.	Finding a balance:	a. Provided information on how to find a balance with activities.	3a.				
			b. Helped the participant to think about which activities they find enjoyable and important, using the 'find a balance' grid.	3b.				
	4.	How others can help	a. Provided information on how other people can help.	4a.				
			b. Encouraged the participant to describe their current social connections.	4b.				
			c. Provided examples of how other people help others.	4c.				
	5.	Keeping going:	a. Provided information on how to choose activities to keep going.	5a.				
			b. Provided examples of how others keep going.	5b.				
	6.	Asked the participant to choose three topics to work on.		6.				
PLAN	7.	Helped the participant to set an activity goal.		7.				
	8.	Chosen topic:	a. Provided relevant resources for topic chosen from PRIDE manual and own sources.	8a.				
			b. Discussed in relation to the participant *(Please turn over and provide details).*	8b.				
	9.	Made at least one plan with the participant (including where, when and how they will do the plan and who will help).		9.				
	10.	Encouraged the participant to think about what might help and what might get in the way of doing their plan(s).		10.				
	11.	Encouraged the participant to think of ways to overcome problems.		11.				
	12.	Recorded plan(s) on the plan sheet.		12.				
DO	13.	Showed the participant how to record progress between sessions.		13.				
SUPPORT	14.	Gave positive feedback.		14.				
	15.	Gave the opportunity to ask any questions or clarify any issues.		15.				
	16.	Provided contact details and explained methods of support.		16.				
NEXT STEP	17.	Set a time and date for next session.		17.				

Session 1: Please complete for appointment activity 8 only.

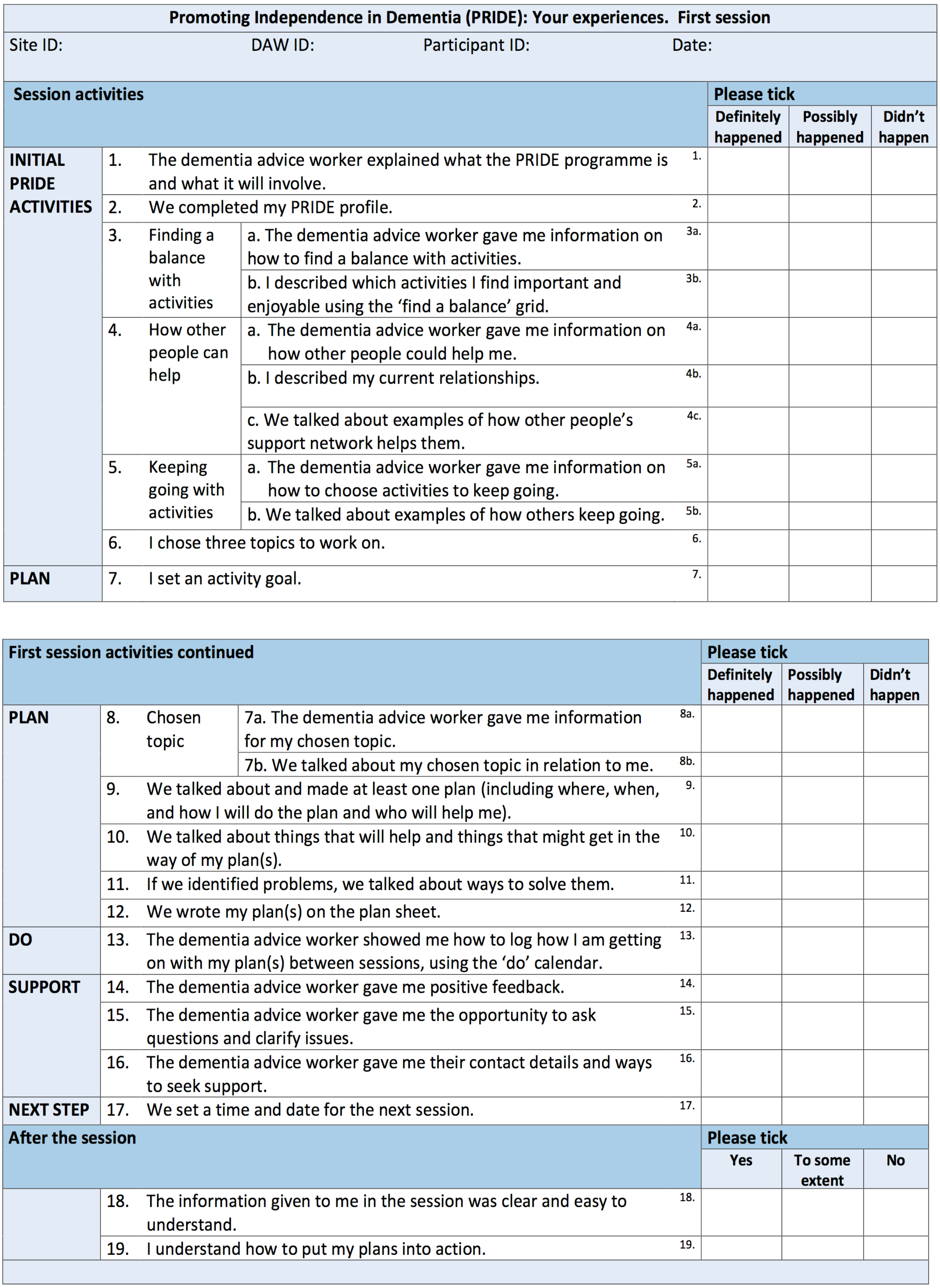
For the topic that your participant chose to work on, please tick what was done.

If anything else was done, please provide details in the space below.

	Provided information, assessed situation and identified challenges				
Topic	Provided information on the benefits associated with it	Provided information on how dementia can affect it	Assessed participant's current style (decision making/ communication)	Identified potential challenges	Provided information on resources
1. Keeping mentally active		▨	▨	▨	▨
2. Keeping physically active		▨	▨	▨	▨
3. Keeping socially active		▨	▨	▨	▨
4. Making decisions					▨
5. Getting your message across					▨
6. Receiving a diagnosis		▨	▨		▨
7. Keeping healthy		▨	▨	▨	

	Provided examples and tips					
Topic	Provided instructions on how to do it	Provided example activities for this topic	Provided examples of how others do it	Provided tips on how others can provide support	Provided example of how others overcome challenges	Provided tips to overcome challenges
1. Keeping mentally active					▨	
2. Keeping physically active					▨	
3. Keeping socially active					▨	
4. Making decisions	▨	▨				
5. Getting your message across	▨	▨				
6. Receiving a diagnosis	▨	▨				
7. Keeping healthy	▨	▨	▨	▨	▨	▨

Figure 3-2. An example DAW checklist (Session one)



Promoting Independence in Dementia (PRIDE): Your experiences. First session

Site ID: DAW ID: Participant ID: Date:

Session activities					**Please tick**		
					Definitely happened	**Possibly happened**	**Didn't happen**
INITIAL PRIDE ACTIVITIES	1.	The dementia advice worker explained what the PRIDE programme is and what it will involve.		1.			
	2.	We completed my PRIDE profile.		2.			
	3.	Finding a balance with activities	a. The dementia advice worker gave me information on how to find a balance with activities.	3a.			
			b. I described which activities I find important and enjoyable using the 'find a balance' grid.	3b.			
	4.	How other people can help	a. The dementia advice worker gave me information on how other people could help me.	4a.			
			b. I described my current relationships.	4b.			
			c. We talked about examples of how other people's support network helps them.	4c.			
	5.	Keeping going with activities	a. The dementia advice worker gave me information on how to choose activities to keep going.	5a.			
			b. We talked about examples of how others keep going.	5b.			
	6.	I chose three topics to work on.		6.			
PLAN	7.	I set an activity goal.		7.			

First session activities continued					**Please tick**		
					Definitely happened	**Possibly happened**	**Didn't happen**
PLAN	8.	Chosen topic	7a. The dementia advice worker gave me information for my chosen topic.	8a.			
			7b. We talked about my chosen topic in relation to me.	8b.			
	9.	We talked about and made at least one plan (including where, when, and how I will do the plan and who will help me).		9.			
	10.	We talked about things that will help and things that might get in the way of my plan(s).		10.			
	11.	If we identified problems, we talked about ways to solve them.		11.			
	12.	We wrote my plan(s) on the plan sheet.		12.			
DO	13.	The dementia advice worker showed me how to log how I am getting on with my plan(s) between sessions, using the 'do' calendar.		13.			
SUPPORT	14.	The dementia advice worker gave me positive feedback.		14.			
	15.	The dementia advice worker gave me the opportunity to ask questions and clarify issues.		15.			
	16.	The dementia advice worker gave me their contact details and ways to seek support.		16.			
NEXT STEP	17.	We set a time and date for the next session.		17.			
After the session					**Please tick**		
					Yes	**To some extent**	**No**
	18.	The information given to me in the session was clear and easy to understand.		18.			
	19.	I understand how to put my plans into action.		19.			

Figure 3-3. An example participant 'your experience' checklist (Session one)

In line with the feedback received from PPI and PRIDE researchers, adjustments were made to minimise jargon. For example, replacing the word 'facilitators' with 'things that will help with my plan'. To enhance accessibility of the checklists for people with dementia, the DEEP guidance (DEEP Guide, 2013), which advises on how to make materials suitable for people with dementia, was used. This included enlarging the font size to 16pt, using a clear font style, using colour, avoiding jargon and academic terminology, removing passive voice and explaining terms.

At this stage of development, participant checklists had a Flesch score (Flesch, 1948) of 69.4 and a grade of 6.0, and the provider checklist had a Flesch score of 60.5 and a grade of 7.3. Finalised participant checklists had a Flesch score of 71.4 and a grade of 6.2, and the provider checklists had a Flesch score of 62.0 and a grade of 7.5. Thus, the readability of the checklists was suitable.

3.3.1.2 Checklist response options

In the provider/researcher checklists, three response options were offered: 'done', 'done to some extent' and 'not done'. A 'reason' column was added to the PRIDE provider checklists so that providers could add details or context to indicate a reason for why a component was not delivered. In the participant checklists three response options were available for the questions on fidelity: 'definitely happened', 'possibly happened' and 'didn't happen', and three response options were available for the questions on engagement: 'yes', 'to some extent', and 'no'.

3.3.1.3 Scoring of the checklists

To measure fidelity in each session, key components were scored from 0 to 2 according to whether they were 'not done' or 'didn't happen' (Score 0), 'done to some extent' or 'possibly happened' (Score 1), or 'done' or 'definitely happened' (Score 2). To measure engagement in each session, the four questions on engagement were scored from 0 to 2, according to whether participants responded 'no' (Score 0), 'to some extent’ (Score 1) or ‘yes’ (Score 2). Total fidelity and engagement scores and percentages were calculated for each checklist. A higher percentage indicated higher fidelity.

3.3.2 Piloted and refined checklists and coding guidelines to assess and improve reliability

Table 3-3 reports weighted kappa (κ) and percentage agreements (%) for each session.

For the standardised components, inter-rater agreement of κ > .61 was achieved after coding 12 transcripts from Session one (κ = 0.8-0.9), 14 transcripts from Session two (κ = 0.7-0.8) and 14 transcripts from Session three (κ = 0.6-1.00) (initial pilot coding not included). For Sessions two and three, inter-rater agreement of > 0.61 kappa was achieved three times in a row. For Session one, inter-rater agreement of >. 61 kappa was achieved two times in a row, but due to a large number of the same response, percentage agreement was very high (86.4%) but weighted kappa was moderate (κ = 0.4).

Table 3-3. Weighted kappa and percentage agreement for standardised components across PRIDE Sessions one, two and three

		Weighted kappa (%)		
Set of transcripts		**Session 1**	**Session 2**	**Session 3**
1	Coding pair 1 (pilot)	0.21 (59.1)	0.26 (55.6)	-0.33 (50)
	Coding pair 2	0.38 (54.6)	0.4 (66.66)	-0.11 (66.66)
3		-0.2 (36.4)	0.48 (61.1)	-0.25 (41.66)
4		0.47 (63.6)	0.65 (72.2)*	0.49 (66.66)
5		0.55 (59.1)	0.62 (77.7)*	0.29 (58.33)
6		0.62 (77.3)*	0.69 (77.7)*	0.31 (50)
7		0.28 (68.2)	0.16 (50)	0.59 (66.6)
11[1]		0.56 (77.3)	0.54 (66.7)	0.00 (33.3)
2		0.83 (90.9)*	0.71 (77.7)*	No session
8		No transcript	No transcript	0.31 (58.3)
9		0.07 (72.7)	0.41 (61.1)	No transcript
10		0.85 (90.9)*	0.83 (83.3)*	No transcript
13		0.81 (86.4)*	No transcript	0.61 (66.66)*
12		No transcript	0.45 (55.6)	0.46 (58.33)
14		0.42 (86.4)*[2]	No transcript	0.57 (66.66)
15		No transcript	No transcript	1.00 (100)*
16		No transcript	No transcript	0.68 (75)*
17		-	0.83 (83.3)*	No transcript
18		-	0.77 (83.3)*	0.64 (83.33)*
1 (recoded new guidelines)		-	0.68 (88.9)*	-

Note:

*Indicates agreement >0.61 was reached

1Coding guidelines not changed after coding this set

2Weighted kappa did not reach >0.61 however >85% agreement achieved three times in a row and >0.8 kappa 3 times in last five sets. Kappa low due to lots of ‘not done’ responses, despite only three disagreements

-: This was used when agreement had already been reached and no further sessions needed to be coded until the next sampled set.

No transcript – refers to sessions where transcripts were not available to code

Table 3-4 reports inter-rater agreement for the selected tailored topics and components.

The average means for agreement for all tailored topics and both sessions (54.6%-87.8%) suggest good agreement between coders for the tailored components (Table 3-4). Overall, agreement for tailored topic components ranged between 27.3% and 90.9%. Coders agreed that no tailored components were delivered in two sessions of Session one and three sessions of Session two.

Table 3-4. Percentage agreement for delivery of tailored topics and topic components (scored out of 11) in PRIDE Sessions one and two

	Mean number of components agreed on (range) (%)	
Topic (number of sets delivered in Session 1 and 2)	**Session 1**	**Session 2**
Keeping mentally active (S1: 9, S2: 2)	75.7 (54.6-90.9)	86.4 (81.8-90.9)
Keeping physically active (S1: 3, S2: 0)	84.8 (72.7-90.9)	N/A
Keeping socially active (S1: 4, S2: 3)	86.4 (72.7-90.9)	87.8 (81.8-90.9)
Making decisions (S1: 2, S2: 1)	86.4 (81.8-90.9)	81.8
Getting your message across (S1: 4, S2: 1)	75 (27.3-90.9)	81.8
Receiving a diagnosis (S1: 1, S2: 2)	54.6	72.7 (63.6-81.8)
Keeping healthy (S1: 0, S2: 0)	N/A	81.8 (63.6-90.9)
No topics delivered (S1: 2, S2: 3)	N/A	N/A

Note:

N/A = not applicable: Topic not delivered

11 components = 100%

3.4 Methods – COTiD-UK

3.4.1 Development of checklists

The development of the COTiD-UK checklists followed the same methodology used to develop the PRIDE checklists (see Section 2.1). See Figure 3-1 for a summary of the procedure used to develop and pilot the fidelity checklists. The roles of contributors involved in the development of these checklists and their tasks are outlined in Table 3-5.

Table 3-5. Outline of the roles and tasks involved in developing and assessing the reliability of COTiD-UK checklists

Role	Task
Researcher (HW)	Developed the checklists and coding guidelines
Behavioural scientists (SM & IT)	Gave feedback on the framework, checklist content and wording, and coding guidelines
Intervention team members (JB & JW) - the trial manager and an OT clinical researcher	Gave feedback on the framework, checklist content and wording
Coding pair 1a (HK & HW) – one independent coder + researcher	Coded set 1 to determine inter-rater agreement
Coding pair 1b (OP & LH) – Independent coders	Coded sets 1-2 to determine inter-rater agreement
Coding pair 2 (JB & TS) – expertise in occupational therapy and COTiD-UK	Coded sets 1-2 to determine inter-rater agreement
Coding pair 3 (HW & TS)	Coded sets 3-4
Coding pair 4 (HW & HG)	Coded sets 1-6, 8-12
Coding pair 5 (HG & TS)	Coded set 4

1) Identified intervention inter-components and developed a framework of intervention components

Key components of each intervention were identified by coding COTiD-UK intervention materials (the COTiD-UK checklist and COTiD-UK training presentation). The COTiD-UK checklist described: 1) date and length of sessions, 2) who was present, 3) location of sessions, 4) COTiD-UK skills delivered in sessions, 5) travel, 6) preparation time, and 7) any clinical recording time required.

The identified components were used to develop an initial intervention framework (see Appendices 3-5). The components were grouped into five categories: 1) key information, 2) assessment and tailoring, 3) analysis, 4) communication techniques, and 5) intervention activities.

The resulting framework outlined 1) key targets, 2) key components (these were subsequently referred to as 'appointment activities' in the fidelity checklists), 3) which session(s) the component should be delivered in, and 4) whether the component was aimed at the person with dementia, family carer or both. Redundant components were identified and removed from the framework by a team of behavioural scientists (SM, IT, HW).

The framework was reviewed by the COTiD-UK intervention team members to check the relevance and comprehensiveness of these components. Upon review of the framework, HW and intervention team members (JW, JB) identified that key occupational therapy skills were missing from the framework (e.g. activity analysis, selection, adaptation and grading). Therefore, relevant literature was reviewed (Creek, 2003) to identify and operationalise these skills for inclusion in the framework.

2) Developing checklists

From the framework, a checklist of key components was developed for each of the sessions. As the Summaries and Goal-setting sessions were often delivered together, these were combined. All checklists were reviewed by the behavioural science team (SM, IT, HW) to identify and remove redundant components and jargon terminology.

To ensure that the items were relevant, accurate and worded appropriately, members of the intervention team provided feedback on content and wording of components.

3.4.2 Piloted and refined checklists and coding guidelines to assess and improve reliability

3.4.2.1 Procedure

The procedure for piloting the checklists followed the same methods used in the PRIDE study (see Section 2.1.2). Coding guidelines were developed to provide guidance on how to code transcripts for fidelity, with illustrative examples of what would be included in the categories ‘done’, ‘done to some extent’ and ‘not done’ (see Appendix 3-6). To maximise researchers’ agreement on fidelity measurements, the fidelity components were operationalised in the form of provider behaviours.

The main difference was that more than two researchers were initially involved in the piloting of COTiD-UK checklists. Multiple researchers were used to maximise feedback on coding guidelines and to try to enhance reliability in a timely and efficient way. Piloting initially involved two sets of sessions coded by three coding pairs. Three coders were not involved in the intervention and three coders had expertise in the intervention (Lombard et al., 2002). Disagreements and inter-rater agreement for each coding pair were calculated. If high levels of agreement were not achieved on the first set, HW met with the coders to discuss disagreements and amend the coding guidelines (see Appendix 3-6) accordingly before the second set of transcripts was coded. After the coding pairs completed the coding for these two sets, components that were difficult to code reliably were identified and coding guidelines were amended.

After the initial pilot coding, nine further sets were coded and the initial two sets were re-coded by one of two coding pairs, consisting of three researchers. All three researchers coded set four. Discrepancies were discussed and coding guidelines and checklists were amended until good reliability of κ > .61 was achieved three times in a row.

3.4.2.2 Analysis

The analysis plan largely followed the same analysis plan used in the PRIDE study (see Section 2.1.2).

Similar to PRIDE, a threshold of > 0.8 kappa (excellent agreement) was too difficult to achieve for all activities. Therefore, the threshold was lowered to > 0.61 (good agreement). Coders needed to achieve κ > 0.61 for three consecutive transcripts per session. In cases where agreement was lower than ‘good’ (e.g. Summaries and Goal-setting and Consultation and advice), checklist components and coding guidelines were revised to simplify the coding task (e.g. deleted components, combined components and amended guidelines to ‘done’ or ’not done’).

Additionally, to determine whether certain components were difficult to code, discrepancies were also split into ‘style of delivery components’ and ‘content components’ after set two was coded.

3.5 Results – COTiD-UK

3.5.1 Development of checklists

3.5.1.1 Content of checklists

Six checklists were developed (Introduction, OPHI, Ethnographic interview, Summaries and Goal-setting, Consultation and advice, and Evaluation). Each COTiD-UK checklist included the key components to be delivered in that session. A summary of the key components included in the final checklists is shown in Table 3-6. Checklists contained standardised intervention components (Introduction: n=15, OPHI: n=16, Ethnographic interview: n=16, Summaries and Goal-setting: n=17, Consultation and advice: n=15, and Evaluation: n=8).

Some components in the COTiD-UK intervention required the absence of a behaviour (e.g. ‘the OT should not speak about themselves’); therefore, these were re-phrased in the checklist to reflect the performance of the behaviour (e.g. ‘the OT asked questions which caused distress’, ‘used jargon or technical language’, ‘spoke about themselves’). In line with the feedback received from the intervention team, adjustments were made to remove unnecessary components, simplify wording and clarify the meaning of components.

Table 3-6. Number of key COTiD-UK components to be delivered according to session

Content outline	**Introduction**	**OPHI**	**Ethnographic interview**	**Summaries and Goal-setting**	**Consultation and advice**	**Evaluation**
Introduction	3	0	0	0	0	0
Key information	6	1	1	1	4 (5)	1
Assessment	2	1	1	0	0	0
Communication techniques	0	11	11	0	3	0
Feedback	0	0	0	5	0	0
Activity selection	0	0	0	1 (2)	0	0
Goal-setting	0	0	0	2 (3)	0	0
Activity adaptation	0	0	0	1 (5)	0	0
Environmental adaptation	0	0	0	2	0	0
Summary	0	0	0	2	1	0
Operationalising goals	0	0	0	0	1 (2)	0
Problem analysis	0	0	0	0	3	0
Review goals	0	0	0	0	0	2
Planning ahead	0	0	0	0	0	2
Support	2	1	1	1	1	1
Next steps	2	2	2	2	2	2 (3)
Total	15	16	16	17 (24)	15 (17)	8 (9)

Note: Numbers in brackets represent the number of components **before** amendments to the coding guidelines and checklists

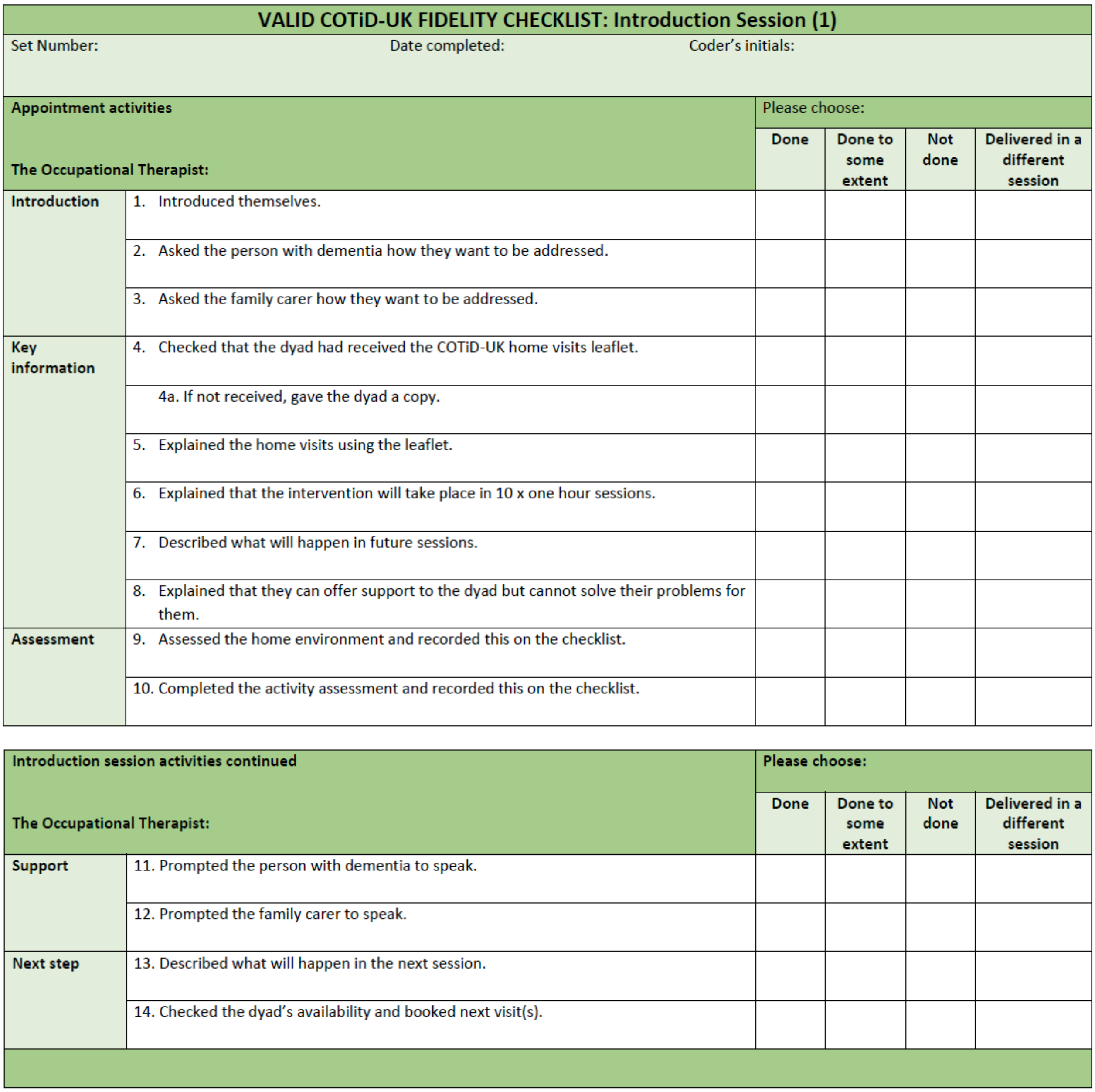
An example of the COTiD-UK fidelity checklists (Introduction) is shown in Figure 3-4 (see Appendices 3-7 for all six checklists).

3.5.1.2 Checklist response options

Three response options were offered: ‘done’, ‘done to some extent’ and ‘not done’. A ‘not applicable’ option was not included in the checklists, as more information was needed to determine applicability and appropriateness of some components. Instead, ‘not applicable’ responses were coded as ‘not done, not applicable’.

3.5.1.3 Scoring of the checklists

To assess fidelity, key components were scored from 0 to 2 according to whether they were ‘not done’ (Score 0), ‘done to some extent’ (Score 1), or ‘done’ (Score 2). Components that required the absence of behaviour, were reverse coded (e.g. ‘done’ scored 0 and ‘not done’ scored 2). Total fidelity scores and percentages were calculated for each checklist. A higher percentage indicated higher fidelity.



VALID COTiD-UK FIDELITY CHECKLIST: Introduction Session (1)					
Set Number:	Date completed:	Coder's initials:			
Appointment activities **The Occupational Therapist:**		**Please choose:**			
		Done	**Done to some extent**	**Not done**	**Delivered in a different session**
Introduction	1. Introduced themselves.				
	2. Asked the person with dementia how they want to be addressed.				
	3. Asked the family carer how they want to be addressed.				
Key information	4. Checked that the dyad had received the COTiD-UK home visits leaflet.				
	4a. If not received, gave the dyad a copy.				
	5. Explained the home visits using the leaflet.				
	6. Explained that the intervention will take place in 10 x one hour sessions.				
	7. Described what will happen in future sessions.				
	8. Explained that they can offer support to the dyad but cannot solve their problems for them.				
Assessment	9. Assessed the home environment and recorded this on the checklist.				
	10. Completed the activity assessment and recorded this on the checklist.				

Introduction session activities continued **The Occupational Therapist:**		**Please choose:**			
		Done	**Done to some extent**	**Not done**	**Delivered in a different session**
Support	11. Prompted the person with dementia to speak.				
	12. Prompted the family carer to speak.				
Next step	13. Described what will happen in the next session.				
	14. Checked the dyad's availability and booked next visit(s).				

Figure 3-4. An example COTiD-UK fidelity checklist (Introduction)

3.5.2 Piloted and refined checklists and coding guidelines to assess and improve reliability

Table 3-7 reports weighted kappa (κ) and percentage agreements (%) for each session by round of coding, set of transcripts and coding pairs.

Satisfactory inter-rater agreement was not achieved following the initial piloting of the first two sets. Inter-rater agreement of κ > .61 was achieved after coding six Introduction transcripts (κ = 0.7), six OPHI transcripts (κ = 0.8-0.9), 10 Ethnographic interview transcripts (κ = 0.7-0.8), 13 Summaries and Goal-setting transcripts (κ = 0.8-0.9), eight Consultation and advice transcripts (κ = 0.6-0.9) and 11 Evaluation transcripts (κ = 0.7-0.8). For the Summaries and Goal-setting session, inter-rater agreement of κ > .61 was achieved three times in the last five sets (κ = 0.6-0.9). However, due to a large number of same responses, percentage agreement was very high (82.4%) but weighted kappa was moderate (κ = 0.4).

Table 3-7. Weighted kappa and percentage agreement scores for each session by round of coding, set of transcripts and coding pair

Linear weighted kappa (percentage agreement)							
Set of transcripts	**Coding pair**	**Introduction**	**OPHI**	**Ethnographic interview**	**Summaries and Goal-setting**	**Consultation and advice**	**Evaluation**
Piloting							
1	1a	0.79 (87%)	0.66 (68.8%)	0.48 (56.3%)	0.5 (58%)	0.22 (35%) (2):0.44 (65%)	0.37 (44%)
1	1b	0.93 (87%)	0.40 (56.3%)	0.2 (43.8%)	0.23 (41.7%)	0.11 (58.8%) (2): 0.01 (41%)	0.11 (33.3%)
2	1b	0.65 (66.7%)	0.27 (43.75%)	0.57 (62.5%)	0.28 (50%)	0.16 (47%) (2):0.13 (35.3%)	0.36 (55.6%)
1	2	0.40 (60%)	0.50 (62.5%)	0.49 (56.3%)	0.15 (37.5%)	0.5 (64.7%) (2): 0.08(47%)	0.16 (33.3%)
2	2	0.50 (53.3%)	0.68 (75%)	0.81 (81.3%)	0.42 (54%)	0.32 (41%) (2): 0.34(47%)	0.54 (66%)
After initial piloting							
3	3	0.70 (80%)	0.75 (81.3%)	0.66 (75%)	4: 0.78 (82.6%) 5: 0.37 (60.9%)	0.58 (82.4%)	0.33 (55.6%)
4	3	0.71 (73.3%)	0.87 (87.5%)	1.00 (100%)	0.56 (59.56%)	0.3 (58.8%)	0.71 (87.5%)
5	3	0.57 (66.7%)	0.56 (68.75%)	0.48 (62.5%)	0.50 (69.56%)	0.42 (56.25%)	0.5 (50%)
5	4	0.56 (60%)	0.69 (81%)	0.67 (75%)	0.43 (65%)	0.61 (68.75%)	0.67 (75%)
5	5	0.49 (66.7%)	0.87 (87.5%)	0.67 (75%)	0.4 (56.5%)	0.31 (62.5%)	0.27 (37.5%)
6	4	0.67 (73.3%)*	0.87 (87.5%)*	0.81 (87.5%)	0.37 (52%)	0.54 (81.25%)	1.00 (100%)
8[1]	4	0.7 (80%)*	0.94 (93.75%)*	0.55 (68.75%)	0.46 (60.9%)	0.63 (75%)	0.73 (75%)
12	4	0.66 (80%)*	0.81 (87.5%)*	0.87 (87.5%)	0.77 (88.2%)	0.93 (93.3%)*	0.58 (75%)

1	4	-	-	0.57 (70.6%)	0.59 (70.6%)	0.66 (73.3%)*	1.00 (100%)
2	4	-	-	0.81 (87.5%)*	0.34 (58.8%)	0.615 (80%)*	0.39 (62.5%)
9	4	-	-	0.66 (75%)*	0.64 (76.5%)*	-	0.74 (75%)*
10	4	-	-	0.81 (81%)*	0.76 (76.5%)*	-	0.733 (75%)*
11	4	-	-	-	0.49 (70.6%)	-	0.765 (87.5%)*
3	4	-	-	-	4: 0.94 (94.1%)* 5: 0.82 (88.2%)*	-	-
4	4	-	-	-	0.44 (82.35%)*[2]	-	-

Note: Missing responses were accounted for in the analysis

*Indicates agreement >0.61 was reached

[1] Coding guidelines not changed after coding this set

[2] Weighted kappa did not reach >0.61 however >70% agreement achieved five times in a row and >0.6 kappa 3 times in last five sets. Kappa low due to distribution of responses: lots of ‘done’ responses, despite only three disagreements

-: Agreement had already been reached and no further sessions needed to be coded until the 10% checks.

‘(2)’: In some cases more than one Consultation and advice session were transcribed and coded, (2) refers to the second transcript for this session

3.6 Discussion

3.6.1 Key findings

This chapter outlined a systematic method involving a number of iterative steps that can be used to develop checklists for measuring fidelity of delivery and engagement with complex interventions, such as dementia interventions. This systematic methodology was used to develop reliable measures to assess fidelity of delivery of the PRIDE intervention and COTiD-UK intervention. Intervention-specific checklists were developed for users (e.g. researchers, quality assessors) to independently code fidelity. In the PRIDE intervention, checklists were developed for use by people with dementia and DAWs to assess fidelity and engagement. After several rounds of piloting and amendments to the coding guidelines and checklists, measures of fidelity of delivery that can be used to measure fidelity of delivery with good inter-rater agreement for PRIDE and COTiD-UK were developed.

3.6.2 How findings relate to previous research

3.6.2.1 Developing fidelity and engagement measures

These findings are consistent with previous research which suggests that intervention manuals can be coded to identify key components (Haynes et al., 2016; Lorencatto et al., 2013a) and used to inform the development of fidelity checklists.

Previous research has demonstrated that fidelity measures should include and distinguish between standardised and tailored intervention components (Century et al., 2010; Haynes et al., 2016). However, few studies (e.g. Haynes et al., 2016) have provided recommendations as to how these different components should be dealt with when developing measures of fidelity. This chapter provides two examples of combining tailored and standardised intervention components in fidelity measures. The inclusion of tailored components in the PRIDE and COTiD-UK checklists required different approaches. For example, in the PRIDE intervention it was possible to measure the fidelity of delivering tailored components directly during data collection, but in the COTiD-UK intervention, tailoring could only be considered during data analysis by determining whether certain components were appropriate for each person with dementia. This suggests that including tailoring in fidelity measures must be considered on an individual basis.

Findings from these studies extend previous work in this area by demonstrating how researchers can consider reliability, validity, practicality and acceptability when developing measures of fidelity and engagement. These psychometric and implementation qualities have been recommended (Gearing et al., 2011; Glasgow et al., 2005; Holmbeck & Devine, 2009; Lohr, 2002; Stufflebeam, 2000), yet reported infrequently (see Chapter 2; Walton et al., 2017). These qualities were considered when developing PRIDE and COTiD-UK checklists. In both interventions, the checklists were piloted for inter-rater agreement to improve consistency of fidelity coding (Lorencatto et al., 2014). Different versions of the checklists were created in the PRIDE study for different audiences to enhance acceptability (Glasgow et al., 2005; Holmbeck & Devine, 2009; Lohr, 2002). Feedback was sought on the content and wording of these checklists from PPI members and interventionists, and adaptations were made, with a view to improve ease of use and acceptability.

3.6.2.2 Piloting checklists to assess reliability

These findings were consistent with previous research finding that good (> .61 kappa) agreement was difficult to achieve for both the PRIDE and COTiD-UK interventions. Previous studies have found poor to fair agreement in their main fidelity analyses (Harting, van Assema, van der Molen, Ambergen & de Vries, 2004; Thyrian et al., 2010). The present findings suggest that several rounds of coding are required to achieve good reliability before measures are sufficiently reliable to use to assess fidelity.

Previous research recommends that simple coding guidelines should be used and amended to achieve reliable coding (French et al., 2015; Hardeman et al., 2008;

Harting et al., 2004; Keith, Hopp, Subramanian, Wiitala & Lowery, 2010; Lorencatto et al., 2014). These findings extend previous work in this area by highlighting the need to develop fully operationalised coding guidelines to limit subjectivity in responses. They also highlight the need for amendments to the coding guidelines (and checklists, as is the case of the COTiD-UK study) before they can be used reliably.

Previous research has found that the more complex an intervention, the harder it is to achieve good inter-rater agreement (Harting et al., 2004). These findings which showed that agreement was difficult to achieve, highlight that it may not be possible to consistently achieve ‘excellent’ reliability in complex interventions, using more conservative estimates of reliability (i.e. weighted kappa). These findings highlight the importance of piloting measures to assess agreement before using them to assess fidelity of interventions. In line with previous studies, difficulties were identified when operationalising intervention fidelity, including how to operationalise those components which related to the style of delivery. These findings suggest that it is necessary to create detailed coding guidelines to minimise uncertainty when assessing the fidelity of complex interventions.

3.6.3 Limitations

To reflect PRIDE and COTiD-UK intervention components and to highlight what the planned intervention consisted of, intervention components were specifically operationalised as behaviours in the fidelity checklists for both interventions. For PRIDE, this could have limited the variability of delivery and DAWs’ freedom to use their own skills. Furthermore, the coding guidelines for researchers specified behaviours with a higher level of specificity than DAW and participant self-report ratings. This was because it was necessary to maximise high levels of agreement which may require a high level of specificity on coding guidelines. DAWs and participants received basic instructions on how to complete the checklist but not on how to judge each component. This was to ensure that the checklists were acceptable and practical for use by DAWs and by people with dementia. This may influence the reliability with which checklists are completed across the three groups,

An alternative approach to measuring fidelity with specific provider behaviours may have been to highlight higher level skills and behaviours on the checklists. However, this may have increased the variability in delivery, which would make it more difficult to understand the extent to which the intervention is delivered as planned and engaged with, and to interpret intervention outcomes. Furthermore, some of the components in COTiD-UK were higher-level OT skills, for example the use of open questions, the use of jargon. These were difficult to achieve agreement for without clear operationalisation and so it may be more difficult to measure fidelity reliably if all components were higher level skills.

Although feedback was sought from the research and intervention teams, only one researcher coded the intervention content and developed the framework of intervention components. For the PRIDE intervention, although BCTs (Michie et al., 2013) were highlighted from the PRIDE manual, these were used only to develop the intervention framework but not the checklist components. Therefore, components in the checklists were not as specific as BCTs. However, in the PRIDE intervention this allowed the checklists to be accessible for all audiences, including DAWs and people with dementia. BCTs were not identified for the COTiD-UK intervention.

As the kappa statistic controls for chance agreement, reliability between coding pairs might have been underestimated (Gisev et al., 2013); particularly for those sessions with more components (Stein, Sargent & Rafaels, 2007). Also, kappa may be lower if responses are not equally distributed (Feinstein & Cicchetti, 1990). This offers a potential explanation for why agreement was difficult to achieve three times in a row for the Summaries and Goal-setting sessions in the COTiD-UK study and Session one in the PRIDE study. Percentage agreements and kappa scores were used to assess and report reliability as recommended in previous research (Lombard et al., 2002). This allowed for pragmatic decisions to be made if satisfactory reliability (in the form of weighted kappa) was difficult to achieve.

A limitation of inter-rater agreement is that coders may agree on a response but this may be an incorrect response (Gisev et al., 2013). Although this cannot be ruled out, coders were trained and given clear, thorough coding guidelines to try and mitigate this effect.

‘Done to some extent’ was not applicable for certain components in the COTiD-UK intervention. For other COTiD-UK components, it was necessary to simplify the coding task by removing the ‘done to some extent’ option to achieve agreement. Thus, there were only two options for some components. If Likert scales were chosen to measure fidelity, inter-rater agreement would have been even more difficult to achieve (Carroll et al., 2000; Stein et al., 2007).

Earlier findings highlighted a need for further research into the categorisation of fidelity and engagement measurement qualities to inform the development of fidelity and engagement measures (see Chapter 2). This addition to the research was not within the scope of the time-frame of this study, therefore further research is needed to address this gap.

Self-reported PRIDE fidelity checklists were developed to be used by both DAWs and people with dementia. As the PRIDE intervention lasted for three months, people with dementia’s cognitive capacities may fluctuate or deteriorate throughout the intervention. Deterioration of cognitive abilities during the intervention was less likely than fluctuation because three months is a relatively brief intervention. Therefore, some of the self-report data collected using these checklists may be affected by participants’ ability to self-report the delivery of the intervention and levels of engagement.

3.6.4 Implications

The systematic methodology reported in this Chapter can inform the development of fidelity and engagement measures to be used with complex interventions. Developing high-quality measures with good psychometric and implementation qualities can advance our understanding of the fidelity and engagement outcomes and help us interpret intervention effectiveness more accurately. If the checklists are found to be acceptable and practical for the target audience and researchers, the burden associated with monitoring fidelity and engagement could be reduced.

3.6.5 Future research

The PRIDE and COTiD-UK fidelity checklists will be used to assess fidelity of delivery of the PRIDE and COTiD-UK interventions and engagement with the PRIDE intervention (see Chapter 4).

3.7 Conclusion

A reliable, systematic method for measuring fidelity of delivery of two interventions for people with dementia (PRIDE and COTiD-UK) has been developed. The PRIDE checklists can be used to assess engagement (receipt and enactment). This method can be adapted for use in similar interventions.

Chapter 4 Assessing fidelity of delivery of, and/or engagement with, dementia interventions

4.1 Introduction

The gold standard method for measuring fidelity is to audio-record all intervention sessions and randomly select a percentage of sessions to be rated and transcribed by multiple, independent raters (Borrelli, 2011; Lorencatto et al., 2014; see Chapter 1, Section 1.3.3 for more information). Research suggests that there is little agreement between different types of fidelity measurements (Lillehoj et al., 2004; Moncher & Prinz, 1991; Ward et al., 2013; see Chapter 1, Section 1.3.3). For example, findings suggest that self-reported scores from providers may score fidelity of delivery higher than researchers using observational measures (Hansen, Graham, Wolkenstein & Rohrbach, 1991; Toomey et al., 2017); possibly due to social desirability factors (Schinckus et al., 2014). Therefore, triangulation of multiple measures is recommended to overcome the limitations of individual measurements (McKenna et al., 2014; Moncher & Prinz, 1991; Munafo & Smith, 2018; see Chapter 1, Section 1.3.3). Fidelity of delivery checklists were developed for use by researchers, providers and people with dementia in the PRIDE intervention and for use by researchers in the COTiD-UK intervention (see Chapter 3).

Measuring how an intervention is delivered and engaged with enables an understanding of the extent to which components of the planned intervention contribute to the desired changes. Fidelity of delivery and engagement have rarely been investigated in previous dementia interventions. Therefore, it is unclear what people with dementia have received or engaged with, when taking part in these interventions. To the author’s knowledge, no studies have assessed fidelity of delivery and engagement from the perspective of researchers, providers and people with dementia in interventions for people with dementia.

The studies described in this Chapter aimed to 1) assess fidelity of delivery of, and engagement with, the PRIDE feasibility intervention, 2) assess fidelity of delivery of, the COTiD-UK intervention, and 3) compare fidelity of delivery of PRIDE and COTiD-UK across sessions, sites and providers.

If PRIDE and COTiD-UK were found to be delivered as planned, one can be more confident that the intervention effects (whether positive or negative) were the result of the intervention. If findings indicate that PRIDE and COTiD-UK were not delivered as planned, this suggests that the intervention effects may indicate a Type I or Type II error and may be attributable to other factors. Recommended fidelity thresholds suggest that: 80-100% indicates high fidelity, 51-80% indicates moderate fidelity and <50% indicates low fidelity (Borrelli, 2011).

4.2 Methods - PRIDE

PRIDE is a community based intervention, delivered by DAWs to people with dementia and their supporters in dyads' homes over three sessions.

4.2.1 Design

A longitudinal observational design was used. The PRIDE feasibility trial was planned across five sites but took place in four National Health Service (NHS) hospital trust sites across England. Recruitment and delivery of the intervention began in November 2016 and ended in November 2017.

4.2.2 Intervention

The intervention was delivered by 12 DAWs. Prior to delivering the intervention, DAWs received a day of training on how to deliver the PRIDE intervention. This included training on PRIDE as well as training on why it is important to measure fidelity and how to audio-record and complete checklists.

To receive the intervention, people with dementia needed to be in the early stages of dementia and have a supporter who could take part with them. Intervention sessions were designed to last between 60 and 90 minutes. The study planned to recruit 40 dyads across four sites. Thirty-four dyads of people with dementia and their supporters were recruited across four sites.

The PRIDE intervention aimed to improve independence in dementia by promoting an active healthy lifestyle and enabling people with mild dementia to maintain their cognitive activities and social roles (see Chapter 1, Section 1.1.4.1 for more information). The PRIDE intervention consisted of three sessions. In the first session, DAWs provided standardised information (on finding a balance, social connections and keeping going) before encouraging participants to choose three topics and plan at least one activity to work on. In the second and third sessions, plans were reviewed and barriers, facilitators and solutions were identified before covering new plans and topics.

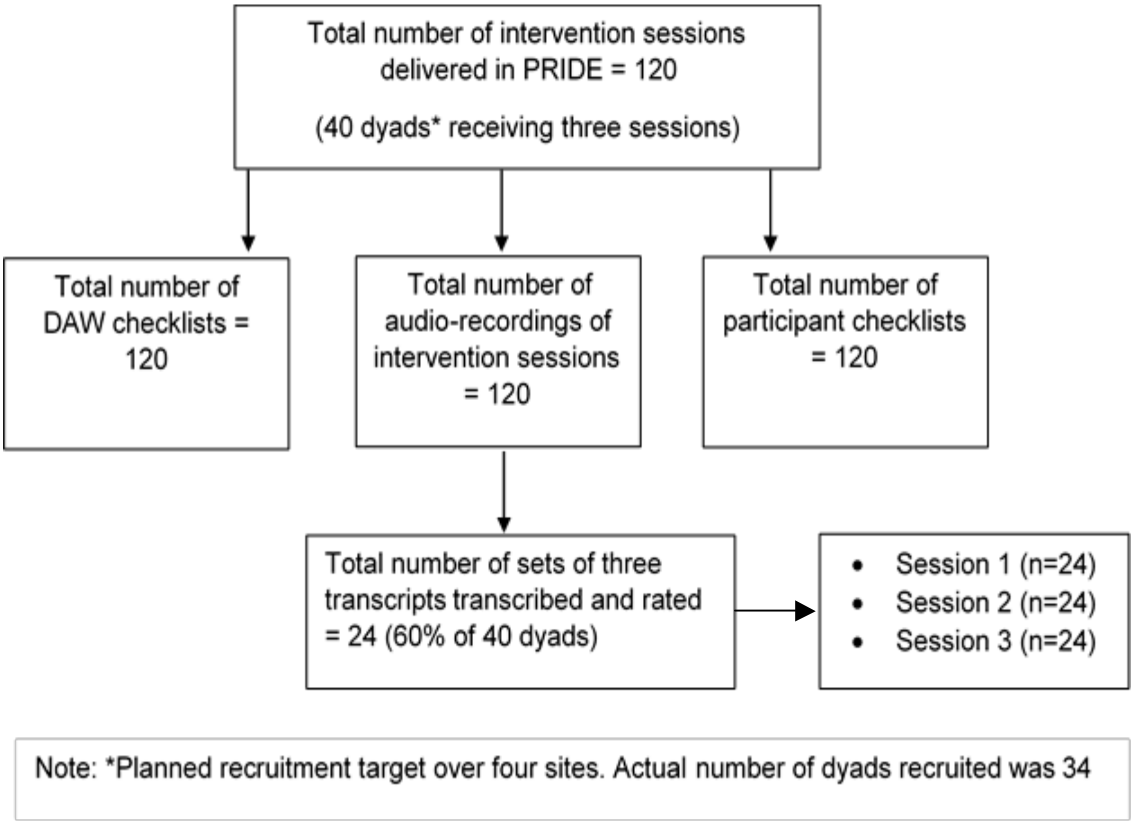
4.2.3 Sample

Figure 4-1 outlines the sampling strategy for this study, selected from within the trial sample.

To identify whether fidelity of delivery and engagement varied across sites, fidelity of delivery and engagement data were collected from all four sites. To overcome the possibility that DAWs may select sessions or forget which sessions to record (Lorencatto et al., 2013a), all intervention sessions were audio-recorded.

To provide a representative sample across sessions and sites, it is recommended that at least 20-40% of intervention sessions are monitored (Schlosser, 2002). Sixty percent of sessions (six sets of three sessions per site) were sampled for this study. Twenty-four sets of sessions (six sets per site) were sampled randomly using ‘R’ software (R Core Team, n.d). Once final participant numbers were confirmed, additional sets were randomly selected to account for any sets that were not available.

All DAWs (n=12) and people with dementia/supporters (n=34) were invited to complete fidelity checklists after each session.



Note: *Planned recruitment target over four sites. Actual number of dyads recruited was 34

Figure 4-1. A flow chart to show the planned sampling strategy for this study, selected from the PRIDE trial

4.2.4 Measures

Three checklists, and a set of coding guidelines, used to measure fidelity of delivery of, and engagement with the PRIDE intervention were developed for this study. For a description of the checklists and how they were developed for this study, please see Chapter 3. The PRIDE fidelity checklists were developed (as described in Chapter 3) to outline the key specific behaviours that needed to be delivered in each of the three intervention sessions to meet the aim of the intervention (see Chapter 4, Section 4.2.2) and to deliver the intervention as planned.

4.2.5 Procedure

4.2.5.1 Audio-recording

People with dementia and supporters were given an information sheet explaining the purpose and procedure of the audio-recording and provided written consent for their sessions to be audio-recorded. All DAWs received a Dictaphone and were trained on how to use it. All intervention sessions were audio-recorded, except in cases where the person with dementia and/or supporters did not consent. DAWs stopped the recording if it was inappropriate to record at any point during the sessions (i.e. person with dementia became distressed). Audio-recordings were uploaded using a secure data protection system. Audio-recordings were transcribed by a professional transcription company. Transcripts were checked against audio-recordings and clear errors or omissions were amended by HW.

4.2.5.2 Researcher ratings of audio-recorded data

The coding guidelines and checklists developed in Chapter 3 were used to provide standardised guidance on how to score the components. Once agreement was achieved (as described in Chapter 3), all sets were coded for fidelity by HW. To identify coder drift, 10% of sets that were not yet double coded in Chapter 3 (set five, set 18, set 19: Session 1, set 23: Sessions 2 and 3) were coded by a second researcher

(MW). If agreement was not achieved (>0.61 weighted kappa), further sets were coded and discussed until agreement was reached.

4.2.5.3 Self-reported ratings of fidelity and engagement

4.2.5.3.1 Fidelity of delivery

DAWs were trained in how to complete checklists during the training session. After each session, DAWs gave the dyad a copy of the guidelines and checklists (complete with ID numbers) relevant to that session. DAWs completed fidelity checklists (Appendix 3-2) and the person with dementia completed ‘PRIDE: your experience’ checklists (Appendix 3-3). Instruction sheets and examples on how to complete the fidelity checklists were provided. As the checklists did not have identifiable information (just ID numbers), DAWs returned checklists by either scanning and emailing them to the trial manager, uploading them to the data transfer system or posting them using prepaid envelopes. The dyad returned the checklists using prepaid envelopes.

4.2.5.3.2 Engagement

In addition to the participant ‘your experience’ checklists, engagement was also measured using telephone contact forms completed by the DAWs. These were used to measure when telephone support took place, how long it lasted and whether the dyad had been doing their activities. To record the person with dementia’s engagement with activities between sessions, data from the PRIDE ‘do calendars’ were analysed.

4.2.6 Data management

The data were accessed by authorised study members and stored securely in a central location. The study followed all relevant ethical and research governance requirements for participants’ consent, confidentiality and data storage. All transcripts were fully anonymised (names and places) to ensure that no individual was identifiable from the data or resulting outputs.

4.2.7 Analysis

4.2.7.1 Quality of measures

To indicate how acceptable and practical the checklists were for use by DAWs and people with dementia, response rates were calculated.

To ensure that the reliability of the fidelity checklists (outlined in Chapter 3) was maintained during the main coding period, inter-rater agreement was calculated using weighted kappa and percentage agreement for the 10% of transcripts that were double-coded.

4.2.7.2 Assessing fidelity of delivery of the PRIDE feasibility trial

To assess the percentage of standardised intervention components that were delivered as planned per session (fidelity of delivery), descriptive statistics (means, percentages) were calculated. Descriptive statistics were compared across sessions, DAWs and sites.

Three fidelity scores for each session were calculated: the researcher's score, the DAW's self-report score and the person with dementia's self-report fidelity score. A total score and percentage for the number of standardised components delivered was calculated. For example, if a DAW scored 22/44 on the Session one checklist, they would receive 50% for the standardised components.

To determine a fidelity score, components were rated according to whether they were 'done'/'definitely happened' (Score 2), 'done to some extent'/'possibly happened' (Score 1), 'not done'/'didn't happen' (Score 0), 'not applicable' (Coded 97), 'missing (Coded -999), or 'unclear' (Coded 10). To provide a conservative estimate of fidelity and ensure that fidelity was comparable across DAWs and sites, missing data, unclear data and components that were not applicable were scored as '0' (not done).

To identify which components were delivered, partly delivered, or not delivered, frequency data was explored across sessions and source of rating (researcher, DAW, person with dementia).

To determine fidelity of delivery of tailored topics and components delivered in Session one and Session two, the average number of tailored topics delivered in a session and number of tailored components delivered for each topic were calculated.

4.2.7.3 Assessing participants' engagement with the PRIDE feasibility trial

To assess levels of engagement, descriptive statistics (means, percentages) were calculated. To calculate a score for 'intervention receipt', participants' responses to two questions were used: 'The information given to me in the session was clear and easy to understand' and 'I understand how to put my plans into action'. To calculate a score for 'intervention enactment', participants' responses to two questions were used: 'since the last session, I have written my activities on the 'do' calendar' and 'since the last session, I have practiced and used the information and skills learnt' were used. Percentages of those who chose 'yes' (Score 2), 'to some extent' (Score 1), 'no' (Score 0), 'not applicable' (Coded 97), 'missing' (Coded -999) or 'unclear' (Coded 10) were compared across DAWs and sites. To provide a conservative estimate of engagement and ensure that engagement was comparable across DAWs and sites, missing data, unclear data and components that were not applicable were scored as '0' (not done).

Eight telephone forms were returned and 'do' calendars were not collected from dyads. Therefore, it was not possible to measure engagement using these measures.

4.3 Results - PRIDE

4.3.1 Sample

Twelve DAWs including: four memory nurses, five dementia advisors and three researchers delivered the intervention to 34 dyads across four sites (see Table 4-1).

Table 4-1. Number of DAWs delivering PRIDE at each site and number of dyads receiving PRIDE at each site

Site (n=4)	Number of DAWs (n=12)	Number of dyads delivered to (n=34)
1	2	11
2	4	8
3	5	8
4	1	7

4.3.2 Quality of measures

4.3.2.1 Response rates

Ninety-three sessions were delivered. Of these, 72 audio-recordings (77.4%), 75 DAW checklists (80.7%) and 59 participant checklists (63.4%) were returned.

Missing data were: 21 audio-recordings, 18 DAW checklists and 34 participant checklists. Reasons for not returning the audio-recordings were: technical failures during or after recording, the audio-recording being wiped from the device before uploading, or a corrupt file. Of the 24 sets (n=72 transcripts) sampled for this study, 17 recordings were missing, resulting in 55 transcripts.

For the researcher ratings, no components were missing, 13 components were scored ‘not applicable’ and no responses were unclear. For the DAW self-report, 30 components were missing, 11 components were scored ‘not applicable’ and one component was ‘unclear’. For the participant self-report, 20 fidelity components were missing, one fidelity component was scored ‘not applicable’ and six fidelity components and two engagement components were ‘unclear’. The number of missing, not applicable (N/A) and unclear data points associated with each measure during data collection are shown in Table 4-2.

Table 4-2. Number of missing, not applicable (N/A) and unclear responses from PRIDE audio-recordings, DAWs self-report and participant self-report

	Session	**Researcher (n)**	**DAW (n)**	**Participant (n)**	
				Fidelity	Engagement
Missing	**Overall**	**0**	**30**	**20**	**0**
	1	0	14	13	0
	2	0	13	6	0
	3	0	3	1	0
Not applicable	**Overall**	**13**	**11**	**1**	**0**
	1	6	5	1	0
	2	6	2	0	0
	3	1	4	0	0
Unclear response	**Overall**	**0**	**1**	**6**	**2**
	1	0	1	2	2
	2	0	0	1	0
	3	0	0	3	0

4.3.2.2 Inter-rater agreement

For the standardised components, inter-rater agreement for the 10% of sets that were double coded were $\kappa > .61$ for Session one ($\kappa = 0.7$-0.8), apart from sets 18 ($\kappa = 0.4$) and 19 ($\kappa = 0.6$). Agreement for Session two dropped below the required threshold for sets five ($\kappa = 0.5$), six ($\kappa = 0.4$), seven ($\kappa = 0.4$), 19 ($\kappa = 0.5$), and 23 ($\kappa = 0.5$), but then agreement was reached for sets 20 ($\kappa = 0.7$) and 24 ($\kappa = 0.7$). Agreement for Session three dropped below the required threshold for sets five ($\kappa = 0.3$), 19 ($\kappa = 0.4$) and 20 ($\kappa = 0.6$), but then agreement was reached for set 24 ($\kappa = 0.8$) (see Table 4-3).

Table 4-3. Inter-rater agreement for standardised components, for the 10% of PRIDE sets that were double coded

	Weighted kappa (% agreement)		
Set	**Session 1**	**Session 2**	**Session 3**
5(*)	0.7 (72.7)	0.5 (72.2)	0.3 (66.7)
6	-	0.4 (66.7)	0.8 (83.3)
7	-	0.4 (72.2)	-
18(*Session 1)	0.4 (68.2)	Pre- coded	Pre- coded
19 (*Session 2)	0.6 (77.3)	0.5 (66.7)	0.4 (50)
20	0.8 (90.9)	0.7 (77.7)	0.6 (75)
23 (*)	0.8 (90.9)	0.5 (55.5)	No transcript
24	-	0.7 (83.3)	0.8 (91.7)

Note: (*) Sets that were selected for double coding

-: This was used when agreement had already been reached and no further sessions needed to be coded until the next sampled set.

Pre-coded refers to sets that were coded during the piloting phase (see Chapter 3).

No transcript – refers to sessions where transcripts were not available to code

Percentage agreement for delivery of tailored components in PRIDE Sessions one and two, for the 10% of sets that were double coded, ranged from 63.6% to 100% (see Table 4-4).

Table 4-4. Percentage agreement for delivery of tailored topics and topic components (scored out of 11) in PRIDE Sessions one and two, for the 10% of PRIDE sets that were double coded

	Mean number of components agreed on (range) (%)	
Topic (number of sets delivered in for Session 1 and 2)	**Session 1**	**Session 2**
1 Keeping mentally active (S1: 4, S2: 1)	93.6 (81.8-100)	100
2 Keeping physically active (S1: 2, S2: 2)	90.9	90.9
3 Keeping socially active (S1: 2, S2: 2)	90.9 (81.8-100)	86.4 (81.8-90.9)
4 Making decisions (S1: 2, S2: 1)	81.8	63.6
5 Getting your message across (S1: 2, S2: 1)	81.8 (72.7-90.9)	81.8
6 Receiving a diagnosis (S1: 2, S2: 0)	95.5 (90.9-100)	N/A
7 Keeping healthy (S1: 0, S2: 2)	N/A	77.3 (63.6-90.9)
No topic delivered (S1: 0, S2: 3)	N/A	N/A

Note:
N/A = not applicable: Topic not delivered
11 components = 100%

4.3.3 Assessing fidelity of delivery of the PRIDE feasibility trial

4.3.3.1 Standardised components

The findings from rated transcripts of audio-recordings indicated that a mean of 69% (range: 13.6-86.4%) of components were delivered in Session one, 57.7% (range: 41.7-83.3%) in Session two and 54.9% (range: 25-95.8%) in Session three. The findings from DAW self-report scores indicated that a mean of 85% (range: 22.7-100%) of components were delivered in Session one, 84.3% (range: 61.1-100%) in Session two and 86.5% (range: 62.5-100%) in Session three. The findings from participant self-report scores indicated that a mean of 89.8% (range: 59.1-100%) of components were delivered in Session one, 90.1% (range: 50-100%) in Session two, and 92.5% (range: 50-100%) in Session three. This shows that PRIDE was delivered with moderate to high fidelity. Researcher ratings from audio-recorded data indicated the lowest levels of fidelity and participant self-report ratings indicated the highest levels of fidelity. See Table 4-5 for standardised fidelity of delivery scores across different sources of rating, sites and sessions.

As shown in Table 4-5, the mean fidelity of standardised components for each session varied across sites across all three sources of rating (audio-recorded data, DAW self-report and participant self-report). For example, audio-recorded data highlighted that fidelity of delivery scores ranged from 60.2% to 81.8% in Session one. The mean fidelity for each session also varied across different DAWs across all three sources of rating. For example, audio-recorded data highlighted that fidelity of delivery scores ranged from 13.6% to 81.8% in Session one.

Table 4-5. Fidelity of delivery scores for standardised PRIDE components across all three sources of rating (audio-recordings, DAW self-report and participant self-report), sites and DAWs

	Mean % of components delivered (range)								
	Audio-recordings			**DAW**			**Participant**		
Site	**Session 1**	**Session 2**	**Session 3**	**Session 1**	**Session 2**	**Session 3**	**Session 1**	**Session 2**	**Session 3**
Overall	69.2 (13.6-86.4)	57.7 (41.7-83.3)	54.9 (25-95.8)	85.0 (22.7-100)	84.3 (61.1-100)	86.5 (62.5-100)	89.8 (59.1-100)	90.14 (50-100)	92.5 (50-100)
A	62.5 (13.6-84.1)	56.1 (50-63.9)	51.0 (33.3-66.7)	92.5 (72.7-100)	87.7 (80.6-100)	75.6 (62.5-91.7)	97.0 (90.9-100)	85.6 (50-100)	93.1 (79.2-100)
B	75.8 (47.7-84.1)	61.1 (44.4-86.1)	63.9 (54.2-70.8)	69.3 (22.7-90.9)	72.2 (61.1-88.9)	70.8 (70.8)	89.8 (75-90.9	79.2 (58.3-100)	87.5 (87.50)
C	73.1 (70.5-79.6)	58.8 (41.7-83.3)	56.7 (25-95.8)	86.2 (54.6-100)	82.3 (66.7-94.4)	93.5 (75-100)	83.2 (59.1-100)	88.9 (80.6-100)	88.2 (50-100)
D	60.2 (20.5-86.4)	50 (44.4 (55.6)	50.8 (25-75)	84.7 (77.3-93.2)	88.5 (77.8-100)	93.8 (79.2-100)	94.9 (90.91-97.7)	98.9 (94.4-100)	97.2 (91.7-100)
Unknown							92.6 (70.5-100)	100 (100)	97.2 (91.7-100)

Note: N/A (Not applicable) scores were scored as not done (0)

Max fidelity (100%): Session 1: n=44, Session 2: n=36, Session 3: n=24

Blank cells indicate that either the sets were not sampled for rating (audio-recordings) or that data were missing.

To ensure site anonymity, site numbers have been shuffled up so that sites 1-4 do not directly correspond to letters A-D

The extent to which individual components were delivered (‘done’, ‘done to some extent’, ‘not done’, ‘not applicable’, ‘missing’ or ‘unclear’), according to each of the three sources of rating, for each session are shown in Appendices 4-1 to 4-3. Component numbers in Appendices 4-1 to 4-3 directly correspond with component numbers in the PRIDE checklists (see Appendix 3-3). For example: researcher ratings of audio-recorded data show that for Session one, components that were frequently 'done’ were: ‘helped the participant to think about which activities they find enjoyable and important, using the ‘find a balance’ grid (component 3b, n=18, 90%), ‘asked the participant to choose three topics’ (component 6, n=15, 75%), ‘encouraged the participant to think about what might help and get in the way of plans’ (component 10, n=18, 90%), ‘encouraged the participant to think of ways to overcome problems (component 11, n=14, 70%), ‘recorded plan on the plan sheet’ (component 12, n=16, 80%), and ‘showed the participant how to record progress’ (component 13, n=18, 90%). Components that were frequently ‘not done’ in Session one were: ‘providing examples of how people keep going’ (component 5b, n=10, 50%) and ‘setting a time and date for the next session’ (component 17, n=10, 50%) (see Appendix 4-1 for more details).

Discrepancies between researcher, DAW and participant ratings are highlighted in Appendices 4-1 to 4.3. An example of a discrepancy is Session two, component nine (making a plan). Researchers reported that less plans were made (n=4, 22.2%) than DAW self-report (n=17, 68%) and participant self-report (n=16, 80%) (see Appendix 4-2 for more details).

4.3.3.2 Tailored components

Researcher ratings of session transcripts indicated that a mean of 1.9 topics and 4.6 components were delivered in Session one and 1.1 topics and 3.0 components in Session two. DAW self-report indicated that a mean of 2.4 topics and 7.9 components were delivered in Session one and 2.2 topics and 7.8 components in Session two. The number of tailored topics and components that were delivered in Sessions one and two, as measured by audio-recordings and DAW self-report, are shown in Table 4-6.

As shown in Table 4-6, the mean number of topics and components delivered in each session varied across sites for researcher ratings of session transcripts and DAW self-report. For example, researcher ratings of session transcripts indicated that in Session one delivery of tailored topics ranged from 1.5 to 2.2, and delivery of tailored components ranged from 2.6 to 6.8. The mean number of topics and components delivered in each session varied across different DAWs from audio-recorded data and DAW self-report. For example, researcher ratings of session transcripts indicated that in Session one, delivery of tailored topics ranged from 0 to 2.5 and delivery of tailored components ranged from 0 to 11.5.

Table 4-6. Number of topics and components delivered for tailored PRIDE components across sites and DAWs

	Mean number delivered (range)			
	Researcher		**DAW**	
Site	**Session 1**	**Session 2**	**Session 1**	**Session 2**
Overall				
Topics	1.9 (0-4)	1.1 (0-2)	2.4 (0-7)	2.2 (0-7)
Components	4.6 (0-16)	3.0 (0-8)	7.9 (0-29)	7.8 (0-45)
A				
Topics	1.5 (0-3)	0.8 (0-2)	1.9 (1-3)	1.9 (1-3)
Components	6.8 (0-16)	2.8 (0-5)	7.9 (3-18)	5.1 (3-7)
B				
Topics	1.8 (0-5)	1.2 (0-3)	0.8 (0-1)	0 (0)
Components	2.8 (0-11)	2.2 (0-7)	4 (0-6)	0 (0)
C				
Topics	2.2 (1-4)	1.5 (0-2)	1.5 (0-4)	2 (0-5)
Components	5.7 (4-7)	4.8 (0-8)	5.4 (0-14)	6.5 (0-12)
D				
Topics	1.8 (0-3)	0 (0)	5.4 (3-7)	3.7 (1-7)
Components	3.3 (0-8)	0 (0)	14.1 (5-29)	15.3 (5-45)

Note:

Blank cells indicate that either the sets were not sampled for rating (audio-recordings) or that data were missing.

To ensure site anonymity, site numbers have been shuffled up so that sites 1-4 do not directly correspond to letters A-D

The percentages of tailored components that were delivered for each tailored topic (‘done’, ‘not done’, or ‘not applicable’) across audio-recorded ratings and DAW self-report are shown in Appendix 4-4 (Session one) and Appendix 4-5 (Session two). For example: according to researcher ratings from audio-recorded data, the tailored components that were frequently ‘done’ in Session one were: ‘provided information on benefits’ (keeping mentally active, n=8, 45%), ‘identified potential challenges’ (keeping mentally active, n=7, 35%; getting your message across, n=3, 15%), ‘provided example activities’ (keeping mentally active, n=14, 70%) and ‘provided information on how dementia can affect it’ (getting your message across, n=4, 20%) (see Appendix 4-4). The tailored component that was frequently ‘done’ in Session two was: ‘provided information on benefits’ (keeping mentally active, n=4, 22.2%) (see Appendix 4-5).

4.3.4 Assessing engagement with the PRIDE feasibility trial

Self-reported data from the participants with dementia indicated that the mean level of receipt was 85.9% (range: 0-100%) for Session one, 87.5% (range: 50-100%) for Session two and 90.6% (range: 50-100%) for Session three. Self-reported data from participants with dementia indicated that the mean level of enactment was 81.3% (range: 0-100%) for Session two and 82.8% (range: 0-100%) for Session three. This shows that participants understood the information and could put their plans into practice. Table 4-7 illustrates levels of engagement across sites and sessions.

Table 4-7. Participants' engagement (receipt and enactment) with the PRIDE intervention across the three sessions and sites

		Mean % (range)	
Session	**Site**	**Receipt**	**Enactment**
1	Overall	85.9 (0-100)	-
	A	83.3 (50-100)	-
	B	87.5 (50-100)	-
	C	75 (0-100)	-
	D	100 (100)	-
	Unknown	93.8 (75-100)	-
2	Overall	87.5 (50-100)	81.3 (0-100)
	A	90 (50-100)	80 (0-100)
	B	75 (50-100)	75 (75)
	C	85.7 (75-100)	92.9 (75-100)
	D	90 (50-100)	65 (50-100)
	Unknown	100 (100)	100 (100)
3	Overall	90.6 (50-100)	82.8 (0-100)
	A	91.7 (75-100)	66.7 (0-100)
	B	50 (50)	75 (75)
	C	87.5 (50-100)	83.3 (50-100)
	D	100 (100)	100 (100)
	Unknown	100 (100)	83.3 (75-100)

Note: Responses that were unclear were coded as missing and thus scored as '0' in percentage calculations.

-: Indicates that there were no scores for enactment for Session one as enactment was only measured in Sessions two and three.

The percentage of participants' responses in relation to their engagement ('yes', 'to some extent', no'), for each of the three sessions is shown in Appendix 4-6. For example, in Session two, 75% of participants reported that the information was clear and easy to understand and that they understood how to put their plans into action. In Session two, 80% of participants reported that they had written their activities on the 'do' calendar since the last session and 60% of participants reported that they had practiced and used the information and skills learnt since the last session.

4.4 Methods – COTiD-UK

COTiD-UK is a community based intervention delivered by OTs to people with dementia and their family carers. Sessions took place in dyads' homes over approximately 10 sessions and 10 hours.

4.4.1 Design

A longitudinal observational design was used. The COTiD-UK RCT took place across 15 NHS hospital trust sites across England. Recruitment for the intervention began in October 2014 and ended in July 2017.

4.4.2 Intervention

Thirty-one OTs delivered the intervention to 468 dyads of people with mild to moderate dementia and their family carers (COTiD-UK: 249 dyads, usual care: 219 dyads). Prior to delivering the intervention, each OT received two days of face-to-face training in how to deliver the COTiD-UK intervention. After this, they delivered the intervention to a 'training dyad'. These sessions were audio-recorded and assessed by a COTiD-UK trainer who confirmed when the OT had achieved the necessary standard to take part in the RCT. To enable OTs to consolidate their COTiD-UK understanding, knowledge and skills and give opportunity for reflection, a follow-up training day was provided once they had delivered COTiD-UK. All OTs were given supervision throughout the delivery of COTiD-UK. Supervision models differed between peer, group and individual supervision depending on supervisor availability and capacity.

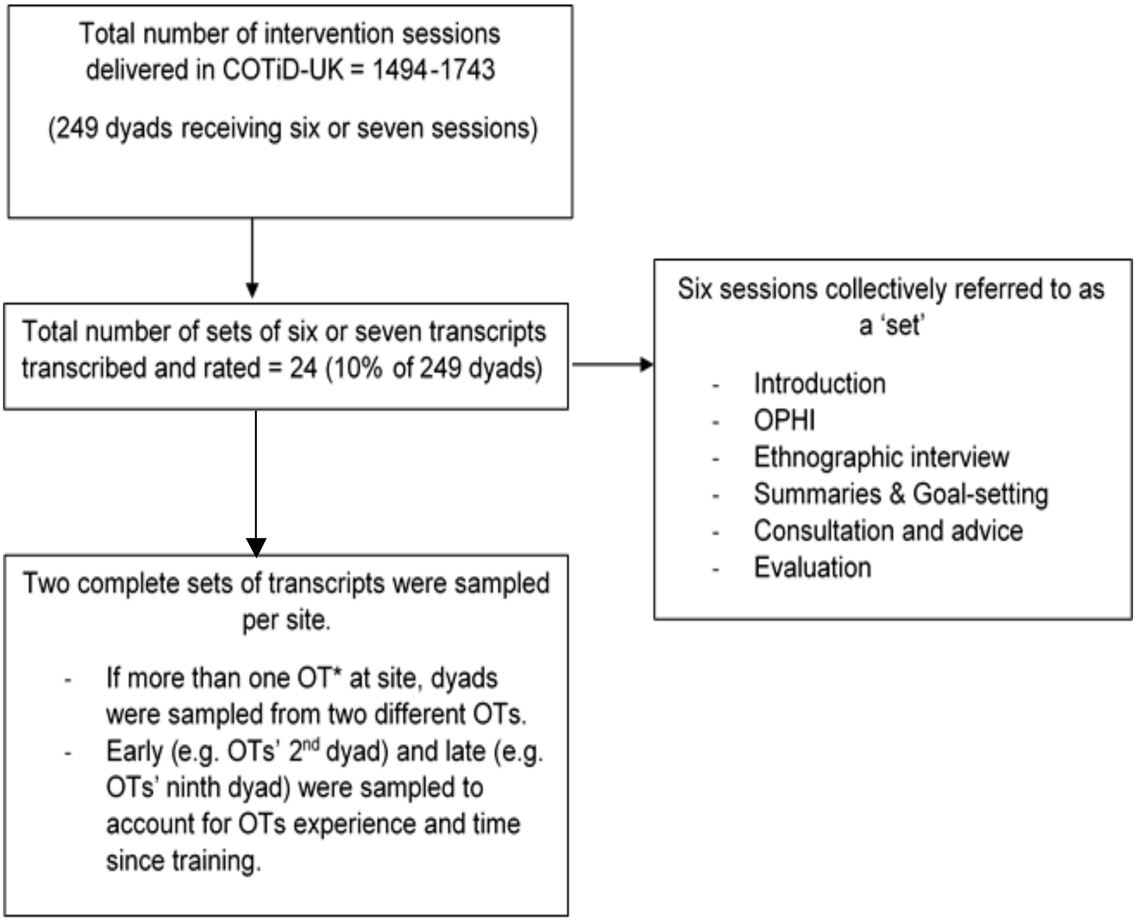
The aim of the COTiD-UK intervention was to facilitate independence, meaningful activity and quality of life among people living with mild dementia and their family carers (see Chapter 1, Section 1.1.4.2 for more information). Seven key skills were delivered over the intervention. These were: an introduction to the intervention and COTiD-UK format, an OPHI interview with the person with dementia, an Ethnographic interview with the family carer, Summarising interviews and observations, Goal-setting, Consultation and advice and an Evaluation session.

4.4.3 Sample

Figure 4-2 outlines the sampling strategy for this study, selected from within the trial sample.

As with the PRIDE intervention, data were collected alongside the intervention and all intervention sessions were audio-recorded routinely, provided that consent was given and it was practical to audio-record (see Section 4.2 for details). Ten percent of the intervention group's intervention sets (24 sets) were transcribed and analysed. Sets contained either six or seven COTiD-UK key sessions, depending on whether Summaries and Goal-setting were delivered separately or together. In cases where Summaries and Goal-setting were delivered separately, these are referred to in the results as Goal-setting 1 (Summary) and 2 (Goal-setting).

Sets were purposively sampled from 12 of the 15 trial sites and 28 of the 31 OTs, as shown in Figure 4-2. Two of the 15 sites withdrew and one did not have sufficient recordings for sampling. Two sets per site were selected. To take OTs' experience into account, sets were sampled from each site, different OTs and from dyads who received the intervention early and late during the intervention period. If no full sets were available (n=8), sets which had audio-recordings for most of the sessions were sampled.



Note*: OT stands for occupational therapist

Figure 4-2. A flow chart to show the planned sampling strategy for this study, selected from within the COTiD-UK trial sample

4.4.4 Measures

Six checklists, and a set of coding guidelines, used to measure fidelity of delivery of COTiD-UK were developed for this study. The development of these checklists was informed by the development of the PRIDE checklists (see Section 4.2.4). For a description of the checklists and how they were developed for this study, please see Chapter 3. The COTiD-UK fidelity checklists were developed (as described in Chapter 3) to outline the key specific behaviours that needed to be delivered for each of the seven skills to meet the aim of the intervention (see Chapter 4, Section 4.3.2) and to deliver the intervention as planned.

4.4.5 Procedure

4.4.5.1 Audio-recording

The procedure for audio-recording was closely aligned with the procedure followed for PRIDE (see Section 4.2.5.1). To monitor fidelity, sampled audio-recordings were transcribed and rated for fidelity against the checklists. To check that transcript labels accurately represented their content, a member of the intervention team checked the labelling before they were coded. Transcripts were not checked against the audio-recordings for COTiD-UK.

4.4.5.2 Researcher ratings of audio-recorded data

The procedure for researcher ratings of audio-recorded data was closely aligned with the procedure followed for PRIDE (see Section 4.2.5.2). The coding guidelines and checklists developed in Chapter 3 were used to provide standardised guidance on how to score the checklists. Additionally, the COTiD-UK leaflet, self-reported goal-setting forms (completed by the OTs) and OPHI and Ethnographic interview questions were used to inform the coding guidelines and criteria for ‘done’, ‘done to some extent’ and ‘not done’.

Once agreement was achieved (as described in Chapter 3), all data were coded for fidelity by HW. To identify coder drift, 10% of sets (eight, 16, and 24) were coded by a second researcher (HG). If agreement was not achieved, further transcripts were coded and discussed until agreement was reached.

4.4.6 Data management

See Section 4.2.6 for the data management procedure used in both studies.

4.4.7 Analysis

4.4.7.1 Quality of measures

To identify how acceptable and practical audio-recording was for OTs, response rates were calculated. To ensure that the reliability of the fidelity checklists (outlined in Chapter 3) was maintained during the coding period, inter-rater agreement was assessed using weighted kappa and percentage agreement.

4.4.7.2 Assessing fidelity of delivery of the COTiD-UK intervention

To assess the percentage of intervention components that were delivered as planned (fidelity of delivery), descriptive statistics (means, percentages) were calculated. These were compared across sessions, OTs and sites.

A total fidelity score and percentage for each session, for the number of components delivered, was calculated. For example, an OT scoring 15/30 on the Introduction checklist would achieve 50% fidelity.

To determine a fidelity score, components were scored according to whether they were 'done' (Score 2), 'done to some extent' (Score 1), 'not done' (Score 0), 'delivered in a different session' (Coded 98), or 'not done, not applicable' (Coded 99). A score of 'done to some extent' was coded when components were neither fully 'done', nor 'not done'. 'Not done, not applicable' was coded when the delivery of a component had previously been accounted for. For example, the component 'assessed the home environment' could be delivered in the Introduction, OPHI or Ethnographic interview.

Therefore, when it was coded as ‘done’ in the first session, this was coded as ‘not done, not applicable’ in the OPHI and Ethnographic interviews.

Components that required the absence of behaviour (e.g. ‘use of jargon’) were reverse coded during analysis. To provide a conservative estimate of fidelity and ensure that fidelity was comparable across OTs and sites, components that were not applicable or delivered in a different session were scored as ‘0’ (not done).

To identify which components were delivered, partly delivered, or not delivered, frequency data was explored across sessions.

4.5 Results – COTiD-UK

4.5.1 Sample

COTiD-UK was delivered by 31 OTs to 249 dyads across 15 sites (see Table 4-8).

Table 4-8. Number of OTs delivering COTiD-UK and number of dyads receiving COTiD-UK at each site

Site (n=15)	**Number of OTs (n=31)**	**Number of dyads delivered to (n=249)**
1	4	44
2	4	40
3	-	-
4	2	10
5	-	-
6	1	10
7	4	31
8	-	-
9	3	6
10	2	21
11	2	8
12	3	20
13	1	5
14	1	6
15	1	6

Note: Data from Site 3, 5, and 8 were not included in the study, hence only 12 sites and 28 OTs were included in the analysis

4.5.2 Quality of measures

4.5.2.1 Response rates

Out of 2,696 delivered sessions, 1409 recordings (52.3%) were returned. Of the 24 sets (n=144-168 transcripts) chosen for transcription, 137 transcripts were available and were coded, seven were missing and two were not labelled correctly and could not be coded.

Overall, 84 components were scored ‘not applicable’, and 27 components were scored ‘not done, delivered in a different session’. Table 4-9 shows the number of components that were not applicable (N/A) or delivered in a different session.

Table 4-9. Number of COTiD-UK components that were not applicable (N/A) or delivered in a different session

	Session	Number of components (n)
Not applicable	**Overall**	**84**
	Introduction	22
	OPHI	32
	Ethnographic interview	24
	Summaries and Goal-setting	6
	Summaries and Goal-setting (2)	3
	Consultation and advice	2
	Evaluation	1
Delivered in a different session	**Overall**	**27**
	Introduction	1
	OPHI	0
	Ethnographic interview	1
	Summaries and Goal-setting	6
	Summaries and Goal-setting (2)	18
	Consultation and advice	1
	Evaluation	0

4.5.2.2 Inter-rater agreement

Inter-rater agreement for the 10% of sets that were double coded were all κ > .61, including for the Introduction session (κ = 0.6-0.8), OPHI (κ = 0.8-0.9), Ethnographic interview (κ = 0.7-0.9), and Summaries and Goal-setting (κ = 0.7-1). Agreement for the Consultation and advice session dropped below the required threshold for set eight (κ = 0.5), but then agreement was reached for sets 13 (κ = 0.8) and 16 (κ = 0.8). Agreement for the Evaluation session dropped below the required threshold for sets eight (κ = 0.5), 13 (κ = 0.3) and 14 (κ = 0.3), but then agreement was reached for sets 15 (κ = 1) and 16 (κ = 0.9). For set 24, agreement for the Consultation and advice (κ = -0.1) and Evaluation sessions (κ = 0.2) were particularly low. In this set, Consultation and advice and Evaluation were combined and there was no clear distinction as to which components belonged to which session; thus making it difficult to code with high agreement. See Table 4-10 for weighted kappa and percentage agreement across skills.

Table 4-10. Inter-rater agreement for the 10% of COTiD-UK sets that were double coded

	Weighted kappa (% agreement)					
Set	**Introduction**	**OPHI**	**Ethnographic interview**	**Summaries and Goal-setting**	**Consultation and advice**	**Evaluation**
8(*)	0.6 (66.7)	0.9 (93.8)	0.8 (81.3)	0.7 (82.4)	0.5 (73.3)	0.5 (75)
13	-	-	-	-	0.8 (86.7)	0.3 (62.5)
14	-	-	-	-	-	0.3 (75)
15	-	-	-	-	-	1 (100)
16 (*)	0.8 (86.7)	0.8 (81.3)	0.7 (81.3)	1 (100)	0.8 (80)	0.9 (87.5)
24 (*)	No transcript	0.8 (81.3)	0.9 (87.5)	0.7 (82.4)	-0.1 (33.3)	0.2 (37.5)

Note:

(*) Sets that were selected for double coding

-: This was used when agreement had already been reached and no further sessions needed to be coded until the next sampled set.

No transcript – refers to sessions where transcripts were not available to code

4.5.3 Assessing fidelity of delivery of the COTiD-UK intervention

Overall, a mean of 52.4% (range: 30-86.7%) of components were delivered in the Introduction session, 75.5% (range: 62.5-90.6%) in the OPHI session, 71.9% (range: 56.3-84.4%) in the Ethnographic interview, 71.7% (range: 52.9-94.1%) in the Summaries and Goal-setting session, 65.6% (range: 30-86.7%) in the Consultation and advice session and 69% (range: 43.8-87.5%) in the Evaluation session. The second Summaries and Goal-setting session was delivered with low fidelity (44.1% of components (range: 29.4-55.9%)). Overall, findings show that COTiD-UK was delivered with moderate fidelity. See Table 4-11 for audio-recorded fidelity of delivery scores across different sites, OTs and sessions.

As shown in Table 4-11, the mean fidelity for each session varied across sites. For example, fidelity of delivery scores across sites in the Introduction session ranged from 26.7% to 78.4%. The mean fidelity for each session also varied across different OTs. For example, in the Summary and Goal-setting session, fidelity across OTs ranged from 52.9% to 94.1%. This shows that whilst COTiD-UK was delivered with moderate fidelity overall, this was not the case across all OTs and sites.

Table 4-11. Fidelity of delivery scores for components delivered across COTiD-UK sessions, sites and OTs

	Session (Mean % (Range %))						
Site	**Introduction**	**OPHI**	**Ethnographic interview**	**Summaries and Goal-setting**	**Consultation and advice**	**Evaluation**	**Summaries and Goal-setting (2)****
Overall	**52.4% (26.7-86.7) or *47.5 (13.3-86.7)**	**75.5 (62.5-90.6)**	**71.9 (56.3-84.4)**	**71.7 (52.9-94.1)**	**65.6 (30-86.7)**	**69.0 (43.8-87.5)**	**44.1 (29.4-55.9)**
A	26.7 (13.3*-40)	76.6 (75-78.1)	70.3 (62.5-78.1)	57.4 (52.9-61.8)	30.0 (30.0)	68.8 (56.3-81.3)	51.5 (47.1-55.9)
B	58.3 (53.3-63.3)	82.8 (78.1-87.5)	76.6 (75-78.1)	91.2 (88.2-94.1)	86.7 (86.7)	71.9 (68.8-75.0)	-
C	35.0 (33.3-36.7)	82.8 (75-90.6)	70.3 (56.3-84.4)	77.9 (73.5-82.4)	55.0 (53.3-56.7)	75.0 (75)	-
D	55.0 (53.3-56.7)	75.0 (68.8-81.3)	75.0 (68.8-81.3)	64.7 (61.8-67.7)	80.0 (80.0)	65.6 (56.3-75)	-
E	28.3 (26.7-30)	70.3 (62.5-78.1)	75.0 (68.8-81.3)	72.1 (52.9-91.2)	-	75.0 (75)	-
F	28.3 (13.3*-43.3)	71.9 (65.6-78.1)	67.2 (62.5-71.9)	77.9 (70.6-85.3)	63.3 (53.3-73.3)	78.1 (75-81.3)	-
G	68.3 (60-76.7)	73.4 (65.6-81.3)	68.8 (62.5-75.0)	83.8 (76.5-91.2)	71.7 (70-73.3)	65.6 (56.3-75)	-
H	68.3 (56.7-80)	78.1 (75-81.3)	68.8 (68.8)	73.5 (67.7-79.4)	71.7 (66.7-76.7)	65.6 (56.3-75)	-

I	26.7 (13.3*-40)	73.4 (71.9-75)	73.4 (65.6-81.3)	64.7 (64.7)	71.7 (70-73.3)	43.8 (43.8)	-
J	36.7 (33.3-40)	73.4 (68.8-78.1)	73.4 (65.6-81.3)	63.2 (55.9-70.6)	-	65.6 (62.5-68.8)	-
K	60.0 (53.3-66.7)	76.6 (68.8-84.4)	71.9 (71.9)	69.1 (58.8-79.4)	46.7 (46.7)	78.1 (75-81.3)	-
L	78.4 (70-86.7)	71.9 (65.6-78.1)	71.9 (68.8-75.0)	64.7 (64.7)	53.3 (53.3)	75.0 (62.5-87.5)	29.4 (29.4)

Note: Max fidelity (100%): Introduction: n=30, OPHI and Ethnographic interview: n=32, Summaries and Goal-setting: n= 34, Consultation and advice: n=30, Evaluation: n=16.

Components that were N/A are coded as missing and thus scored ‘0’ in percentage calculations, therefore fidelity for individual sets may be underestimated.

*Three Session 1’s were missing – cannot tell fidelity of these. Can only tell if the observations have been carried out, thus leading to some sets having only 13.3% fidelity. Average without these data points also provided (without *)

**4&5(2) = second Summaries and Goal-setting transcript when OTs have delivered 4&5 separately

-: No transcript available

To ensure site anonymity, site numbers have been shuffled up so that sites 1-15 do not directly correspond to letters A-L

The extent to which individual components were delivered ('done', 'done to some extent', 'not done', 'not applicable', or 'delivered in a different session') for each session are shown in Appendix 4-7. Component numbers in Appendix 4-7 directly correspond with component numbers in the COTiD-UK checklists (see Appendix 3-7). For example, components that were frequently 'done' for the Introduction session were: 'assessed the home environment' (component nine, n=24, 100%), 'completed the activity assessment' (component 10, n=24, 100%), 'described what will happen in the next session' (component 13, n=13, 59%). On the other hand, components that were frequently 'not done' for the Introduction session were: 'asking how to address the person with dementia' (component two, n=16, 72.7%), 'asking how to address the family carer' (component three, n=17, 77.3%), 'checked that the dyad received the leaflet' (component four, n=18, 81.8%), and 'gave a copy of leaflet' (component 4a, n=17, 77.3%) (see Appendix 4-7a).

4.6 Discussion

4.6.1 Key findings

This Chapter outlined the measurement of fidelity of delivery of PRIDE and COTiD-UK and engagement with the PRIDE intervention. Findings from audio-recorded data showed that overall, PRIDE and COTiD-UK were delivered as planned moderately well. For PRIDE, there was a discrepancy between ratings of transcripts from audio-recordings and self-report data. Findings from self-report data showed that DAWs and people with dementia reported high fidelity of delivery across the three sessions, whereas audio-recorded data indicated moderate fidelity. Participants' engagement with PRIDE was high. Dyads understood the information given to them and put their plans into practice. Delivery varied slightly across sessions, sites and providers.

The intervention effects from the PRIDE feasibility study and the COTiD-UK RCT are not yet available. These findings suggest that there can be a reasonable degree of confidence that intervention effects (whether positive or negative) were the result of the planned interventions. The findings from PRIDE also suggest that levels of receipt and enactment were high. This implies that engagement may not be a barrier to achieving intervention effects in this study (Borrelli, 2011).

4.6.2 How findings relate to previous research

4.6.2.1 Assessing fidelity of delivery of, and/or engagement with dementia interventions

The average fidelity of delivery of intervention components, rated using audio-recorded data, ranged from 54.9%-69% for PRIDE and 52.4%-75.5% for COTiD-UK. This shows that complex interventions for people with dementia, like other behavioural interventions, are not fully delivered as planned (Bond et al., 2009; Lorencatto et al., 2013a; Lorencatto et al., 2014; Toomey et al., 2015). Although these findings suggest that some content was not delivered and that delivery varied across sites and providers, the intervention sessions overall were delivered with moderate fidelity.

Previous research measured fidelity of delivery based on BCTs (Lorencatto et al., 2013a). In the PRIDE study BCTs were only used to identify intervention content to inform the development of the checklist of intervention components. However, to ensure that checklists were easy to complete for DAWs and people with dementia in PRIDE and to ensure that non BCT-specific components (e.g. using open questions) were measured in COTiD-UK, BCTs were not used to assess fidelity in either intervention.

In both interventions, providers were trained to be aware of the importance of delivering the intervention according to protocol prior to delivering the intervention. For example, COTiD-UK OTs had to meet a required standard, determined by the trainer, before delivering the intervention. Despite this, fidelity varied across sessions, sites and providers (Durlak, 1998; Lorencatto et al., 2014; Moncher & Prinz, 1991). For PRIDE, researcher-rated fidelity for Session one was much higher than for Sessions two and three. Levels of fidelity for the COTiD-UK Consultation and advice session were lower than for other COTiD-UK sessions. In these instances, the structure of sessions could have influenced how feasible the session was to deliver with fidelity. For example, in PRIDE, Session one largely followed the structure of the manual whereas Session two and three focused more on reviewing progress and identifying new plans and topics. For COTiD-UK, an explanation for differences in fidelity across sessions could lie in the provision of material aids for OTs in some sessions. For example, OTs were given example questions for OPHI and Ethnographic interviews and were asked to fill in a goal-setting form for the Summaries and Goal-setting sessions. These materials may have prompted the delivery of some components, thus increasing fidelity.

The finding that fidelity varied across providers (DAWs and OTs) in both interventions supports previous research which highlights the impact of the wider organisational environment on the delivery of interventions (Damschroder et al., 2009; Kitwood, 1997b; Mahoney et al., 2006). For example, in PRIDE, DAWs consisted of memory nurses, researchers and DAWs. Therefore, differences in delivery could be the direct result of different backgrounds and different skills. For COTiD-UK, all providers were OTs and therefore it is likely that all providers had shared experience of OT training. However, for both interventions, DAWs and OTs may have differed in years of experience, with could have also contributed towards the differences in fidelity. Furthermore, delivery of both interventions took place over many different NHS sites, and so differences in delivery may have been a result of different work environments and different types of support. For example, some DAWs and OTs may have had peers delivering the intervention alongside them, whereas other providers may have been delivering the intervention with little peer support. DAWs in PRIDE were not provided with standard supervision. All OTs within COTiD-UK were offered supervision, however supervision models differed between peer, group and individual supervision which could have influenced the fidelity of delivery and contributed towards the observed differences.

The differences in fidelity between sessions, sites and providers highlight the complexity of tailoring interventions and sessions to perceived individual needs whilst trying to deliver the intervention as planned. In both interventions, sessions which involved more tailoring towards the needs of the person with dementia and his/her supporter were more difficult to deliver as planned. For example: in both interventions, the sessions that were delivered with the lowest fidelity (PRIDE Sessions two and three and the delivery of tailored topics and components, COTiD-UK Consultation and advice) were based around the dyad’s experiences of carrying out activities since the previous session and problem solving skills.

There was good receipt and enactment of the PRIDE intervention. This knowledge highlights that high levels of engagement can be achieved in dementia intervention research, despite symptoms of cognitive impairment associated with a dementia diagnosis. This refutes findings which suggests that older adults may find it difficult to engage with information given by healthcare professionals in health appointments (Ong et al., 1995; Safeer & Keenan, 2005; Williams et al., 2002).

4.6.2.2 Quality of measures

The findings of this study are consistent with previous research indicating that it is difficult to achieve good inter-rater agreement when measuring fidelity (Harting et al., 2004; Thyrian et al., 2010). To achieve good inter-rater agreement, clear definitions of components were provided to make guidelines easier to use and limit subjectivity in responses, as recommended by previous research (French et al., 2015; Hardeman et al., 2008; Harting et al., 2004; Keith et al., 2010; Lorencatto et al., 2014). The results of these studies highlight the need to monitor inter-rater agreement throughout the fidelity assessment to identify coding drift, as there were instances where it dropped below the required threshold in both interventions. This monitoring was found to be feasible.

The PRIDE study measured fidelity from three different perspectives. Self-reported data were consistently higher than researcher ratings in the PRIDE study and there was some variation in delivery for both interventions across sites and providers (Durlak, 1998; Moncher & Prinz, 1991; Ward et al., 2013). This is consistent with previous findings which suggest that providers' self-reported fidelity is higher than ratings from observational measures (Hansen et al., 1991; Lillehoj et al., 2004; Moncher & Prinz, 1991; Toomey et al., 2017; Ward et al., 2013). Previous research suggests that social desirability and lack of memory may explain some differences in fidelity measurements across different audiences (Schinckus et al., 2014). In the PRIDE study, differences in researcher ratings, DAW ratings and participant ratings may have occurred due to differences in measurement tools. For example: researchers had thorough coding guidelines to base their decisions on (to enhance inter-rater agreement), whereas DAWs and dyads only received instructions on how to complete the checklists.

The results from the COTiD-UK intervention found that fidelity for COTiD-UK was lower than COTiD in Germany; the former was based on audio-recorded data, and the latter was based on provider self-report (Voigt-Radloff et al., 2011a). The use of different methods may explain differences in fidelity, as self-report may lead to biases such as social desirability or difficulties remembering what was delivered (Schinckus et al., 2014). The checklists used to measure fidelity in this study were different than those used in Germany: In COTiD-UK, more specific components were assessed, operationalised as specific activities that OTs could deliver. For example, in this study, OPHI was a key session which contained 16 components (e.g. open questions, use of visual objects). In Germany, 'interviewing the person with OPHI' was included as one component (Voigt-Radloff et al., 2011b). Without using the same reliable measures across intervention contexts, it is difficult to compare whether interventions were delivered in the same way and whether differences in delivery explain possible differences in intervention effects.

4.6.3 Limitations

4.6.3.1 Both interventions

For both interventions, fidelity may have been underestimated in some instances, as ‘not applicable’ codes were scored as ‘not done’. This decision would particularly affect those sessions where ‘not applicable’ responses were high, including the COTiD-UK Introduction Session (n= 22), OPHI (n= 32) and Ethnographic interview (n= 24). There were many ‘not applicable’ responses for the Introduction session as many Introduction sessions were delivered at the same time as the OPHI; thus, rendering components about the next visit ‘not applicable’. Furthermore, there were many ‘not applicable’ responses for the interviews, as ‘assessing the home environment’ was included on all three checklists. Therefore, it is likely that the fidelity of these sessions may be underestimated.

Fidelity of delivery and engagement were analysed using descriptive statistics. This is consistent with most studies which measure fidelity of delivery of, and engagement with, complex face-to-face health behaviour change interventions (see Chapter 2; Walton et al., 2017). Descriptive statistics were appropriate for these studies, as they allowed for exploratory analyses of the extent to which interventions were delivered as planned and engaged with.

4.6.3.2 PRIDE

For PRIDE, there were some challenges identified in relation to collecting data. These difficulties included technical failures and difficulties uploading the data to the encrypted system. Some providers only recorded part of the session, which made it difficult to identify what was delivered in other aspects of the session. Additionally, some components were difficult to code, as sessions were not observed visually (e.g. the completion of forms). Video-recording would have helped to overcome this limitation, but would have been more intrusive than audio-recording for people with dementia and DAWs (Breitenstein et al., 2010a).

In this study, people with dementia were asked to complete the fidelity checklists. However, it is not known whether the person with dementia completed the checklists, or if these were instead completed by the supporter or with help from the DAW. Therefore, it is likely that the ‘participant your experience’ checklists may have been completed by some people with dementia and some supporters.

4.6.3.3 COTiD-UK

Fidelity may have been underestimated in some instances, since some aspects of COTiD-UK were not captured using audio-recording. These included: components of COTiD-UK delivered outside of the home, telephone calls, interactions which occurred after the session had finished and non-verbal interactions. For example: some OTs may have delivered Introduction components by telephone when setting up the appointment; or prior to turning the audio-recorder on; with the latter situation usually influenced by needing to establish rapport and confirm consent.

Whilst data on the type of usual care that participants received were measured in the usual care group in COTiD-UK, fidelity of COTiD-UK specific components was not measured in the control condition. Therefore, it is not known exactly what components the participants in the control groups received. This undermines the ability to draw conclusions about intervention effects (Borrelli, 2011; de Bruin, Viechtbauer, Hospers, Schaalma & Kok, 2009; de Bruin et al., 2010).

Another unknown is the extent to which dyads engaged with the intervention (understanding and use of skills); thus, differential engagement cannot be ruled out as a possible factor which may influence COTiD-UK effects.

4.6.4 Implications

4.6.4.1 Research

The studies outlined in this Chapter extend previous research by developing a systematic method of measuring fidelity in a reliable way. For PRIDE, response rates for audio-recording, for DAW self-report and for participant self-report were high, indicating that the checklists for this study can be used by DAWs and people with dementia to measure fidelity and engagement. These checklists could be used in future versions of PRIDE and COTiD-UK across varying settings and cultures to determine whether fidelity differs across trials. This would ensure that future interventions measure fidelity in a consistent way and facilitate comparison and replication of intervention evaluations across studies, as fidelity of delivery can be compared. The findings from this study highlight the importance of measuring fidelity and engagement in future complex interventions for people with dementia.

4.6.4.2 Practice

PRIDE and COTiD-UK were delivered with moderate fidelity. This knowledge can inform efforts to implement these interventions on a wider scale to support people living with dementia and contributes to our understanding of the effectiveness of PRIDE and COTiD-UK. As these interventions were delivered with moderate fidelity, and PRIDE was engaged with, it is likely that intervention effects reflect the planned intervention. For researchers and policymakers, findings can therefore provide useful knowledge to inform decisions about whether and how PRIDE and COTiD-UK should be implemented on a wider scale.

Individual components that were delivered frequently, along with those that were delivered infrequently were identified. This knowledge can be used to highlight areas in which DAWs and OTs may require further training to maximise fidelity of complex interventions for people with dementia. Further training may need to focus on components that were delivered infrequently. For PRIDE, further training could focus on: tailoring PRIDE towards the chosen topic (e.g. providing relevant resources and discussing these in relation to the participant) and problem solving, components that were infrequently delivered across the PRIDE sessions (see Section 4.3.3 and Appendices 4-1 - 4-3). For COTiD-UK, further training could focus on adapting activities and providing information about environmental barriers (see Section 4.5.3 and Appendix 4-7).

Fidelity of delivery of both interventions differed across providers and sites. This highlights that different training and support may be needed for different providers and sites to account for both individual and environmental factors. For example, differences in delivery for PRIDE may have been due to different skills, backgrounds and organisational support (Kitwood, 1997b) as PRIDE was delivered by researchers, DAWs and memory nurses; each of whom may have different skills and backgrounds. On the other hand, the COTiD-UK intervention was only delivered by OTs, yet delivery still varied across providers and sites. This may indicate the importance of the environment and organisational support for influencing delivery of the COTiD-UK intervention (Kitwood, 1997b. This finding also highlights the variability of delivery when all providers have the same occupation. One alternative explanation may be the length of time that participants had been OTs, DAWs, memory nurses and researchers, which was not measured in these studies. Therefore, it is possible that their amount of experience could have influenced fidelity of delivery. One practical implication of these findings is that training should be developed to take different job roles, varying levels of support and levels of experience into account. For example, a provider with less experience may require more practice during training than a provider who has vast experience delivering similar interventions previously. These findings also highlight the need to ensure that skills are assessed prior to delivering an intervention (as was done within the COTiD-UK intervention using training dyads).

4.6.5 Future research

As the PRIDE intervention is currently in the feasibility trial stage with a view to evaluation in an RCT, it is necessary to understand which factors influenced delivery and engagement, so that recommendations can be developed to improve fidelity and engagement. The next stage of this PhD research qualitatively explores the barriers and facilitators to delivery of, and engagement with the PRIDE intervention (described in Chapter 5).

Larger studies adequately powered for testing hypotheses about whether delivery differs across sites and providers and whether varying levels of fidelity influence intervention effectiveness are now required. This could be done using multilevel modelling with four levels: individual sessions, participants, providers and sites (Heck, Thomas & Tabata, 2014).

Fidelity and engagement were compared across sites, sessions and providers. However, providers' gender, age or experience was not accounted for. These demographic characteristics could explain some of the differences in fidelity across providers. Further research could measure and evaluate whether providers' demographic characteristics influence the extent to which providers deliver an intervention with fidelity.

4.7 Conclusion

For both interventions, ratings of transcripts from audio-recorded data indicated that fidelity of delivery of planned content was moderate. For PRIDE, there was a discrepancy between ratings of transcripts from audio-recordings and self-report data. DAW and participant self-report data indicated that fidelity of delivery was high. There were differences in fidelity across sites, sessions and providers. For PRIDE, participants engaged with the intervention. Whilst the effectiveness of PRIDE and COTiD-UK are not yet known, there can be a reasonable degree of confidence that any intervention effects were likely to be the result of the planned interventions.

Chapter 5 Identifying barriers and facilitators to fidelity of delivery of, and engagement with the PRIDE intervention

5.1 Introduction

Interventions are often not delivered or engaged with as planned (see Chapter 1, Section 1.3.1.2). For both the PRIDE and COTiD-UK interventions, ratings of transcripts from audio-recorded data indicated that fidelity of delivery of planned content was moderate (see Chapter 4, Sections 4.3 and 4.5). For PRIDE, there was a discrepancy between ratings of transcripts from audio-recordings and self-report data. Audio-recorded ratings indicated moderate fidelity of delivery, whereas DAW and participant self-report data indicated high fidelity of delivery. Fidelity of delivery varied across sites, sessions and participants (see Chapter 4, Section 4.3). Participant self-report suggested that engagement with PRIDE was high (see Chapter 4, Section 4.3).

Fidelity of delivery and engagement are complex behaviours which have many underlying mechanisms. Behaviour change is complicated (Michie et al., 2014) and behaviours take place within complex systems (Dahlgren & Whitehead, 1991). Environmental, organisational, and individual characteristics may influence fidelity of delivery of, and engagement with interventions for people with dementia (see Chapter 1, Section 1.4). Examples are, respectively, allocation of governmental funding, an organisation's availability of resources for delivering an intervention as planned, and cognitive impairments, which may make it more difficult for people with dementia to understand and enact the skills learnt in an intervention (Dugmore et al., 2015). Most interventions for people with dementia are complex in nature, which may be more challenging to implement as many different components must be delivered, understood and used.

PRIDE is currently in the feasibility stage of intervention evaluation. To maximise fidelity of delivery and engagement, and hence reduce bias in the RCT, it is important to find out what factors facilitated and hindered delivering and engaging with the intervention. Qualitative methods, such as conducting semi-structured interviews with intervention DAWs, people with dementia and their supporters, allow in-depth explorations of factors influencing fidelity of delivery and engagement. These factors can be systematically identified using the COM-B model (see Chapter 1, Section 1.5.3; Michie et al., 2011a; Michie et al., 2014), to identify aspects of capability, opportunity and motivation that facilitate or hinder delivering and engaging with an intervention as planned.

This study aimed to identify factors that influence fidelity of delivery of, and engagement with, the PRIDE intervention. Data were collected on: 1) DAWs' perspectives on the barriers to, and facilitators for, delivering the intervention with fidelity, and 2) the perspectives of people with dementia and their supporters on barriers to, and facilitators for, engaging with the intervention.

The research questions were:

1. What factors influenced fidelity of delivery of, and engagement with, the PRIDE intervention?
2. How did DAWs, people with dementia and supporters experience the intervention?

5.2 Methods

5.2.1 Design

One-to-one semi-structured interviews were conducted with DAWs, people with dementia and supporters between March 2017 and January 2018 by HW.

5.2.2 Ethics

The PRIDE programme of research has received Health Research Authority approval and NHS ethical approval as part of the feasibility trials intervention ethics application to NHS East Midlands – Nottingham 1 Research Ethics committee (reference number: 16/EM/0044). To provide anonymity, codes were assigned to each participant, for example: DAW 1, P1 (Person with dementia 1) and S1 (Supporter 1).

5.2.3 Participants

To ensure that DAWs and dyads were recruited from all four sites, purposive opportunity sampling was used. Those who took part in the PRIDE intervention (either as a provider or a recipient of the intervention) were invited. All eight DAWs, who were contacted by phone or email, agreed to participate. Ten participants and 10 supporters were contacted by telephone and invited to the interview. Three participants and supporters declined, or were not available for telephone contact. In total, eight DAWs, seven people with dementia and seven supporters were recruited. To participate in the intervention, people with dementia needed to be in the mild stages of dementia, and therefore they could consent to the interviews. It was intended that two DAWs and two dyads per site would be recruited. However, if sites did not have two DAWs who were interested in taking part, additional DAWs from other sites were invited.

When dyads of people with dementia and supporters expressed an interest in participating, both members of the dyad were given the opportunity to be interviewed. To ensure that both the person with dementia and supporter had the opportunity to independently speak about their experiences, people with dementia and supporters were interviewed separately. The complete dyad was present for three interviews with people with dementia and four interviews with supporters.

Table 5-1 shows the demographic characteristics of DAWs.

Table 5-1. Demographic characteristics of DAWs

Demographic characteristics	**Number of DAWs (total N=8)**
Gender	
Female	7
Male	1
Experience in years, Mean, SD (range)	9.7, 12.0 (1.5-37)
Job roles	
Dementia advisor	4
Memory nurse	3
Researcher	1
Sites	
Site A	3
Site B	1
Site C	1
Site D	3

Note: As with Chapter 4, To ensure site anonymity, site numbers have been shuffled up so that sites 1-4 do not directly correspond to letters A-D

Table 5-2 shows the demographic characteristics of people with dementia and supporters.

Table 5-2. Demographic characteristics of people with dementia and supporters

Demographic characteristics	**Number of people with dementia (total N=7)**	**Number of supporters (total N=7)**
Gender		
Female	2	5
Male	5	2
Age, Mean, SD (range)	79.6, 3.2 (74-82)*	71.7, 15.4 (39-84)
Dyad type		
Spousal	6	
Parent-child	1	
Sites		
Site A	2	2
Site B	1	1
Site C	2	2
Site D	2	2

Note:

*Missing: n=2

As with Chapter 4, To ensure site anonymity, site numbers have been shuffled up so that sites 1-4 do not directly correspond to letters A-D

5.2.4 Interview schedules

Two semi-structured interview guides, informed by the COM-B model (see Chapter 1, Section 1.5.3 for more information; Michie et al., 2011a) and TDF (see Chapter 1, Section 1.5.3 for more information; Cane et al., 2012) were developed. To ensure that the interview schedules were comprehensive and included many facets of behaviour, the TDF, which provides a more in-depth framework of capability, opportunity and motivation, was also used.

The interview schedule for DAWs was developed to explore the factors that they felt facilitated or hindered them from delivering the intervention as intended, and their experiences of delivering the intervention (Appendix 5-1). A separate interview schedule was developed for people with dementia and supporters to explore their experiences of receiving the intervention, and the things that facilitated and hindered them from understanding and practicing the skills and putting their plans into action. (Appendix 5-2).

Open-ended interview questions were developed that were mapped onto COM-B and TDF domains about barriers to, and facilitators for, delivery and engagement and the experiences of delivering or receiving the intervention (see Appendix 5-1 and 5-2). The PRIDE team and academic supervisors were asked to offer feedback on the wording of the interview schedules. Interview schedules were iteratively reviewed throughout data collection.

5.2.5 Data collection

DAWs were invited to participate in the interview after their final intervention session with their last dyad. People with dementia and their supporters were invited to the study by the PRIDE researcher during the follow-up intervention session. If they agreed to be contacted, HW contacted them by telephone to provide more details about the study and arrange a date for the interviews. Interviews were arranged at a location convenient to participants (e.g. dyads' homes or DAW's place of work).

Interviews aimed to take place between one and two weeks after the dyad had received their final session, or as soon as possible after the DAW finished delivering their last session. This was to ensure that people with dementia, supporters and DAWs were still familiar with the intervention at the time of the interview. In practice, this was not always possible due to the timing of the follow-up visits.

Written informed consent, which included consent for audio-recording the interview, was sought at the beginning of the interview. Participants were informed that their data would be kept confidential, fully anonymised and that they could withdraw at any time. All participants were provided with a copy of their signed consent form for their records. In situations where the person with dementia had writing difficulties, HW or the supporter provided support completing the consent form (e.g. writing the participant's full name), and the person with dementia provided their own signature. Although all participants were in the mild stages of dementia and could consent to the interview, supporters also provided secondary consent for the person with dementia, as requested by the ethics committee.

Data on demographic characteristics were not collected unless volunteered during the interviews in response to prompting (e.g. 'please tell me about yourself'). Age of the person with dementia and supporter and the years of experience of DAWs were prompted and recorded during the interviews. This is consistent with qualitative studies of people with dementia where they only collected information on age and type of dementia if the information was shared during the interviews (Stevenson, Savage & Taylor, 2017).

Twenty-two interviews, lasting between 12 to 93 minutes were conducted by HW and all interviews were audio recorded. The following materials were used to prompt the discussion: 1) PRIDE intervention manual (their personal copy, if it was available, as this had more information regarding their engagement), 2) intervention sheets and 3) fidelity checklists. After the interview, participants were thanked for their participation, asked if they had any questions, debriefed and reminded that they were free to withdraw at any time. The audio-recordings were transcribed verbatim by a professional transcription company, before being checked for accuracy and fully anonymised (names and places).

5.2.6 Data analysis

To analyse the interview data, inductive thematic analysis was used. Deductive content analysis was also used to identify which COM-B domains frequently facilitated or hindered delivery and engagement.

5.2.6.1 Thematic analysis

In this study, thematic analysis was used to identify and describe themes in the data (Braun & Clarke, 2006; Pistrang & Barker, 2012; Joffe, 2012) regarding barriers to, and facilitators for, fidelity of delivery and engagement. The thematic analysis approach in this study used inductive thematic analysis (as proposed by Braun & Clarke, 2006) with elements of deductive thematic analysis (e.g. the use of a coding frame) (Joffe, 2012). This approach would fit within a ‘medium Q thematic analysis approach’ (Clarke & Braun, 2018). The methods of thematic analysis were facilitated by the iterative categorisation method (Neale, 2016). Iterative categorisation is compatible with thematic analysis approaches and is a systematic, rigorous and transparent technique for sorting data (Neale, 2016). The iterative categorisation method assumes that studies and interview schedules have clear aims and objectives, and takes a pragmatic approach to data analysis (Neale, 2016).

Formal reliability assessments were not carried out, as previous research has suggested that reliability assessments may not be appropriate for qualitative methods (Braun & Clarke, 2006; Braun & Clarke, 2014), as they may restrict the flexibility of coding approaches and the identification of new findings (Cook, 2011). Instead, to enhance trustworthiness of data analysis, and to refine the interpretation of analysis, a second researcher was involved in applying the coding frame and peer reviewing the coding and summaries (Barbour, 2001; Golafshani, 2003; Guest, MacQueen & Namey, 2012; Krefting, 1991).

Braun and Clarke (2006) proposed six stages of thematic analysis: 1) familiarising with data, 2) generating initial codes, 3) identifying themes, 4) reviewing themes, 5) defining and labelling themes, and 6) interpreting the findings. To become familiar with the data, transcripts were read and re-read. To generate initial codes, line-by-line coding was conducted for half of the data (four DAW interviews, four participant interviews and four supporter interviews). From this inductive coding, initial coding frameworks were developed (one for delivery, one for engagement: see Appendix 5-3 and 5-4) by condensing the codes into groups and identifying similarities across transcripts (Joffe, 2012). The coding frames were independently applied to three transcripts (one DAW interview, one participant interview and one supporter interview) by HW and an independent researcher (JB) using Microsoft Word. Findings were compared and differences were discussed and resolved. Minor changes were made to the coding framework including: adding a ‘training recommendation’ code and amending the definition of one code. All remaining transcripts were coded by HW, and the transcripts were then uploaded to NVivo 11. All transcripts (n=22) were coded using the final coding framework.

Stages of thematic analysis were followed by identifying themes, reviewing themes and defining and labelling themes (Braun & Clarke, 2006). This was facilitated by following the iterative categorisation method (Neale, 2016): the quotes for each code were imported into a ‘coding file’, a duplicate ‘analysis file’ was created and topics and themes were summarised on a line-to-line basis. These summaries were then reviewed, and regrouped according to their frequency. From this, the summaries were categorised into higher order themes and the extent to which they applied to data and participants were reviewed.

A table of themes, sub-themes and example quotes for fidelity of delivery and engagement were created. Themes and example quotes were reviewed by a second researcher (JB) and discussed with members of the research team.

5.2.6.2 Content analysis

Content analysis was used to deductively identify barriers to, and facilitators for, fidelity of delivery and engagement. In content analysis, data are categorised according to pre-defined categories (Pistrang & Barker, 2012), which in this study, included domains of capability (psychological or physical), opportunity (physical or social) and motivation (automatic or reflective) (Michie et al., 2011a).

All quotes identified from the thematic analysis were extracted into an excel spreadsheet and duplicate quotes were removed. To ensure that coding was consistent, all extracts were coded by HW and an independent researcher (AR) by domains of capability, opportunity and motivation and by barriers to, or facilitators for, fidelity of delivery and engagement. Discrepancies between coders were resolved through discussion. Any quotes that did not fit into any of these domains were coded as 'none'. More than one domain could be coded for each quote. It was recorded how frequently each domain was identified.

5.3 Findings

5.3.1 Barriers to, and facilitators for, fidelity of delivery of the PRIDE intervention

5.3.1.2 Thematic analysis

Four overarching themes were identified as potentially important to influence fidelity of delivery of the PRIDE intervention: I) Providers' knowledge about how to deliver PRIDE, II) Providers' personal attributes, III) Adaptation of PRIDE in relation to participants' needs, and IV) Logistical considerations. Figure 5-1 provides an overview of overarching themes and related themes. Further details of each theme, including relevant sub-themes, are described below.

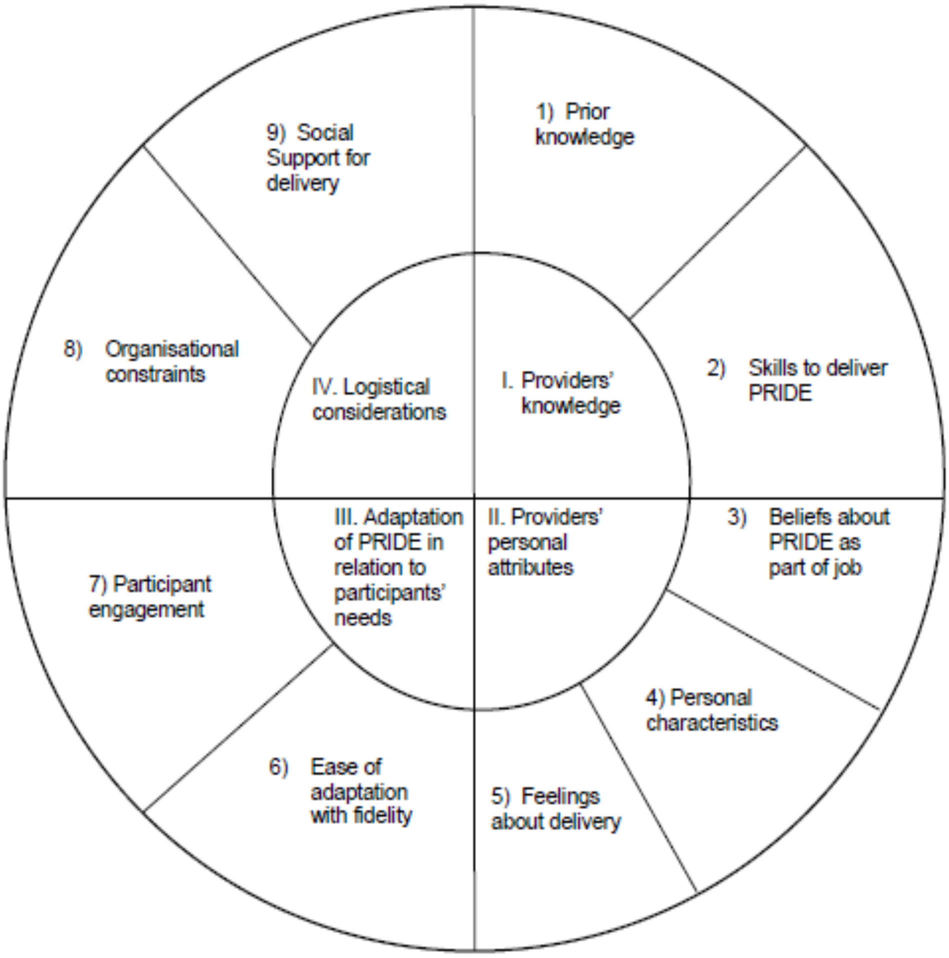


Figure 5-1. Thematic map of overarching themes and sub-themes for fidelity of delivery

I. Providers' knowledge

1) Prior knowledge

Previous qualifications and/or experience of working with people with dementia were perceived to help DAWs deliver PRIDE with fidelity as it increased their confidence and ability to tailor the intervention to their participants. DAWs mentioned that they would like to refresh their knowledge and learn more about dementia.

> *"Well I can't really say for the others but we're all really experienced […] A bit more confident and thinking I can do this." (DAW 3, Site A)*

DAWs reported that their prior knowledge of the individual participants or local environment helped them deliver PRIDE as planned. For example, having knowledge about the activities offered in the local borough and using strategies and systems to deliver PRIDE that they used in their job was perceived to facilitate delivery.

> *"I guess what helps as well, is just working in the same borough […]. If I had worked, I don't know, somewhere completely different I would have had to do quite a lot of research in advance because I would've been very lost […]. Yes, because I know how the system works and social services […] so that's quite helpful." (DAW 6, Site D)*

2) Skills to deliver PRIDE

Whilst DAWs understood how to complete forms, they did not always have the skills to deliver PRIDE or use the manual. This hindered DAWs from delivering the intervention with fidelity. DAWs reported that further training was necessary on the practical elements of delivery, such as how to deliver PRIDE using the manual, deliver key information and adapt this to participants. DAWs suggested that key bullet points or a step-by-step delivery guide would improve fidelity of delivery.

> *"I think from the training point of view […] I came away thinking I can fill those forms in now but I can't deliver that. So it may need to be more about the delivery, the actual how you want it delivering, the key points, and this is so much information and maybe it would be useful for like bullet points, key points, to be pulled out a bit." (DAW 2, Site A)*

DAWs discussed that familiarisation with the manual and practice gave them confidence to deliver PRIDE, with delivery becoming easier over time. Those who delivered the intervention to only one dyad expressed that they would have needed more opportunities to practice how to deliver components of PRIDE.

> *"I felt relatively confident with [delivering PRIDE]. I suppose the more that you do the more you get familiar with it […] I guess that if you're doing several, or you're doing it, you know, over a longer period of time then you get more familiar with it and more confident with it. No, I felt I did okay." (DAW 7, Site D)*

II. Providers' personal attributes

3) Beliefs about PRIDE as part of job

Perceived differences between PRIDE and their job roles made it harder for DAWs to deliver the intervention as planned. These difficulties included: PRIDE not being in their remit, DAWs not being used to following a manual or DAWs not being trained as thoroughly for PRIDE as they were in their job role. On the other hand, similarities between PRIDE and job roles (e.g. delivering similar content, or dealing with similar issues) made intervention delivery easier for DAWs.

> *"It's something that we are actually doing. We do encourage people to do things that they maybe didn't do before and to look at what they enjoy doing or they used to enjoy previously and try and engage with that so once you realise that it makes it a lot less daunting." (DAW 1, Site A)*

When job related issues or queries arose as competing priorities within PRIDE sessions, delivering PRIDE as planned was perceived to be more difficult.

> *"It might sort of help. In some ways I don't think it needed to be a nurse […] I think we got bogged down with so many other things." (DAW 3, Site A)*

4) Personal characteristics

Aspects of personal characteristics were reported to influence fidelity of delivery. These included feeling conscious about delivering the intervention as planned, wanting to stay longer with participants to ensure that both members of the dyad were supported, and difficulties engaging with training because of different learning styles.

> *"I think that's just my personality. Because I kind of felt if I don't do it that way then I'm going to miss something and I was a little bit conscious of the checklist that we had to do afterwards, thinking I want a tick in every one of the boxes. Again that's my personality." (DAW 1, Site A)*

DAWs' personal views on benefits for both themselves and the participants influenced delivery. Whilst all DAWs felt that delivering PRIDE was beneficial for them, these benefits varied individually. Personal benefits included enjoying spending time with people with dementia, wanting to learn more, gaining new experience and delivering PRIDE due to personal interest. DAWs were interested and motivated to deliver PRIDE as planned.

> *"Yes, I think it's absolutely wonderful. I find it really interesting […] it's interesting to see what everyone does, and what you want from it as well […] obviously you look at it from a different direction to how I've always worked […] and I'm up for listening and learning as well." (DAW 4, Site D)*

DAWs reported what they perceived as benefits for people with dementia and their supporters. These mainly related to participants' independence. PRIDE was perceived as having the potential to change post diagnostic support and give people with dementia tangible goals.

> *"I think the basis of it all is really good. I think it's something that it helps […] because even for us going in sometimes when we go and see people and you do feel a little bit useless […] you're leaving them with hope but you're not leaving them with anything that's tangible. And with this you are; you're leaving them with a plan […] a plan that can be reviewed […] it will grow." (DAW 2, Site A)*

5) Feelings about delivery

DAWs' feelings influenced the delivery of PRIDE. They reported that they were sometimes anxious about trying to deliver PRIDE as planned, using the manual and being judged by participants for not knowing everything. There was no consensus about feelings towards fidelity checklists and audio-recordings. DAWs reported that fidelity checklists were useful and that audio-recording was not anxiety provoking. Others expressed that the anxiety about delivering PRIDE as planned were exacerbated by the sessions being audio-recorded and the need to complete fidelity checklists after the session.

> *"I was quite nervous because of the recording, I was quite nervous just in case I was missing something that was important. I think after the first session I felt a bit better. Like okay, we've actually set a goal, we've done all this, I think I talk about herself, what she likes, so that's fine." (DAW 6, Site D)*

DAWs' perceived self-confidence facilitated the delivery of PRIDE. Age, work-related experience and experience with delivering PRIDE were important factors that boosted DAWs' confidence and therefore improved fidelity of delivery.

> *"Well I suppose experience and having maybe a bit more confidence as I've got older to not be too worried […] I think because we're all experienced, maybe a bit older, but somehow we sort of overcame those barriers." (DAW 3, Site A)*

III. Adaptation of PRIDE in relation to participants' needs

6) Ease of adaptation with fidelity

DAWs reported that there was conflict between trying to deliver PRIDE as planned and delivering PRIDE in the best way for individual participants. DAWs mentioned that they tried to deliver PRIDE as planned, but it was difficult. Therefore, they delivered the intervention flexibly, in whichever way was best for the participants, which may have influenced fidelity. They thought that the manual could not always be followed when working with people with dementia and that this was used differently with different participants and situations, such as with participants who did not engage with the intervention. DAWs suggested that PRIDE may be better and more feasible to deliver if it was delivered as a framework rather than exactly as specified in the manual.

> *"It was trying […] and thinking right, there is no right and then there is no wrong […] it's about people's choice, what is stated in a manual, when you're working with dementia, cannot always be followed […] So, we can only deliver it how we feel is best for that person when we arrive […] That's my opinion anyway." (DAW 4, Site D)*

This adaptation also applied to the delivery of case studies. For example, DAWs emphasised that it was important to ensure that a case study was relevant to a participant before speaking about it. This was to avoid upsetting participants due to the sensitivity or (lack of) relevance of the case study.

> *"Case studies worked really well with some people in some circumstances and other topics. But you just had to make sure before you went through one that it was actually relevant […] if they're talking about […]. Their supporter taking charge and you're like, wait, actually, they didn't mention this, but this could be a touchy subject." (DAW 5, Site C)*

DAWs reported that delivering PRIDE with strict fidelity felt restricting and they discussed that they were more comfortable delivering PRIDE using their own style.

> *"As I said, the first couple felt a little bit forced […] they were good sessions as well. They both really engaged, but they did feel a little bit kind of, right, so this topic's next and we're going to talk about this […]. They didn't flow and they didn't […] it was more difficult to engage people in a conversation and discussion." (DAW 5, Site C)*

Whilst having experience helped DAWs to deliver PRIDE, this may also have hindered the delivery of PRIDE as planned in the manual. Having more experience with delivering PRIDE was perceived to facilitate the adaptation of PRIDE in relation to participants' needs. DAWs mentioned that initially they delivered the intervention with strict fidelity but they then became less reliant on the manual and delivered PRIDE flexibly. For example, DAWs' reported that they initially stuck to the delivery of the manual, but once they became more familiar delivering PRIDE, they were more comfortable delivering PRIDE in a looser style. On the other hand, those who followed the manual strictly reported that they saw it as useful resource and it made them feel comfortable with delivering the intervention.

> *"The first couple of sessions […] I felt very stuck to the manual […] whereas actually, as I got more confident with it, it was much more that, you know, this is a resource that you've got to keep and refer back to […] we're just going to have an open discussion about what you want to get in general, rather than sticking strictly to the rules." (DAW 5, Site C)*

7) Participant engagement

DAWs reported that being able to deliver the intervention as planned depended on participants' understanding, motivation and engagement. The dyads' physical health, the dyads' anxieties about taking part in activities and wanting to 'do it right', the person with dementia's verbal and written communication skills and the resources available to the dyad to engage in the intervention and their activities (e.g. losing the manual or not having time to look through the manual) were perceived by DAWs to influence participants' engagement.

> *"Well my service users did [help delivery] because they were quite keen. They definitely helped with the momentum without having to try and give*

> *too much encouragement and go and see them and things had happened […] So that helped." (DAW 1, Site A)*

There was a lack of consensus among DAWs regarding the appropriateness of PRIDE for people with different stages of dementia. PRIDE was perceived as suitable to those with a diagnosis of mild dementia if the characteristics of dementia (e.g. level of cognitive impairment) were considered when delivering the intervention. In relation to characteristics of dementia, PRIDE was seen as more difficult to deliver if participants did not know about their diagnosis and if supporters were not present at sessions.

> *"It's very difficult. You have to be really sure, number one that they're not as impaired as you think because it just makes it too difficult and they feel pressurised and I think it's very difficult if there's no support about. Because who's going to help them to do it?" (DAW 3, Site A)*

IV. Logistical considerations

8) Organisational constraints

DAWs reported that PRIDE mostly fit well around their work commitments. A supportive work environment, flexibility to manage their own diaries, and the allocation of appropriate time for each dyad were seen as facilitators for intervention delivery. Barriers included lack of time to prepare for sessions and travel to dyads, and difficulties scheduling the three sessions into DAWs' and dyads' diaries at the right time of each month.

> *"I mean it's something I'd like to do but, like I said, it's quite difficult when you've got other job commitments. I found it a lot easier once I started working part time […] when I was with the [Organisation 1] it was full time*

> *plus extra hours […] So I'd be working till half four then going to do an intervention, getting home at half six seven with the traffic. That was really draining. My new job, because I was working part time there was a lot more flexibility. And even just delivering intervention during the day like the traffic made a massive difference." (DAW 8, Site B)*

9) Social support for delivery

Support from a variety of people was perceived to be helpful to deliver PRIDE as planned, including the PRIDE research team, the site researchers and other DAWs. Peer support from other DAWs was particularly important to share experiences, gain knowledge about how to deliver PRIDE and reduce anxiety about delivery. Nevertheless, more support from researchers or peers would have been sometimes desired, such as technical support with Dictaphones.

> *"We've used each other's experience of, you know, what's worked and what hasn't. […] I think to begin with, because [Name of DAW] was the first one who did it, we were all like listening to how she'd delivered it and that was really useful and helpful. So I think between us we've sort of taken little bits of each other's experience." (DAW 2, Site A)*

There was no consensus regarding what role supporters should have. DAWs felt that supporters facilitated delivery (e.g. providing practical support for engaging in activities). Others reported that sometimes supporters were involved too much (e.g. telling their story in the session which took time away from the delivery of PRIDE) or too little (e.g. not being there during the sessions made it hard to make progress throughout the intervention), which made it difficult to deliver PRIDE. DAWs suggested that the presence of a supporter should be optional depending on participants' individual needs.

> *“Occasionally the supporter is really good because they help focus the person with dementia. Sometimes I found them a distraction and they actually make the sessions a lot longer than need be. They’re great in between the sessions because they’re the ones who are doing the monitoring and the encouraging.” (DAW 8, Site B)*

5.3.1.3 Content analysis

Four hundred and sixty-five quotes were included in the content analysis. The frequencies of occurrence of COM-B domains were as follows: social opportunity (n=214), physical opportunity (n=188), psychological capability (n=139), reflective motivation (n=119), automatic motivation (n=74) and physical capability (n=1). Forty-five quotes had no COM-B domains. Table 5-3 highlights the occurrence of COM-B domains and the frequency of barriers and/or facilitators for each domain for fidelity of delivery, as identified in the content analysis.

For each sub-theme, many COM-B domains were identified as barriers to, and facilitators for, fidelity of delivery. For example, for the sub-theme ‘I-1: prior knowledge’, barriers to social opportunity related to: not having the opportunity to meet the participant prior to delivery and social context of work roles and difficulties swapping between delivery of PRIDE and normal work. Facilitators related to: participant engagement and having had the opportunity to meet the participant before delivering PRIDE. Barriers related to physical opportunity included: not being able to use strategies used in job and not having time to meet participants prior to the intervention delivery. Facilitators included the PRIDE manual and using similar strategies to deliver PRIDE that are used in their work role (e.g. making notes). For psychological capability, prior knowledge of the participant was both a barrier to and facilitator for fidelity of delivery. Barriers related to: a lack of knowledge on how to deliver PRIDE, and facilitators related to: knowledge of working with people with dementia and knowledge of resources and the environment. In terms of reflective motivation, facilitators related to: DAWs' evaluations that experience influenced knowledge and beliefs in their ability to know how to deliver PRIDE. Appendix 5-5 provides examples of barriers and facilitators of COM-B domains in relation to the sub-themes identified in the thematic analysis.

Table 5-3. Frequency of occurrences of COM-B domains in total and by barriers to, and facilitators for, fidelity of delivery

COM-B	**Number of occurrences of domains within quotes**		
Component and domain	**Total**	**Barriers**	**Facilitators**
Capability			
Psychological	139	85	85
Physical	1	1	0
Opportunity			
Physical	188	123	110
Social	214	131	162
Motivation			
Automatic	74	38	45
Reflective	119	28	107
None	45	-	-

Note: Barriers and facilitators do not add up to the total due to some quotes being coded both as barriers and facilitators. More than one domain could be coded for each quote.

Table 5-4 reports the frequency of occurrences of COM-B domains across themes and sub-themes. Social opportunity was coded as a barrier for all four themes (providers' knowledge: n=40, providers' attributes: n=48, ease of adaptation with fidelity: n=86 and logistical considerations: n=65). Physical opportunity was coded as a barrier for three of the themes (providers' knowledge: n=65, ease of adaptation with fidelity: n=39 and logistical considerations: n=63). Psychological capability was coded as a barrier for two of the themes (providers' knowledge: n= 59 and providers' attributes: n=43).

Facilitators to all four themes related to: social opportunity (providers' knowledge: n=46, providers' attributes: n=65, ease of adaptation with fidelity: n=95 and logistical considerations: n=75), physical opportunity (providers' knowledge: n=49, providers' attributes: n=44, ease of adaptation with fidelity: n=42 and logistical considerations: n=61), reflective motivation (providers' knowledge: n=33, providers' attributes: n=78, ease of adaptation with fidelity: n=44 and logistical considerations: n=30) and psychological capability (providers' knowledge: n=65, providers' attributes: n=41, ease of adaptation with fidelity: n=35 and logistical considerations: n=27).

Table 5-4. Frequency of occurrences of COM-B domains across themes and sub-themes for fidelity of delivery

Theme		**Sub-theme**	**Psychological Capability**	**Physical Capability**	**Physical opportunity**	**Social opportunity**	**Automatic motivation**	**Reflective motivation**
I.	Providers' knowledge	Overall	n=101 (B: 59, F: 65)	n=0	n=93 (B: 65, F: 49)	n=65 (B: 40, F: 46)	n=32 (B: 23, F: 13)	n=35 (B: 9, F: 33)
		1) Prior knowledge	n=32 (B: 11, F: 27)	n=0	n=17 (B: 10, F: 12)	n=25 (B: 18, F: 19)	n=11 (B: 5, F: 8)	n=9 (B: 3, F: 9)
		2) Skills to deliver	n=66 (B: 43, F: 40)	n=0	n=67 (B: 46, F: 35)	n=42 (B: 25, F: 29)	n=19 (B: 13, F: 13)	n=23 (B: 5, F: 22)
II.	Providers' attributes	Overall	n=70 (B: 43, F: 41)	n=0	n=73 (B: 48, F: 44)	n=90 (B: 48, F: 65)	n=68 (B: 35, F: 41)	n=84 (B: 18, F: 78)
		3) Beliefs about PRIDE as part of job	n=22 (B: 14, F: 11)	n=0	n=18 (B: 8, F: 14)	n=31 (B: 20, F: 15)	n=11 (B: 6, F: 7)	n=15 (B: 4, F: 12)
		4) Personal characteristics	n=19 (B: 10, F 13)	n=0	n=28 (B: 15, F: 17	n=42 (B: 21, F: 35	n=30 (B: 9, F: 24)	n=72 (B: 12, F: 69)
		5) Feelings about delivery	n=51 (B: 33, F: 28)	n=0	n=48 (B: 35, F: 28)	n=40 (B: 22, F: 27)	n=56 (B: 30, F: 32)	n=37 (B: 13, F: 32)
III.	Adaptation of PRIDE in	Overall	n=53 (B: 27, F: 35)	n=1 (B: 1)	n=66 (B: 39, F: 42)	n=118 (B: 86, F: 95)	n=21 (B: 11, F: 13)	n=53 (B: 20, F: 44)

	relation to participants’ needs	6) Ease of adaptation with fidelity	n=43 (B: 21, F: 30)	n=0	n=56 (B: 30, F: 38)	n=81 (B: 58, F: 68)	n=16 (B: 9, F: 10)	n=44 (B: 17, F: 37)
		7) Participant engagement	n=24 (B: 15, F: 13)	n=1 (B: 1)	n=20 (B: 13, F: 11)	n=70 (B: 56, F: 57)	n=7 (B: 4, F: 4)	n=22 (B: 8, F: 18)
IV.	Logistical considerations	Overall	n=46 (B: 33, F: 27)	n=0	n=98 (B: 63, F: 61)	n=118 (B: 65, F: 97)	n=25 (B: 12, F: 15)	n=34 (B: 8, F: 30)
		8) Organisational constraints	n=16, (B: 11, F: 12)	n=0	n=42 (B: 28, F: 29)	n=26 (B: 17, F: 17)	n=8 (B: 3, F: 7)	n=7 (B: 2, F: 6)
		9) Social support for delivery	n=20 (B: 14, F: 10)	n=0	n=27 (B: 16, F: 19)	n=85 (B: 39, F: 75)	n=12 (B: 5, F: 8)	n=20 (B: 5, F: 18)

Note: Frequency: n= overall frequency, B: barrier F: facilitator

5.3.2 Barriers to, and facilitators for, engagement with the PRIDE intervention

5.3.2.2 Thematic analysis

Three overarching themes were identified as potentially important to influence engagement with the PRIDE intervention: I) Participants' attributes, II) Participants' capability, and III) Participants' opportunity to engage. Figure 2 provides an overview of overarching themes and related themes. Further details of each theme, including relevant sub-themes, are described below.

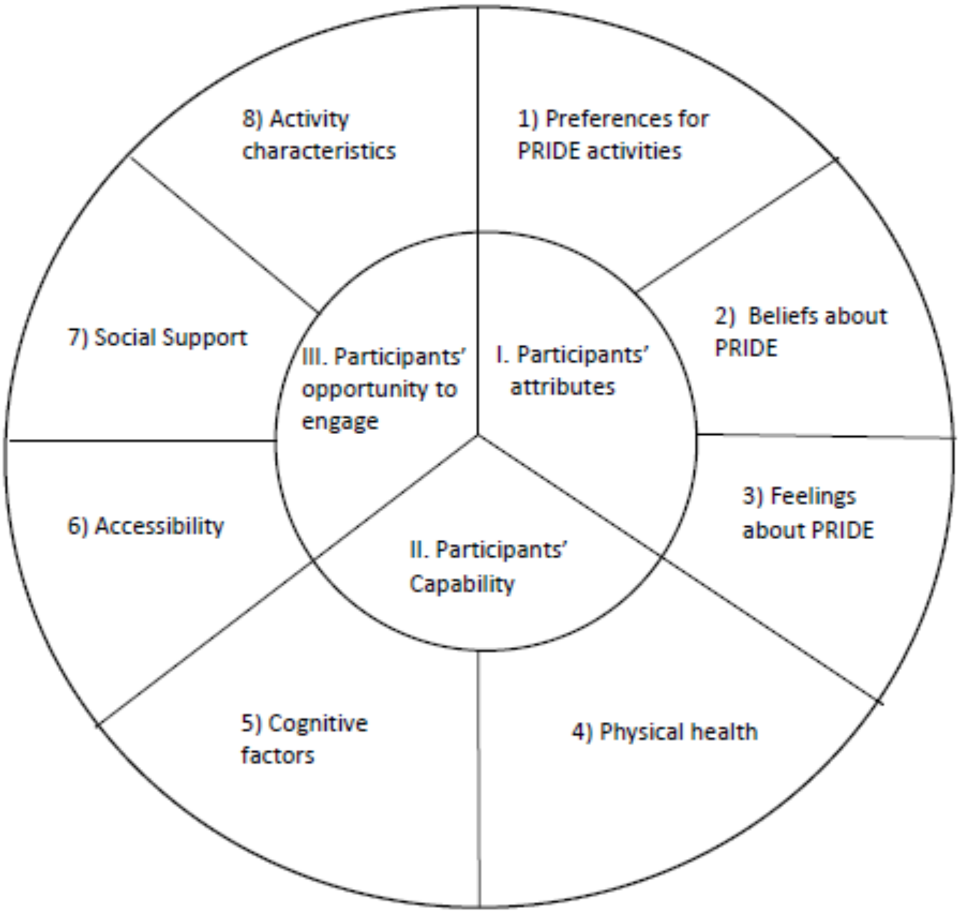


Figure 5-2. Thematic map for overarching themes and sub-themes for engagement

I. Participants' attributes

1) Preferences for PRIDE activities

People with dementia and supporters engaged in PRIDE activities that they wanted or liked to do (e.g. activities that they already know, social activities, convenient activities and activities which are easy to do), and avoided activities that they disliked. This was a key consideration when engaging with the manual and choosing activities with the DAW, and also on their own. However, liking activities was not always enough to influence engagement if they were unable to perform the activities.

> *"Oh, we've been dancing for years […] I just like dancing." (P4, Female)*

Decisions to engage in activities and PRIDE intervention sessions appeared to be influenced by personality traits of people with dementia and supporters. These included competitiveness, sportiness, sociability, thoroughness and organisation. For example: being a 'thorough' person was perceived to increase the intensity of engagement with the manual, with the person wanting to thoroughly complete each section rather than just filling in the minimum information.

> *"Yes, it was very good, but he is so thorough. He was in his working life. Do you know in his…? He couldn't just say, went to so-and-so […] It's got to be everything he done that day. He's a bit obsessive […] I wouldn't say obsessive […] so to him, there wasn't enough space." (S1, Female)*

2) Beliefs about PRIDE

People with dementia and supporters felt that PRIDE, it's components (e.g. problem solving) and structure (e.g. flexibility of person being able to take part on their own) were helpful. Perceived benefits included: having encouragement to do their chosen activities, having someone to talk to, making time for supporters' own activities, and taking part in research to help other people with dementia in future.

> *"I thought it was just what I required […] it was encouragement to do what we've just been talking about, being involved with people […] I can't think of anything that's more important, no." (P3, Male)*

Personal relevance of PRIDE materials for people with dementia and supporters was perceived to influence engagement. Although the manual was often seen as helpful to boost engagement, not all aspects of the manual were perceived to be relevant for all people with dementia and supporters. However, some felt that the manual and intervention content would become more relevant to them in future, as the symptoms of dementia progressed.

> *"It's useful […]. I might go through now and say, oh, I wonder why I missed that bit? Or perhaps I wasn't ready for it yet […] Some things weren't, like suggestions that, you know, cookery… not allowed on the oven, but no […] this is a book for everybody […] For everybody." (P1, Male)*

3) Feelings about PRIDE

Enjoyment of PRIDE sessions, spending time with the DAW, and taking part in their chosen activities was perceived to be helpful for engaging with PRIDE.

> *"Because it [the chosen activity] satisfies me […] it makes me happy. Infuses me with the idea I'm going to do some more." (P3, Male)*

On the other hand, the person with dementia and supporters' feelings of anxiety towards activities chosen during PRIDE sessions was perceived to limit engagement with the activity. Anxieties were discussed in relation to doing the activity (e.g. going to a social group), travelling to an activity (e.g. worries about driving) and using technology (e.g. worries about technology breaking).

> *"Well, I wouldn't go out on my own because I'm frightened of falling and things." (P6, Female)*

Negative feelings towards an activity also limited engagement. Negative feelings were discussed in relation to memory impairment, inability to go out and do activities, not enjoying the company at some activities and activities which do not have a clear end-point. Negative feelings were also expressed towards the length of the manual and the mental effort that engaging with the manual required.

> *"It's a very good book, it's very full, and I found it, I think I could actually say, exhausting […] it's got a lot of stuff in it, and I can't guarantee that I've remembered everything I read, but it's very interesting and very informative, but rather exhausting." (S6, Male)*

II. Participants' capability

4) Physical health

Physical health problems (e.g. having a bad knee or a cold) were perceived to challenge engagement in chosen activities (e.g. physical activities or travelling to activities) for people with dementia and supporters. On the other hand, being in good health was perceived to help people with dementia and their supporters keep going with their chosen activities.

> *"I was always interested in playing bowls, I don't think I could do it now because I've got a dodgy knee, but I could go and watch." (P1, Male)*

5) Cognitive factors

Memory, knowledge and communication skills were perceived as factors which influenced engagement. People with dementia reported that they could not remember sessions and intervention materials which limited their ability to engage in sessions, or that their memory affected their ability to engage in chosen activities.

> *“It might do, but last time he went with [Name 5], he did come back, he said, I don’t know what was the matter with me, I potted the white ball straight into the […] he’d forgotten the rules and regulations. It may not have been possible anyway.” (S5, Female)*

Understanding the information given to them in PRIDE sessions helped people with dementia and supporters to engage. A lack of knowledge and difficulties communicating made it difficult for some participants to engage with the intervention and activities. This lack of knowledge included how to get to the activity, how to do it, or how to use the required technology.

> *“Well the other thing that gets in my way is I'm not good at initiating things […] Is the thing. If I don’t know what I'm doing I just don’t do it.” (P2, Male)*

Familiarity with activities was perceived to make it easier for people with dementia and supporters to engage. They discussed engaging in activities that they used to do and could still do. People with dementia and supporters wanted to work on activities that they did not do as frequently. There was no consensus about feelings towards engaging in new activities, with discussions ranging from not wanting to engage in new activities (due to wanting to engage in activities that they already know and are interested in) to using the manual to look for new activities if they were bored with old activities.

> *"I'm not one of these people that's always wanting to do something new […] I'm only interested in doing what I know about […] I mean you may pick up the odd thing now and again that you may be interested in but in general I would be wanting to pursue what I already do and I'm not able to do." (P2, Male)*

III. Participants' opportunity to engage

6) Accessibility

Accessibility of PRIDE materials influenced people with dementia and supporters' engagement with PRIDE. For example, PRIDE paperwork was generally perceived to be easy to complete and the manual was perceived to be easy to understand. This facilitated engagement for people with dementia and their supporters. Some recommendations to improve materials, however, included sticky notes on the manual to highlight relevant sections of the manual, and providing summaries between sessions.

> *"Well, I liked the way it was all done. What they didn't do was to have a letter two or three weeks afterwards saying what they'd done, what they thought was perhaps good, what was not quite as good, that I could try and improve, things like that." (P7, male)*

People with dementia and supporters spoke about how the location and accessibility of activities either helped or hindered them from engaging with their activities. Engagement with activities depended on whether people with dementia and supporters could travel to the activity easily. For example, if the location was not appropriate; either it was too far away or they were unable to find the place, people could not engage. Whilst some people could walk to an activity, for others, getting to activities was difficult due to a lack of bus services and difficulties using the bus, or a lack of confidence driving.

> *"If I could find an easy, accessible bridge club that would be good." (P2, Male)*

Having the resources necessary for chosen activities helped people with dementia and their supporters to do the activities. However, barriers to engagement included: cost, time, and finding appropriate equipment. The weather also facilitated or hindered activities, depending on whether the activity was indoors or outdoors.

Reminders and writing notes helped people with dementia and their supporters to engage in activities, such as breaking down an activity, leaving an activity visible to act as a prompt, and doing the activity with others. One supporter reported not using strategies.

> *"I just set up calendars and reminders alerting me about important things, so, that's one of the things." (P1, Male)*

7) Social Support

Practical support for engaging with both the intervention sessions and activities was important for all people with dementia and supporters. Practical support was reported in relation to the DAW encouraging them to do their activity and giving them information. Supporters helped most people with dementia in relation to setting up activities, researching and organising activities, helping them get to the activity and to complete forms. Family members and organisations also provided practical support to some people with dementia, such as going with the person with dementia to their activity to overcome the aforementioned travel barriers.

> *“[DAW] put the thing in my mind but [Name of supporter], sort of, looked out for different groups like that […] And seeing whether we can get in there.” (P1, Male)*

DAWs, family members and organisations also provided emotional support to people with dementia and supporters. Having a positive relationship with the DAW was helpful as they provided encouragement for people with dementia and supporters and it meant that they had someone to talk to during the PRIDE intervention.

Although people with dementia and supporters felt they had enough support to engage in the intervention and associated activities, in some cases, further support was perceived to be necessary (e.g. having someone to do the activity with). However, others felt that it was their own responsibility to move forward with their plans.

> *“The other thing was he wanted to play snooker again, and I’d suggested the snooker, but because what I didn’t think about, I didn’t give it enough thought, is when you go to play snooker, you really need a partner to go with.” (S5, Female)*

8) Activity characteristics

The most frequently discussed activity characteristic that influenced engagement was the difficulty of activities. Some supporters reported that PRIDE was mostly easy to participate in. People with dementia and supporters mentioned that easier activities helped them engage whereas they may not engage in activities that were more difficult (for example, walking groups that cover too much distance).

> *“You go on the computer and it’s dead easy.” (P3, Male)*

> *"We looked into group, walking groups, but the one that they do, it's not just dementia they deal with at [Place 4], it's all elderly people over 60, I think. They have walking groups, but they're 3–4 mi. Well, that's too much for us." (S1, Female)*

Other activity characteristics, including length of activity and regularity of activity, were also discussed in relation to finding activities that met participants' requirements. For example: people with dementia and supporters reported wanting to participate in activities that were weekly, instead of daily (too frequent) or monthly (too infrequent). Breaking activities down into shorter tasks and needing to have an end were also perceived to be helpful for engagement.

5.3.2.3 Content analysis

Five hundred and twenty-three quotes were included in the content analysis. The frequencies of occurrence of COM-B domains were as follows: social opportunity (n=207), physical opportunity (n=176), reflective motivation (n=167), automatic motivation (n=124), psychological capability (n=119) and physical capability (n=35). Fifty-seven quotes had no COM-B domains. Table 5-5 highlights the occurrence of COM-B domains and the frequency of barriers and/or facilitators for each domain for engagement, as identified in the content analysis.

For each sub-theme, many COM-B domains were identified as barriers to, and facilitators for, engagement. For example, for the sub-theme 'I-1: participants' preferences', barriers to physical opportunity related to: a lack of resources, appropriate locations, time and money to do activities that the participants liked or wanted to do, whereas facilitators related to: having appropriate locations and weather and the manual to do activities that participants' liked or wanted to do. Barriers related to psychological capability included: perceived difficulty of activities and lack of memory for activities that they liked/wanted to do. For social opportunity, facilitators included: support to help participants organise their activities and having people to do activities with. In terms of reflective motivation, facilitators related to: being interested in activities and evaluations about what activities they prefer. In terms of automatic motivation, facilitators related to: enjoyment and wanting to do activities. Appendix 5-6 provides examples of barriers and facilitators of COM-B domains in relation to the sub-themes identified in the thematic analysis.

Table 5-5. Frequency of occurrences of COM-B domains in total and by barriers to, and facilitators for, engagement

COM-B	**Number of occurrences of domains within quotes**		
Component and domain	**Total**	**Barriers**	**Facilitators**
Capability			
Psychological	119	100	30
Physical	35	26	15
Opportunity			
Physical	176	102	111
Social	207	40	188
Motivation			
Automatic	124	50	93
Reflective	167	36	144
None	57		

Note: Barriers and facilitators do not add up to the total due to some quotes being coded both as barriers and facilitators. More than one domain could be coded for each quote.

Table 5-6 reports the frequency of occurrences of COM-B domains across themes and sub-themes. Physical opportunity (participants' attributes: n=48, participants' capability: n=30 and opportunity to engage: n=94) and psychological capability (participants' attributes: n=48, participants' capability: n=68 and opportunity to engage: n=66) were coded as barriers for all three themes.

Facilitators for all three themes included domains of: social opportunity (participants' attributes: n=89, participants' capability: n=37 and opportunity to engage: n=156), reflective motivation (participants' attributes: n=108, participants' capability: n=21 and opportunity to engage: n=75), physical opportunity (participants' attributes: n=50, participants' capability: n=50 and opportunity to engage: n=99), and automatic motivation (participants' attributes: n=82, participants' capability: n=53 and opportunity to engage: n=47).

Table 5-6. Frequency of occurrences of COM-B domains across themes and sub-themes for engagement

Theme	**Sub-theme**	**Psychological capability**	**Physical capability**	**Physical opportunity**	**Social opportunity**	**Automatic motivation**	**Reflective motivation**
I. Participants' attributes	Overall	N=55 (B:48, F: 11)	N=22 (B:15, F: 10)	N=83 (B: 48, F: 50)	N=96 (B: 17, F: 89)	N=108 (B: 44, F: 82)	N=127 (B: 30, F: 108)
	1) Preferences for PRIDE activities	n=29 (B: 25, F: 8)	n=17 (B: 11, F: 8)	n=47 (B: 27, F: 27)	n=43 (B: 13, F: 37)	n=72 (B: 27, F: 60)	n=46 (B: 8, F: 42)
	2) Beliefs about PRIDE	n=20 (B: 17, F: 4)	n=1 (B: 1)	n=29 (B: 15, F: 18)	n=38 (B: 5, F: 37)	n=16 (B: 4, F: 13)	n=67 (B: 18, F: 56)
	3) Feelings about PRIDE	n=20 (B: 20, F: 2)	n=10 (B: 6, F: 6)	n=29 (B: 17, F: 20)	n=42 (B: 5, F: 39)	n=52 (B: 27, F: 35)	n=35 (B: 7, F: 31)
II. Participants' capability	Overall	n=73 (B: 68, F: 12)	n=22 (B: 16, F: 9)	n=53 (B: 30, F: 34)	n=41 (B: 11, F: 37)	n=43 (B: 22, F: 29)	n=36 (B: 11, F: 28)
	4) Physical health	N=3 (B: 3, F: 1)	N=16 (B: 14, F: 5)	N=9 (B: 8, F: 3)	N=6 (B: 2, F: 6)	N=9 (B: 4, F: 7)	N=4 (B: 0, F: 4)
	5) Cognitive factors	N=72 (B: 67, F: 12)	N=8 (B: 4, F: 5)	N=48 (B: 26, F: 32)	N=37 (B: 9, F=33)	N=37 (B: 19, F: 25)	N=33 (B: 11, F: 25)
III. Opportunity to engage	Overall	n=81 (B: 66, F: 24)	n=25 (B: 20, F: 10)	n=159 (B: 94, F: 99)	n=172 (B: 35, F: 156)	n=70 (B: 34, F: 47)	n=86 (B: 15, F: 75)
	6) Accessibility	n=57 (B: 47, F: 16)	n= 13 (B: 9, F: 7),	n=130 (B: 78, F: 78)	n=53 (B: 15, F: 47)	n=33 (B: 18, F: 19)	n=44 (B: 11, F: 36)

	7) Support	n=44 (B: 36, F: 14)	n=15 (B: 12, F: 6)	n=56 (B: 26, F: 40)	n=155 (B: 30, F: 142)	n=42 (B: 19, F: 30)	n=45 (B: 8, F: 40)
	8) Activity characteristics	n=14 (B: 10, F: 6)	n=5 (B: 4, F: 2)	n=21 (B: 13, F: 14)	n=22 (B: 5, F: 20)	n=16 (B: 8, F: 13)	n=10 (B: 2, F: 9)

Note: Frequency: n= overall frequency, B: barrier, F: facilitator

5.4 Discussion

5.4.1 Key findings

Key factors influencing the delivery of PRIDE with fidelity related to DAWs' 1) knowledge, 2) personal attributes, 3) skills to adapt PRIDE in relation to participants' needs, and 4) supportive work environment. Barriers to fidelity related to social opportunity (e.g. lack of participant engagement), physical opportunity (e.g. lack of time in training session to practice delivery) and psychological capability (e.g. lack of knowledge about how to deliver the intervention as specified in the manual). Facilitators for fidelity related to social opportunity (e.g. researcher and peer support), physical opportunity (e.g. resources, including the manual and session guide), reflective motivation (e.g. the belief that there is value in PRIDE), and psychological capability (e.g. prior knowledge of environment and working with people with dementia).

Key factors influencing engagement with PRIDE related to people with dementia and their supporters' 1) personal attributes, 2) capability, and 3) opportunity to engage with PRIDE and related activities. Barriers to engagement related to physical opportunity (e.g. lack of appropriate location or transport to do activity) and psychological capability (e.g. not remembering PRIDE or lack of knowledge on how to do activities). Facilitators for engagement related to social opportunity (e.g. DAW or supporter helping to organise activity), reflective motivation (e.g. the belief that PRIDE is relevant), physical opportunity (e.g. accessible or appropriate locations and prompts or reminders) and automatic motivation (e.g. liking and wanting to do activities).

5.4.2 How findings relate to previous research

5.4.2.1 Fidelity of delivery

The findings were consistent with previous studies in that intervention factors, provider factors, participant factors and organisational factors influenced fidelity of delivery of dementia interventions (Dugmore et al., 2015; Lawrence et al., 2012; Mahoney et al., 2006).

In line with previous findings, this study found that higher levels of knowledge about how to deliver the intervention as planned (Dariotis et al., 2008; Dugmore et al., 2015), and having prior knowledge of the person with dementia (Lawrence et al., 2012), as well as experience of working with people with dementia, facilitated delivering PRIDE with fidelity.

Findings were consistent with research suggesting that DAWs' personal attributes facilitate or hinder delivery (Bearman et al., 2013; Dugmore et al., 2015; Hahn, Noland, Rayens & Christie, 2002; Toomey et al., 2017). DAWs' beliefs about perceived similarities between PRIDE and providers' job role facilitated the delivery of PRIDE, whereas differences and competing priorities hindered delivery of PRIDE. Secondly, believing that PRIDE was beneficial for their professional development and enjoyment, but also for people with dementia and supporters' independence facilitated their motivation to deliver PRIDE as planned. Finally, DAWs' automatic motivations, including anxieties about delivering PRIDE as planned were perceived to hinder delivery, whereas self-confidence, which was perceived to increase with age, work-related experience and experience delivering PRIDE, facilitated delivery.

These findings offer potential insights into why manuals are not consistently used in dementia interventions (Spector et al., 2013). DAWs believed that it was not always possible to deliver PRIDE with fidelity and that sticking to the manual strictly, restricted therapeutic alliance. However, findings demonstrated that DAWs understood why fidelity was important and acknowledged the importance of using the manual for delivery.

Previous research suggested that tailoring facilitated the delivery of dementia interventions (Lawrence et al., 2012; Mahoney et al., 2006). However, findings from this study suggested that DAWs prioritised adapting PRIDE to suit individual participants' needs, over delivering the intervention as planned. To deliver a tailored intervention with fidelity, DAWs would need to have: sufficient social support from researchers to facilitate fidelity and tailoring of PRIDE, the skills to deliver PRIDE as planned whilst adapting content to individual participants, and time in the training session to get used to the manual and to learn how to use it to tailor the intervention to individual participants.

Findings suggest that higher levels of participant engagement facilitated delivery, whereas lower levels of engagement hindered delivery (Greenberg et al., 2005; Schinckus et al., 2014). In this study, participants' enthusiasm, understanding, and motivation were perceived to facilitate delivery. These findings suggest that it was more difficult for DAWs to deliver the intervention as specified in the manual for those with dementia and their supporters who did not engage with PRIDE.

Findings were consistent with research which suggests that organisational factors (e.g. availability of resources) influence the delivery of interventions (Damschroder et al., 2009; Dugmore et al., 2015; Lawrence et al., 2012; McKenna et al., 2014). For PRIDE, DAWs' work environment mostly facilitated delivery. However, a lack of time to prepare for sessions and travel to dyads was a barrier. To deliver PRIDE as planned, DAWs needed to have a facilitative work environment, which allowed DAWs to manage their own diaries and provided DAWs with enough time to prepare for PRIDE sessions. This suggests that sufficient time for preparation and delivery of PRIDE needed to be planned into DAWs' job roles.

Social support from researchers, other DAWs and supporters facilitated the delivery of PRIDE (Lawrence et al., 2012), with different groups of people facilitating delivery in different ways. For example, researchers facilitated delivery by answering questions about how to deliver PRIDE. DAWs sharing their experiences of delivery with other DAWs facilitated delivery by increasing knowledge about how to deliver PRIDE and reducing anxieties. Supporters facilitated delivery by prompting and encouraging participants' engagement with activities between sessions. However, findings suggest that supporters facilitated and/or hindered delivery depending on the individual participants and their level of engagement. Sometimes, supporters were too involved (for example, speaking a lot in the intervention sessions), and in these cases, DAWs experienced difficulties keeping to topic within sessions. On the other hand, some supporters were not present in intervention sessions, which meant that it was sometimes difficult to deliver the intervention as planned and follow the structure of the intervention.

Findings indicated that social support from researchers, DAWs and supporters and organisational factors such as availability of resources facilitated delivery. In relation to the factors influencing fidelity of delivery, no major differences across job roles were found. However, findings indicated that differences in the working environment may have influenced delivery for individual DAWs. This is likely given that PRIDE was delivered by researchers, memory nurses and DAWs, all of whom may have different working environments and varying levels of support. Together, these findings support research which suggests that providers require a facilitative working environment and that they should be sufficiently supported by their employing organisation if they are to provide high-quality person-centred care (Kitwood, 1997b). This suggests that all DAWs need to have appropriate levels of organisational support to deliver interventions as planned.

5.4.2.2 Engagement

Previous research suggests that personal attributes, including personal history of care and the dyad’s relationship, influences engagement with behavioural interventions for people with dementia and caregivers (Mahoney et al., 2006). The current study extends this research and highlights the role of participant differences in the effort to facilitate engagement with PRIDE, including differences in their likes and wants in relation to PRIDE activities. Liking or wanting to do an activity motivated participants to engage with their chosen activity. However, findings indicated that motivation alone was not sufficient to facilitate engagement in activities, as barriers related to their capability (including physical health, knowledge and memory) and opportunity (including lack of social support, accessibility of activities, time and money) also limited peoples' engagement with activities that they wanted or liked to do.

Participants' understanding of the benefits of an intervention facilitated engagement. This finding was consistent with previous research (Bunn et al., 2008; Roberts & Bailey, 2011). Our findings suggested that participants perceived the PRIDE intervention as beneficial and the PRIDE manual as relevant, which facilitated engagement. Participant characteristics that hindered engagement included participants' anxiety and negative feelings towards the intervention and activities. Enjoyment and confidence facilitated engagement.

Previous research suggested that participants' cognitive and psychological ability influence their engagement with interventions (Dugmore et al., 2015; Rimmer et al., 2004; Roberts & Bailey, 2011). Cognitive abilities which facilitated engagement with the PRIDE intervention included knowledge about how to put their plans into practice, recalling the information given in the sessions and knowledge about how to do the chosen activities. On the other hand, peoples' lack of knowledge on how to put plans into practice and lack of memory about PRIDE hindered engagement. Findings also indicated that previous experience facilitated engagement. This demonstrates that some people with dementia may prefer to continue engaging with activities that they could previously do, rather than beginning new activities.

Environmental factors have been found to influence engagement with physical activity interventions for older adults, adults with disabilities and individuals with stroke (Boulton et al., 2018; Rimmer et al., 2004; Rimmer, Wang & Smith, 2008). This study highlighted many environmental barriers to people with dementia and their supporters engaging with PRIDE, such as being unable to travel far to activities due to physical health problems, difficulties organising activities and finding places, and difficulties using different modes of transport. These findings demonstrate that the person with dementia's whole environment needs to be facilitative. To engage with activities, participants needed to have: appropriate locations to take part in activities that are easy to travel to, support to organise and take part in activities from their social network and activities available to them which are regular but not too regular, not too difficult and which do not take too long to complete.

5.4.3 Reflexivity

HW, who conducted this study worked on the implementation of the PRIDE intervention and delivered training on fidelity to the DAWs (as described in Chapters 3 and 4). Thus, DAWs may have perceived her to be involved in the intervention development rather than in the evaluation and this may have influenced their responses. HW's interests and prior experience working with people with dementia would have influenced the development of interview schedules and interpretation of data.

As the people living with dementia and supporters had not met HW before the interviews, and there were clear age differences between HW and participants, they may not have felt initially comfortable providing all relevant information; for example: providing negative feedback about PRIDE. However, HW has experience working with people with dementia and older adults, and good rapport was built with all participants and supporters.

5.4.4 Limitations

The interviews did not always take place two weeks after the final intervention session due to recruitment issues. Good response rates were achieved for participant 'your experience' fidelity checklists, which were returned in prepaid envelopes (see Chapter 4). One way to recruit participants in a timelier manner may therefore have been to provide information sheets in prepaid envelopes and ask participants to return expressions of interest, instead of recruiting during follow-up visits.

Where participants did not remember the intervention sessions or chosen activities, HW asked questions about activities that participants engaged with on a daily basis. As a result of this, activities discussed may not have been specific to PRIDE. Since PRIDE aimed to develop peoples' skills to engage independently in activities, the identified barriers and facilitators were relevant for improving engagement in all activities.

To identify as many factors as possible which influenced fidelity and engagement, both the COM-B model and TDF were used to inform interview schedules. For the content analysis, only the COM-B model was used. An alternative optional step would have been to supplement COM-B coding with the TDF (see Chapter 1, Section 1.5.3; Michie et al., 2014). This was not used in this study as the content analysis combined with the thorough thematic analysis provided sufficient detail and context regarding how COM-B domains related to themes and sub-themes.

5.4.5 Implications

5.4.5.1 Practice

The finding that organisational factors influence fidelity of delivery indicates that it may be beneficial to tailor support and training to individual organisations and providers. Tailoring of training could help to overcome individual differences in skills and environmental factors such as varying levels of support (Kitwood, 1997b). This may enable all providers to have the required time and resources to implement interventions as planned and may reduce differences in delivery across sites and providers.

The factors identified in this study that helped or hindered the delivery of and engagement with PRIDE should be considered when supporting DAWs to deliver psychological and social interventions, and when encouraging people with dementia to choose activities to live independently.

5.4.5.2 Research

The findings of this research contribute to understanding about which factors influence fidelity of delivery of, and engagement with, complex interventions for people with dementia and their supporters. These findings helped to interpret the findings discussed in Chapter 4, by indicating that many factors facilitated and/or hindered fidelity and engagement, even when moderate fidelity and high engagement were achieved.

These findings show that a combination of capability, opportunity and motivation influence fidelity and engagement. These findings demonstrate that consideration of multiple domains would be required to improve fidelity of delivery of, and engagement with, PRIDE.

5.4.6 Future research

To identify relevant intervention functions and BCTs and to inform potential recommendations, the next stage of this PhD research (described in Chapter 6) maps the barriers identified in this Chapter onto the BCW (Michie et al., 2014). These recommendations can be tested within a PRIDE RCT to improve and/or maintain fidelity and engagement.

Whilst interviews were used to explore factors influencing engagement with PRIDE, the use of other methods could be explored within dementia interventions. For example, ‘Photovoice’ may be appropriate. ‘Photovoice’ is a participatory research method which involves participants taking photos and using these photos to guide an interview (Sutton-Brown, 2014). To measure engagement in an intervention setting, participants could take photos of themselves engaging with activities. Interviews could be guided by these photos to support recall. Further research is needed to determine which factors predict high fidelity and high engagement.

5.5 Conclusion

Fidelity of delivery and engagement are complex behaviours with many interlinked factors influencing behaviour. DAWs need to have the knowledge, personal attributes, skills required to tailor the intervention accordingly in relation to the person with dementia and supporter, whist maintaining fidelity and a facilitative work environment to deliver PRIDE with fidelity. Barriers to, and facilitators for, fidelity of delivery include: social opportunity, physical opportunity and psychological capability, whereas facilitators include: reflective motivation. People with dementia and supporters' need to have the interest, opportunity and ability to engage in PRIDE and their chosen activities. Barriers to, and facilitators for, engagement include social opportunity and physical opportunity. Barriers include: psychological capability and facilitators include: reflective and automatic motivation. These findings can be used to develop recommendations to improve fidelity of delivery of, and engagement with, PRIDE.

Chapter 6 Developing recommendations to improve fidelity of delivery of, and engagement with, the PRIDE intervention

6.1 Introduction

Factors which facilitated and/or hindered fidelity of delivery of, and engagement with, the PRIDE intervention were identified in Chapter 5 (see Sections 5.3.1 and 5.3.2). To maintain or potentially improve fidelity of delivery of, and engagement with, the PRIDE intervention these barriers and facilitators should be considered by researchers in developing future iterations of the intervention.

A systematic method of intervention development that can be applied to different target populations and behaviours is provided by the BCW (see Chapter 1, Section 1.5.3 for further details on the BCW). This includes behaviours related to fidelity and engagement. An example of the former is an intervention to improve implementation of the Sepsis Six intervention (Steinmo, Fuller, Stone & Michie, 2015). Examples of the latter are interventions aimed to improve hearing-aid use (Barker, Atkins & de Lusignan, 2015), attendance at stop smoking services (Fulton, Brown, Kwah & Wild, 2016) and upper limb exercise in stroke rehabilitation (Connell, McMahon, Redfern, Watkins & Eng, 2015). This suggests that the BCW is a suitable framework with which to consider methods for improving both fidelity of delivery of, and engagement with, the PRIDE intervention. To the author's knowledge, the BCW has yet to be used to inform the development or refinement of dementia interventions. This Chapter reports the first phase of the systematic development of recommendations to improve 1) fidelity of delivery of, and 2) engagement with the PRIDE intervention. These recommendations are to be considered within the context of improving PRIDE, rather than to provide the basis of a standalone intervention.

Recommendations related to fidelity of delivery and engagement are discussed separately, in recognition of differences in the nature of these behaviours and populations.

6.2 Methods

To improve fidelity of delivery of and engagement with the PRIDE intervention, an initial set of recommendations was developed by following the methodological steps proposed by the authors of the Behaviour Change Wheel (BCW) (Michie et al., 2014). These steps included: 1) understand the behaviour, 2) identify intervention functions and policy categories, 3) specify intervention content in terms of BCTs and 4) identify a mode of delivery. Each step is discussed in detail below.

6.2.1 Understanding the behaviour

The target behaviours were defined in relation to: who is expected to perform the behaviour, what they need to do differently, when, where and how often they need to perform the behaviour and with whom.

Findings from Chapters 4 and 5 were used to inform this step. Findings from Chapter 4 were used to define target behaviours by identifying components that were difficult to deliver and the nature and extent of engagement with PRIDE. Findings from the thematic analysis and content analysis were then used to identify what needed to change to achieve the target behaviour (see Chapter 5, Sections 5.3.1 and 5.3.2). Fidelity of delivery and engagement are complex behaviours. Therefore, recommendations to improve specific aspects of fidelity and engagement are developed in this Chapter.

6.2.2 Intervention functions and policy categories

The BCW highlights optimal links between COM-B domains and intervention functions, based on expert consensus (Michie et al., 2014). In this study, HW used the BCW and the APEASE criteria to identify relevant intervention functions. Barriers to fidelity of delivery and engagement were linked to COM-B domains (see Chapter 5).

COM-B domains were linked to relevant intervention functions in the BCW (Michie et al., 2014). The APEASE criteria were used by HW to inform which intervention functions could be affordable (deliverable to all whom it would benefit, within an acceptable budget), practicable (able to be delivered as designed), effective and cost-effective, acceptable to stakeholders, safe, and have the potential to reduce disparities in standards of living, wellbeing or health (equitable) (Michie et al., 2014). Findings from Chapters 4 and 5, and previous research conducted in similar populations and behaviours were used to identify intervention functions and judge their suitability. Direct evidence to support the selection of intervention functions in relation to improving fidelity of delivery and engagement within dementia interventions were not available, therefore research relating to similar populations and behaviours were identified and used.

Intervention functions were then linked to policy categories. Potential policy categories were also assessed by HW using the APEASE criteria. Links between COM-B domains, intervention functions and policy categories, as proposed by Michie et al (2014) are reported in Appendix 6-1.

6.2.3 Intervention content

The BCW highlights optimal links between intervention functions and BCTs (Michie et al., 2014). In this study, HW used the BCW to identify which BCTs from the BCTTV1 (Michie et al., 2013) were relevant to selected intervention functions. To identify BCTs that were most relevant in this context, behaviours and populations, potential BCTs were assessed by the APEASE criteria. Findings from Chapters 4 and 5 and previous research conducted in similar populations and behaviours were reviewed to judge the suitability of BCTs. Direct evidence to support the choice of BCTs in relation to improving fidelity of delivery and engagement within dementia interventions were not available, therefore research relating to similar populations and behaviours were identified and used. To narrow down possible BCTs, those which have been previously identified within the BCW as frequently used were considered (Michie et al., 2014).

6.2.4 Mode of Delivery

The Mode of Delivery taxonomy (Carey et al., 2017; preliminary version) was used to select appropriate modes of delivery for the BCTs. The APEASE criteria were used to select which were suitable for the target population and target behaviours.

6.2.5. Developing initial recommendations

Findings from each of the four stages (as described in Sections 6.2.1 to 6.2.4) were used to develop an initial version of practical recommendations which aim to improve fidelity of delivery of, and engagement with, the PRIDE intervention. Recommendations on how to implement these findings within the context of the PRIDE intervention are provided.

6.3 Results

6.3.1 Understanding the behaviour

For fidelity of delivery, the target behaviours were that DAWs would deliver PRIDE components that were infrequently delivered within the PRIDE feasibility trial, including those components which related to tailoring the intervention to participants (providing resources for chosen topics and discussing these in relation to the participants) and problem solving (see Chapter 4, Section 4.3). The delivery of planned components needs to take place during each of the three intervention sessions at the participants' home with the person with dementia and supporter.

For engagement, the target behaviour was that people with dementia and supporters would carry out the activities that they planned in the first or second PRIDE sessions (e.g. attending an activity group or completing a jigsaw puzzle). Engagement with these activities needs to take place in the four weeks between each of the three sessions either at home or within the community with help from the supporter, other people or DAWs.

Findings suggested that barriers to delivering PRIDE as planned were DAWs' psychological capability (e.g. skills to deliver PRIDE as planned and remembering information from training), physical opportunity (e.g. having the appropriate PRIDE resources and time to practice delivering PRIDE) and social opportunity (e.g. participant engagement and support from researchers) (see Chapter 5, Section 5.3.1).

Findings suggested that barriers faced by people with dementia and their supporter with regards to carrying out activities that they planned to work on were their physical opportunity (e.g. money and time to do the activity, accessible locations and resources to prompt activities) and psychological capability (e.g. knowledge and skills about how to do activities and how to organise and carry out activities) (see Chapter 5, Section 5.3.2).

6.3.2 Intervention functions and policy categories

In terms of fidelity of delivery, three intervention functions were identified as potentially relevant to include within recommendations to improve psychological capability, social opportunity and physical opportunity to deliver PRIDE as planned. These were identified using expert consensus from the BCW and APEASE criteria. These were 'Training', 'Modelling' and 'Enablement' (reducing barriers to increase capability or opportunity) (Michie et al., 2014). Other intervention functions were identified as potentially suitable, but were not included as they did not meet the APEASE criteria. For example: the intervention function 'Incentivisation' would be unnecessary as staff were already motivated to deliver PRIDE as planned (see Chapter 5, Section 5.3.1).

To improve skills, additional 'Training' could be delivered. A review of 152 education and training interventions for health and social care staff involved in dementia care suggests that 'Training' increases knowledge, staff confidence and facilitates behaviour change (Surr et al., 2017). Poor training is one reason that interventions are not effective (Borrelli, 2011). Whilst additional ‘Training’ would require more time and money (Brown, 2002), it could be more cost-effective to invest in training to improve fidelity of delivery before PRIDE is delivered within an RCT. The findings presented in this thesis support the inclusion of ‘Training’ to improve fidelity of delivery of PRIDE. For example, findings indicated that providing extra ‘Training’ on how to deliver PRIDE as planned would be acceptable to DAWs as they spoke about wanting more training in the interviews (see Chapter 5, Section 5.3.1). Based on these findings, ‘Training’ was considered to be suitable to improve fidelity of delivery of PRIDE.

To show DAWs how to deliver PRIDE, ‘Modelling’ could be used. An evidence-based framework for improving skills training in medical settings proposes that ‘seeing’ a procedure being delivered facilitates the acquisition of clinical skills (Sawyer et al., 2015). ‘Modelling’ was not previously included in the training for the PRIDE feasibility session. However, role modelling to show DAWs how to deliver PRIDE would be acceptable to DAWs who spoke about wanting more guidance about how to deliver PRIDE as planned (see Chapter 5, Section 5.3.1). Based on these findings, ‘Modelling’ was considered to be suitable to improve fidelity of delivery of PRIDE.

To reduce barriers to increase capability or opportunity, ‘Enablement’ could be used. Findings from the PRIDE fidelity study demonstrated that fidelity differed across providers and sites (see Chapter 4). Interview findings also highlighted differences in work environments and social support for delivery (see Chapter 5). This indicates that ‘Enablement’, through individualised training or supervision, may be beneficial. This is supported by previous research which suggests that the development of effective training for behaviour change may include expert clinical supervision and staff champions (Surr et al., 2017). Research also suggests that the broader work environment needs to be facilitative to enable providers to deliver high-quality person-centred dementia care (Kitwood, 1997b). The findings presented in this thesis suggest that ‘Enablement’ would be acceptable to DAWs, as they spoke about the importance of social support for delivery during the interviews (see Chapter 5, Section 5.3.1). Based on these findings, ‘Enablement’ was considered to be suitable to improve fidelity of delivery of PRIDE.

In terms of engagement, three intervention functions were identified as potentially relevant for improving people with dementia and their supporters’ psychological capability and physical opportunity to carry out the activities that they planned to work on. These were: ‘Education’, ‘Training’ and ‘Enablement’ (Michie et al., 2014). Other intervention functions were identified as potentially suitable, but were not included as they did not meet the APEASE criteria. For example, ‘Persuasion’ was not suitable for improving engagement with PRIDE as participants were motivated and reported wanting to do their planned activities (see Chapter 5, Section 5.3.2).

‘Education’ could be used to support engagement with PRIDE. Some participants and supporters in the interviews reported not always knowing or remembering what activities they had chosen to work on during the session (see Chapter 5, Section 5.3.2). Based on these findings, ‘Education’ was considered to be suitable to improve engagement with PRIDE.

As with fidelity of delivery, ‘Training’ could be used to support engagement with PRIDE. ‘Training’ interventions may be acceptable, effective and safe for people with dementia (Hauer et al., 2012). The findings from this thesis support the use of ‘Training’ to improve engagement with PRIDE as participants reported not always knowing what to do to put their plans into practice (see Chapter 5, Section 5.3.2). As PRIDE is already a lengthy intervention, it is necessary to ensure that any additional training provided to participants could be easily implemented. Based on these findings, ‘Training’ was considered to be suitable to improve engagement with PRIDE.

As with fidelity of delivery, ‘Enablement’ could be used to support engagement with PRIDE. Previous research suggests that ‘Enablement’ empowers people with dementia to make decisions and encourages them to have a go at carrying out activities (Fetherstonhaugh et al, 2013). The findings presented in this thesis support the use of ‘Enablement’ to improve engagement with PRIDE as people with dementia and supporters spoke about the importance of social support provided by the DAW, supporters and other people during the interviews (see Chapter 5, Section 5.3.2). Based on these findings, ‘Enablement’ was considered to be suitable to improve engagement with PRIDE.

Using the links proposed by the authors of the BCW (Michie et al., 2014), a number of policy categories were identified to be relevant to support the three intervention functions for fidelity of delivery and the three intervention functions for engagement. After drawing on APEASE criteria and taking PRIDE, the target populations and behaviours into account, ‘Service provision’ was the only policy category that was identified as relevant for the selected intervention functions within the context of PRIDE. One example of a policy category that did not meet the APEASE criteria was: ‘Legislation’, which would not be relevant or practical to implement within the context of PRIDE or fidelity of delivery and engagement.

6.3.3 Intervention content

For the three intervention functions relevant to fidelity of delivery, four BCTs were identified to include within recommendations, using the BCW and APEASE criteria. These were: ‘Social support (unspecified)’ (BCT 3.1), ‘Instruction on how to perform the behaviour’ (BCT 4.1), ‘Demonstration of behaviour’ (BCT 6.1), and ‘Behavioural practice and rehearsal’ (BCT 8.1). Three BCTs were identified for the intervention function ‘Training’ (‘Instruction on how to perform the behaviour’, ‘Demonstration of the behaviour’ and ‘Behavioural practice/rehearsal’), one BCT was identified for the intervention function ‘Modelling’ (’Demonstration of the behaviour’) and one BCT was identified for the intervention function ‘Enablement’ (‘Social support unspecified’). Other BCTs were identified through expert consensus using the BCW as potentially suitable, but were not included as they did not meet the APEASE criteria.

For example: the BCT ’Social support (practical)’ would not be practicable to deliver within the context of PRIDE as it would not be possible to have a second DAW supporting delivery of PRIDE during the sessions due to time and resource constraints. In previous research relating to healthcare provider behaviours, BCTs are often delivered in combination, therefore it is not possible to find evidence which only provides support for one BCT.

‘Social support (unspecified)’ (BCT 3.1) could be used to improve fidelity of delivery with PRIDE. Findings presented in this thesis suggested that social support from researchers and peers was acceptable to DAWs. Social support also facilitated delivery of PRIDE as planned (see Chapter 5, Section 5.3.1). Based on these findings, ‘Social support (unspecified)’ (BCT 3.1) was considered to be suitable to include in recommendations to improve the fidelity of delivery of PRIDE.

‘Instruction on how to perform the behaviour’ (BCT 4.1) could be used to improve fidelity of delivery with PRIDE. Previous research suggests that interventions containing the BCT ‘Instruction on how to perform the behaviour’ may improve general practitioners’ delivery of two recommendations from clinical practice guidelines for back pain management in primary care (French et al., 2012; French et al., 2015). The findings presented in this thesis suggest that instructions would be acceptable to DAWs. For example, providers reported needing more step-by-step guidance on how to deliver practical elements of PRIDE e.g. adapting PRIDE to participants (see Chapter 5, Section 5.3.1). Together, these findings suggest that ‘Instruction on how to perform the behaviour’ (BCT 4.1) would be suitable to include in recommendations to improve the fidelity of delivery of PRIDE.

‘Demonstration of behaviour’ (BCT 6.1) could be used to improve fidelity of delivery with PRIDE. Previous research suggests that interventions containing demonstration may improve delivery of healthcare interventions (French et al., 2012; French et al., 2015; Surr et al., 2017). For example, a review of 152 dementia education and training interventions found that training interventions which consisted of active learning approaches and examples showing how to deliver an intervention delivered through written materials, video or DVD were useful when demonstrating good practice to staff working with people with dementia (Surr et al., 2017). Findings from Chapter 5 (Section 5.3.1) indicated that DAWs wanted more step-by-step guidance on how to deliver PRIDE as planned. Based on these findings, 'Demonstration of behaviour (BCT 6.1) was considered to be suitable to include in recommendations to improve the fidelity of delivery of PRIDE.

'Behavioural practice and rehearsal' (BCT 8.1) could be used to improve fidelity of delivery with PRIDE. Previous research suggests that an intervention containing the BCT 'Behavioural practice and rehearsal' has been found to improve delivery of guidelines in primary care (French et al., 2012; French et al., 2015). Practice would be acceptable to DAWs as findings presented in this thesis identified that DAWs wanted more opportunities to practice delivering components of PRIDE (see Chapter 5, Section 5.3.1). Based on these findings, 'Behavioural practice and rehearsal' (BCT 8.1) was considered to be suitable to include in recommendations to improve fidelity of delivery of PRIDE.

For the three intervention functions relevant to engagement, five BCTs were identified to include within recommendations, using the BCW and APEASE criteria. These were: 'Social support (unspecified)' (BCT 3.1), 'Social support (practical)' (BCT 3.2), 'Instruction on how to perform the behaviour' (BCT 4.1), 'Prompts and cues' (BCT 7.1), and 'Behavioural practice and rehearsal' (BCT 8.1). One BCT was identified for the intervention function 'Education' ('Prompts and cues'), two BCTs were identified for the intervention function 'Training' ('Instruction on how to perform the behaviour' and 'Behavioural practice and rehearsal') and two BCTs were identified for the intervention function 'Enablement' ('Social support (unspecified)' and 'Social support (practical)'). Other BCTs were identified through expert consensus using the BCW as potentially suitable, but were not included as they did not meet the APEASE criteria. For example, the BCT 'Information about social and environmental consequences' was not suitable as participants were already aware of the benefits of engaging with the PRIDE intervention (see Chapter 5, Section 5.3.2).

‘Social support (unspecified)’ (BCT 3.1) could be used to improve engagement with PRIDE. Research suggests that social support (unspecified) contributed towards an improvement in physical activity for people with dementia (Nyman, Adamczewska & Howlett, 2018). Findings from Chapter 5 (see Section 5.3.2) outline how social support from the DAW facilitated engagement with PRIDE. Based on these findings, ‘Social support (unspecified)’ (BCT 3.1) was considered to be suitable to include in recommendations to improve engagement with PRIDE.

‘Social support (practical)’ (BCT 3.2) could be used to improve engagement with PRIDE. Previous research suggests that subtle practical support (e.g. helping the person to form strategies to do their activities) helps people with dementia to maintain independence and make decisions (Fetherstonhaugh et al., 2013). Findings from this thesis highlighted that practical support from many different people (e.g. the DAW, supporter and wider family) facilitated engagement with PRIDE (see Chapter 5, Section 5.3.2). Based on these findings, ‘Social support (practical)’ (BCT 3.2) was considered to be suitable to include in recommendations to improve engagement with PRIDE.

‘Instruction on how to perform the behaviour’ (BCT 4.1) could be used to improve engagement with PRIDE. Previous research suggests that exercise classes, which included instructions, facilitated engagement with physical activity for people with dementia living in residential homes (Heyn, 2003). Findings from the interview study outlined how a lack of knowledge about how to do the chosen activities made it difficult for some people with dementia and supporters to put their plans into practice (see Chapter 5, Section 5.3.2). Based on these findings, ‘Instruction on how to perform the behaviour’ (BCT 4.1) was considered to be suitable to include in recommendations to improve engagement with PRIDE.

‘Prompts and cues’ (BCT 7.1) could be used to improve fidelity of delivery with PRIDE. Previous research suggests that prompting the person with dementia improves the extent to which they engage with an intervention or activities (Cevasco & Grant, 2003; Chard et al., 2009; Cook, Fay & Rockwood, 2008; Dooley & Hinojosa, 2004; Padilla, 2011; Spector et al., 2003). Prompts would be acceptable to people with dementia and supporters as they spoke about the importance of reminders and recommended using sticky notes to highlight relevant sections of the manual or providing summaries between sessions (see Chapter 5, Section 5.3.2). Based on these findings, ‘Prompts and cues’ (BCT 7.1) was considered to be suitable to include in recommendations to improve engagement with PRIDE.

‘Behavioural practice and rehearsal’ (BCT 8.1) could be used to improve fidelity of delivery with PRIDE. Previous research suggests that exercise classes, which included practice, facilitated engagement with physical activity for people with dementia living in residential homes (Heyn, 2003). Participants spoke about wanting to engage in activities that they were familiar with (see Chapter 5, Section 5.3.2). Based on these findings, ‘Behavioural practice and rehearsal’ (BCT 8.1) was considered to be suitable to include in recommendations to improve engagement with PRIDE.

6.3.4 Mode of delivery

In terms of fidelity of delivery, four different types of mode were identified as suitable to deliver the four BCTs. These were: human interactions (e.g. face-to-face or over the telephone), printed materials and digital delivery. ‘Social support (unspecified)’ (BCT 3.1) could be delivered either face-to-face during the PRIDE training day or remotely via telephone. Given that providers are based at different sites and that face-to-face contact is not always possible, the provision of support through telephone calls may be more suitable within the context of PRIDE. ‘Instruction on how to perform the behaviour’ (BCT 4.1) could be delivered through human contact (e.g. face-to-face or remotely), printed materials or digitally. Provision of printed materials may be more suitable in the PRIDE intervention as DAWs reported difficulties remembering the information provided on the training day (see Chapter 5, Section 5.3.1). ‘Demonstration of behaviour' (BCT 6.1) could be delivered through human contact (e.g. face-to-face) or digitally (e.g. through a video displayed on a computer). All PRIDE DAWs need to receive standardised training (Bellg et al., 2004). Therefore, to ensure that all providers receive the same demonstration of behaviour, demonstration could be delivered digitally or by somebody who has been trained to demonstrate the intervention consistently. 'Behavioural practice and rehearsal' (BCT 8.1) could be delivered face-to-face during the PRIDE training day.

In terms of engagement, three different types of mode of delivery were identified as suitable to deliver the five BCTs. These were: human interactions (e.g. face-to-face or remotely via telephone) and printed materials. The BCTs: 'Social support (practical)' (BCT 3.2), and 'Behavioural practice and rehearsal' (BCT 8.1) could be delivered face-to-face by the DAW during the PRIDE sessions. 'Social support (unspecified)' (BCT 3.1) could be delivered over the phone between sessions. The BCTs: 'Instruction on how to perform the behaviour' (BCT 4.1), 'Prompts and cues' (BCT 7.1) could be delivered through the provision of printed materials. Findings from this thesis indicate that this would be acceptable to people with dementia and supporters. Participants reported that a summary sheet may be helpful (see Chapter 5, Section 5.3.2). The delivery of these BCTs with these modes of delivery would require minimal additional resources above and beyond the current trial.

6.3.5. Developing initial recommendations

In terms of fidelity of delivery, four recommendations were developed for use within the PRIDE intervention.

First recommendation: show a video of how to deliver PRIDE. This recommendation aims to increase DAWs' skills to deliver PRIDE as planned, reduce anxieties about delivering PRIDE as planned and improve social support for delivering PRIDE. This recommendation is based on the intervention functions 'Training' and 'Modelling' and the BCT 'Demonstration of behaviour' (6.1) would be delivered using a digital mode of delivery. During the PRIDE training day, DAWs would be shown a video which models a DAW from the feasibility trial demonstrating how to deliver a PRIDE session. The video would demonstrate problem solving and how to tailor the intervention to individual participants, depending on the participants' chosen topics and activities. Once the video is made, it can be shown in every training session and given to DAWs to refresh their training during the delivery of PRIDE.

Second recommendation: give an instruction sheet about how to deliver PRIDE. This recommendation aims to increase DAWs' skills to deliver PRIDE as planned and reduce anxieties about delivering PRIDE as planned. This recommendation is based on the intervention function 'Training' and the BCT 'Instruction on how to perform the Behaviour' (4.1) and would be delivered through printed materials. DAWs would be given an instruction sheet which summarises the information in the manual and compliments the video. This sheet would provide clear, step-by-step instructions on how to deliver both standardised and tailored components of PRIDE.

Third recommendation: give DAWs time to practice delivering PRIDE within the training session. This recommendation aims to equip DAWs with the skills needed to deliver PRIDE as planned. This recommendation is based on the intervention function 'Training' and the BCT 'Behavioural practice/rehearsal' (8.1), and would be delivered face-to-face during the PRIDE DAW training day. At the end of the training sessions, DAWs would be paired up and asked to practice delivering and tailoring the intervention content, based on a participant case study (BCT 8.1 'Behavioural practice and rehearsal').

Fourth recommendation: provide continued support from researchers for delivery. This recommendation aims to improve social support to facilitate DAWs to deliver PRIDE as planned. This recommendation is based on the intervention function 'Enablement' and the BCT 'Social support (unspecified)' (3.1), and would be delivered over the telephone. During the training session and delivery of PRIDE, researchers already provide social support to DAWs. PRIDE researchers would provide regular telephone support to DAWs throughout delivery of PRIDE. One way of overcoming organisational barriers and addressing individual differences in experience and support would be to provide additional individualised training and supervision during these telephone calls.

In terms of engagement, four recommendations were developed for use within the PRIDE intervention.

First recommendation: give participants a session summary document. This recommendation aims to prompt enactment and increase understanding about what participants need to do between sessions. This recommendation is based on the intervention function ‘Education’ and the BCT ‘Prompts and cues’ (7.1), and would be delivered through the provision of printed materials. To remind people with dementia and their supporters of the plans they have made during the session and the need to enact those plans after the session, a summary document would be provided to people with dementia and their supporters after each session. To prompt engagement, this summary document could be placed on a fridge door in participants’ homes or somewhere else that is easily visible to the person. This would help to overcome barriers of not being able to remember which activities participants chose and what they were required to do between sessions. This would also facilitate involvement of supporters who were not involved in the sessions and did not know what activities had been selected.

Second recommendation: give participants clear instructions detailing how to do their chosen activity. This recommendation aims to prompt enactment, increase understanding about what participants need to do between sessions and provide participants with the skills needed to enact their plans. This recommendation is based on the intervention function ‘Training’ and the BCT ‘Instruction on how to perform the behaviour’ (4.1), and would be delivered through the provision of printed materials. To provide people with dementia and supporters with the necessary guidance to put their plans into action, clear step-by-step instructions on how to put their plans into practice would be given to the dyad at the end of each session. Given the tailored nature of PRIDE, it would not be possible to create a generic instruction sheet which would apply to all participants. Instead, instructions would need to be created by DAWs in the session or shortly after the session and would require additional time. To save time and prompt participants with details about which activities were chosen and how to do them, the instructions and summary document could be combined.

Third recommendation: ensure that there is time within the PRIDE session to practice the chosen activity where possible. This recommendation aims to provide participants with the skills needed to perform their activities and improve accessibility of activities. This recommendation is based on the intervention functions ‘Training’ and ‘Enablement’ and the BCTs ‘Behavioural practice and rehearsal (8.1)’ and ‘Social support (practical)’, and would be delivered face-to-face to participants during the PRIDE sessions. Depending on the selected activity, people with dementia and their supporters could practice performing the activity in one of the three sessions, and the DAW could provide practical support. However, this may not fit within the allocated time per visit, or might not be feasible for all activities. For example, travelling to activities was a barrier for people with dementia (see Chapter 5, Section 5.3.2). Supporting participants to travel to activities would not be practicable within the PRIDE sessions. Instead, the DAW could arrange for the supporter to help the person travel to an activity on the first occasion, so that they are able to do this in future.

Fourth recommendation: provide regular compulsory telephone support from the DAW. This recommendation aims to prompt enactment and increase understanding about what participants need to do between sessions. This recommendation is based on the intervention function ‘Enablement’ and the BCT ‘Social support (unspecified)’, and would be delivered over the phone by DAWs between each of the three PRIDE sessions. Although telephone support between sessions was offered within the feasibility trial, a telephone call between sessions would be made compulsory for all participants. The DAW would then provide support to the dyad over the phone, between sessions to remind them of their activity and, for people with dementia and supporters, to ask questions about anything they were unsure of.

6.4 Discussion

6.4.1 Key findings

This Chapter reports the systematic development of recommendations that could potentially improve fidelity of delivery of, and engagement with, the PRIDE intervention. Four were developed to improve fidelity: 1) show a video of how to deliver PRIDE, 2) give an instruction sheet about how to deliver PRIDE, 3) give DAWs time to practice delivering PRIDE within the training session and 4) provide continued support from researchers for delivery. Four were developed to improve engagement: 1) give participants a session summary document to facilitate recall and prompt engagement, 2) give participants clear instructions detailing how to do their chosen activity, 3) give time within the PRIDE sessions to practice the chosen activity, where possible and 4) provide regular compulsory telephone support from the DAW to support them to put their plans into practice. These recommendations could be considered in future refinements of PRIDE to improve fidelity of delivery and engagement.

6.4.2 How findings relate to previous research

The behavioural analysis described in this Chapter focuses largely on developing recommendations to improve delivery by overcoming individual provider barriers such as knowledge. Some recommendations were also developed to target organisational factors, for example not having time within the work role to practice delivering PRIDE and barriers of the wider environment such as the need for additional support from researchers. Findings reported in Chapters 4 and 5 and previous research suggest that organisational factors may contribute towards differences in delivery across providers and sites (Damschroder et al., 2009; Kitwood, 1997b; Mahoney et al., 2006). Findings reported in Chapters 4 and 5 also indicate that differences in experience and work environments need to be considered for PRIDE to be delivered as planned. This is particularly the case when an intervention is delivered by providers with different work roles. Individualised training and supervision throughout delivery of the trial are two ways in which fidelity of delivery could be achieved (Kitwood, 1997b). This is likely to improve fidelity by ensuring that all providers have a facilitative work environment (Kitwood, 1997b). For PRIDE, individual training and supervision could be provided by telephone support.

Whilst four recommendations have been developed to improve participant engagement, it is expected that the level or detail with which these recommendations are implemented for each participant may differ, due to factors such as differences in dementia symptoms, cognitive impairment, physical health, the role of the supporter and their ability to engage (see Chapter 5). Although all participants taking part in PRIDE were diagnosed with mild dementia (Kitwood, 1997b), participants may need different support as the trajectory of dementia is not the same for everybody (Hoe & Thompson, 2010). For example, some participants who may not remember what they chose to work on during the PRIDE session, or participants who do not have a supporter taking part with them may need more detailed instructions on how to do their chosen activity than others, may need more phone calls from the DAW between sessions to prompt or signpost other support services, or may need to display the summary document in a more prominent place. Therefore, these recommendations would be expected to be adapted depending on individual participants' needs.

Interventions are often adapted. For example, the COTiD intervention has recently been adapted for use in UK settings (Wenborn et al., 2016). Whilst this adaptation was to inform the implementation of COTiD in a UK culture, adaptations may also be considered prior to evaluating an intervention. MRC guidance on developing and evaluating complex interventions states that problems with an intervention (e.g. acceptability, compliance and delivery) can be identified during the feasibility trial and refined before being delivered and evaluated (Craig et al., 2008).

There is little guidance on how to adapt interventions systematically to refine interventions based on problems identified during a feasibility trial. To the author's knowledge, this is the first study to develop recommendations to improve fidelity of delivery of, and engagement with, a complex dementia intervention. This study extends previous research by using a theory-based, systematic method to develop preliminary recommendations which could be used to improve fidelity of, and engagement with, a future PRIDE RCT. The resulting recommendations provide detailed and transparent information about (i) recommendations that were developed and (ii) the associated BCTs and intervention functions (Michie et al., 2011b). This information will inform PRIDE researchers when considering intervention refinement.

6.4.3 Limitations

One limitation of this research is that links between intervention functions and BCTs are based on expert consensus (Michie et al., 2014), and some of the identified BCTs may not be effective in particular populations, behaviours or settings. However, as demonstrated, there is some evidence from previous research in different populations, settings and/or behaviours to suggest that the selected intervention functions and BCTs may be effective for improving fidelity of delivery of, and engagement with, the PRIDE intervention.

6.4.4 Implications

This Chapter provides an example of how the BCW can be applied to develop potential recommendations to improve fidelity of delivery of, and engagement with, the PRIDE intervention. This can inform the first phase of intervention development which could be used to improve fidelity of delivery of, and engagement with PRIDE. If implemented within PRIDE, this could enhance intervention effects, and thus improve independence for people with dementia.

Changes to the PRIDE training should be made to improve fidelity of delivery. Possible additional activities include: developing a video to show DAWs how to deliver

PRIDE as planned, developing and providing all DAWs with an instruction sheet on how to deliver PRIDE, adding role-play of a PRIDE session to the training and extending the training to include telephone support and supervision for everyone.

A behavioural analysis was not conducted for COTiD-UK. However, some of the recommendations presented in this Chapter may be useful for amending the COTiD-UK training. For example, findings reported in Chapter 4 indicated that further training may be necessary for PRIDE and COTiD-UK to help providers to deliver difficult components (see Chapter 4, Section 4.5.3). To enhance skills for delivering these difficult components, demonstration and instruction may be suitable for both COTiD-UK and PRIDE. However, not all recommendations are applicable to COTiD-UK, as the training for PRIDE and COTiD-UK differed. For example, supervision and practice would not be necessary for COTiD-UK as these were already implemented into the original training.

6.4.5 Future research

Further research is needed to assess whether fidelity of delivery of, and engagement with, PRIDE can be improved, using the developed recommendations. Whilst previous research indicates that the BCTs included in these recommendations might be effective in other behaviours, populations and/or settings, the extent to which they may improve the fidelity and engagement of the PRIDE intervention is currently unknown.

Before implementing these recommendations, stakeholder feedback would be necessary to identify additional recommendations, highlight whether the selected recommendations would be appropriate for use within PRIDE and adapt the recommendations accordingly. To gain stakeholder feedback on these recommendations and their suitability for use within PRIDE, focus groups could be held with people with dementia, supporters, DAWs and PRIDE researchers. A cost-effectiveness and affordability analysis would provide information about whether these planned recommendations are cost-effective and affordable.

After feedback and amendments, the proposed recommendations could be implemented within PRIDE and evaluated to determine whether fidelity of delivery of, and engagement with, the PRIDE intervention can be improved.

6.5 Conclusions

The BCW can be used as a systematic method for developing potential recommendations to improve fidelity of delivery of, and engagement with, the PRIDE intervention. This Chapter highlights four potential recommendations to improve fidelity of delivery of the PRIDE intervention for DAWs and four potential recommendations to improve engagement with the PRIDE intervention by people with dementia and their supporters.

Chapter 7 General discussion

7.1 Summary of key findings

The main aim of this thesis was to evaluate the implementation (fidelity and engagement) of interventions to improve independence in dementia. The specific aims were:

1. To review measures of fidelity of delivery of, and engagement with, complex health behaviour change interventions (Chapter 2)
2. To develop and evaluate measures of (i) fidelity of delivery of, and engagement with, the PRIDE intervention, and (ii) fidelity of delivery of the COTiD-UK intervention (Chapter 3)
3. To assess fidelity of delivery of PRIDE and COTiD-UK (Chapter 4)
4. To assess participants' engagement with PRIDE (Chapter 4)
5. To investigate similarities and differences in perspectives of delivery between independent observers, DAWs and participants (Chapter 4)
6. To identify barriers to, and facilitators for, fidelity of delivery and engagement from the perspectives of DAWs, people with dementia and their supporters (Chapter 5)
7. To develop recommendations to improve fidelity of delivery of, and engagement with, PRIDE (Chapter 6).

To achieve Aim 1, a systematic review of measures of fidelity of delivery of, and engagement with, complex face-to-face health behaviour change interventions was conducted (see Chapter 2; Walton et al., 2017). Findings indicated that there were multiple measures used to monitor fidelity of delivery, observation and self-report. Engagement was measured by self-report and intervention records. Fewer than half of the reviewed studies measured both fidelity of delivery and engagement. Studies did not report implementation qualities (e.g. acceptability and practicality) as frequently as psychometric qualities (e.g. reliability and validity) of fidelity and engagement measures. Whilst 74% reported at least one psychometric quality, only 26% reported at least one implementation quality.

To achieve Aim 2, a systematic method was used to develop measures of fidelity for PRIDE and COTiD-UK. Four stages were followed: 1) reviewed previous measures, 2) analysed intervention components and developed a framework of intervention components, 3) developed fidelity checklists of key components and coding guidelines, and 4) obtained feedback about the content and wording of checklists and guidelines. Checklists and coding guidelines were then piloted and refined until good agreement was achieved (see Chapter 3). In the PRIDE intervention, checklists were developed for use by people with dementia, DAWs and independent observers to assess fidelity and engagement. In COTiD-UK, checklists were developed for use by independent observers only. After several rounds of piloting and amendments to the coding guidelines and checklists, measures of fidelity of delivery of PRIDE and COTiD-UK, which demonstrated good inter-rater agreement, were developed.

To achieve Aims 3-5, fidelity of delivery was measured in both PRIDE and COTiD-UK and engagement was measured in PRIDE (see Chapter 4). Findings indicated that PRIDE and COTiD-UK sessions were generally delivered moderately well as planned (Aim 3). Delivery varied slightly across sessions, sites and providers in both interventions. For PRIDE, there was a discrepancy between ratings of transcripts from audio-recordings and self-report data, with self-report data showing high fidelity (Aim 5). Participants reported high engagement suggesting that they understood the information and could put the skills into practice (Aim 4).

To achieve Aim 6, semi-structured interviews were conducted with DAWs, people with dementia and supporters who had taken part in PRIDE (see Chapter 5). Fidelity of delivery of PRIDE was influenced by DAWs' knowledge, personal attributes and skills required to maintain fidelity whilst tailoring the intervention to the person with dementia, and supporter and logistical considerations (including a supportive work environment and social support for delivery). Engagement with PRIDE amongst people with dementia and their supporters was influenced by their attributes, capability and opportunity to engage. Barriers to, and facilitators of, fidelity of delivery and engagement were identified (see Chapter 5). Barriers to fidelity related to social opportunity, physical opportunity and psychological capability. Facilitators of fidelity related to social opportunity, physical opportunity, reflective motivation and psychological capability. Barriers to engagement related to physical opportunity and psychological capability. Facilitators of engagement related to social opportunity, reflective motivation, physical opportunity and automatic motivation.

To achieve Aim 7, the BCW was used to develop recommendations to improve fidelity of delivery of, and engagement with, PRIDE. To improve fidelity, four potential recommendations were proposed: 1) show a video of how to deliver PRIDE, 2) give an instruction sheet about how to deliver PRIDE, 3) give DAWs time to practice delivering PRIDE within the training session, and 4) provide continued support from researchers for delivery. To improve engagement, four potential recommendations were proposed: 1) give participants a session summary document to facilitate recall and prompt engagement, 2) give participants clear instructions detailing how to do their chosen activity, 3) ensure that there is time within the PRIDE sessions to practice doing the chosen activity, where possible, and 4) provide regular, compulsory telephone support from the DAW to put their plans into practice.

7.2 How findings relate to previous research

7.2.1 Developing measures of fidelity of delivery of, and engagement with, psychological and social interventions for people with dementia

There is a consensus regarding recommended fidelity measures (Bellg et al., 2004; Borrelli, 2011), with audio-recording as the gold standard (Bellg et al., 2004; Borrelli, 2011; Lorencatto et al., 2013b). Previous research has identified strengths and weaknesses of measures used to monitor fidelity and engagement (Breitenstein et al., 2010a; Durlak 1998; Moncher & Prinz, 1991; Schinckus et al., 2014). Less is known about recommended engagement measures (Bellg et al., 2004; Borrelli, 2011), or which measures have been used to monitor fidelity and engagement in complex, face-to-face health behaviour change interventions. There has been little information about the reported quality of these measures (Baer et al., 2007; Breitenstein et al., 2010a; Maynard et al., 2013; Rixon et al., 2016).

The research outlined in this thesis has extended this knowledge by reviewing and evaluating measures used to measure fidelity of delivery of, and engagement with complex face-to-face health behaviour change interventions (see Chapter 2; Walton et al., 2017). This review found that studies rarely reported both implementation and psychometric qualities (see Chapter 2; Walton et al., 2017), highlighting a need to use high-quality measures to measure fidelity and engagement. These findings informed the development of reliable measures for PRIDE and COTiD-UK that can be used by independent observers, including researchers, providers and people with dementia (see Chapter 3). These studies demonstrate worked examples of how reliable measures can be developed for use by different perspectives, to measure fidelity of delivery of, and engagement with, complex dementia interventions.

Researcher, provider and participant ratings have previously been used to measure fidelity and engagement (Bellg et al., 2004; Borrelli, 2011; Burgio et al., 2001; Resnick et al., 2005). To the author’s knowledge, no previous research has measured fidelity from the perspectives of researchers, DAWs and people with dementia. The PRIDE fidelity study is one of the first to tailor measures to support the completion of fidelity checklists by DAWs and people with dementia (see Chapter 3). This supports a person-centred approach to dementia research and the inclusion of people with dementia in research (Boersma et al., 2015; Department of Health, 2012; Kitwood, 1993; Noland et al., 2002; Reid et al., 2001).

Previous research has measured fidelity of health interventions in terms of their component BCTs (Lorencatto et al., 2013a; Lorencatto et al., 2013b; Michie et al., 2011a; Michie et al., 2013). To identify intervention components, the PRIDE manual was coded for BCTs, but BCTs were not used to measure fidelity in the PRIDE or COTiD-UK checklists. As dementia is characterised by cognitive impairments (see Chapter 1, Section 1.1.1 for more information), measures must be clear and easy to understand and use (DEEP Guide, 2013). Instead of using BCTs, components were operationalised into behavioural activities (described in everyday language) delivered by providers. This was done to ensure that measures could be completed by all key participants, including people with dementia. For PRIDE, it would not have been practical for people with dementia or DAWs to complete the checklists if BCTs were used, as the identification of BCTs requires training (Wood et al., 2014). For COTiD-UK, intervention content may not have fully been captured by BCTs as COTiD-UK consisted of some non-BCT specific components (e.g. using open questions or not using jargon). Describing components as behavioural activities supported the development of simple and easy to use coding guidelines for both PRIDE and COTiD-UK, which facilitated the achievement of good inter-rater agreement for fidelity coding. These findings indicate that measuring fidelity and engagement from different perspectives in psychological and social interventions requires simple, easy to use checklists; measuring fidelity of delivery using BCTs may therefore not be appropriate.

Needs of the target population must be considered when developing and delivering psychological and social interventions for people with dementia (Jootun & McGhee, 2011). Therefore, tailoring is a key aspect in dementia interventions. Whilst some research has recommended the inclusion of both standardised and tailored components in fidelity assessments of complex interventions (Haynes et al., 2016), there is currently little guidance on how to measure both standardised and tailored components in dementia interventions. The development of checklists for PRIDE and COTiD-UK indicated that different interventions require different considerations regarding the measurement of tailored components (see Chapter 3 and Chapter 4). Researchers need to consider the type of tailoring and the specificity with which they need to assess each component. For example, one way to measure the delivery of components which are tailored to participants is to focus on the more general provider behaviour. For example, in both the PRIDE and COTiD-UK fidelity checklists, the standardised component ‘goal-setting’ would apply to all participants regardless of tailoring and the specific goal, and therefore the measurement of fidelity focuses on the provider behaviour of setting goals. Alternatively, additional grids can be developed to measure tailored components separately to standardised components. For example, in PRIDE, a standardised checklist and a tailored grid were developed to measure delivery of different topics and tailored components. This research provides examples of how fidelity checklists can be developed and used to measure both standardised and tailored components of dementia interventions (see Chapter 3).

7.2.2 Measurement of fidelity of delivery of, and engagement with, psychological and social interventions for people with dementia

Interventions to improve quality of life and independence for people with dementia have been developed, but these interventions are often limited by methodological weaknesses (McDermott et al., 2018; Vernooij-Dassen et al., 2010). Furthermore, the reporting and evaluation of such interventions are limited by a lack of reporting and/or measurement of delivery of intervention components (McDermott et al., 2018; Vernooij-Dassen et al., 2010). By developing fidelity checklists, key components of both PRIDE and COTiD-UK were identified. This research therefore contributes towards a clearer understanding of the components included in PRIDE and COTiD-UK and how they are delivered and engaged with. The findings from audio-recorded data highlighted that PRIDE and COTiD-UK were delivered as planned moderately well (see Chapter 4). Since participants’ engagement with PRIDE was high, and they received, understood and used the skills they had learnt (see Chapter 4), it is likely that intervention effects (or a lack thereof) were likely to be a result of the intervention (Borrelli, 2011; Lichstein et al., 1994; Manwaring et al., 2008). These findings can help to understand trial outcomes and interpret qualitative evaluations of interventions.

Previous fidelity studies in behavioural science have found that often less than half of the planned content is delivered (Bond et al., 2009; Hardeman et al., 2008; Lorencatto et al., 2013a; Lorencatto et al., 2014; Toomey et al., 2015). Dementia interventions varied, with some studies reporting moderate fidelity (Stanley et al., 2013) and others reporting high fidelity (Hanson et al., 2016; Voigt-Radloff et al., 2011a; Voigt-Radloff et al., 2011b). The findings that PRIDE and COTiD-UK were delivered with moderate fidelity (audio-recorded data) (see Chapter 4) are consistent with findings from other fidelity studies in behavioural science (Bond et al., 2009; Hardeman et al., 2008; Lorencatto et al., 2013a; Lorencatto et al., 2014; Toomey et al., 2015). PRIDE findings from DAW and participant self-report indicated high fidelity, which is consistent with previous dementia studies (Hanson et al., 2016; Voigt-Radloff et al., 2011a; Voigt-Radloff et al., 2011b). To the author's knowledge, no research prior to this thesis had investigated the differences in fidelity of dementia interventions across multiple participant perspectives. The differences in fidelity across audio-recorded data, DAW and participant self-report support research which indicates that audio-recorded ratings of fidelity show lower delivery of planned components than provider and participant ratings in relation to complex health interventions (Carroll et al., 2000; Lorencatto et al., 2014; Toomey et al., 2017). Therefore, it is possible that differences in fidelity in previous dementia interventions, compared with PRIDE and COTiD-UK, may be attributed to differences in measurement.

This research highlights the benefits of measuring fidelity of delivery and engagement in dementia interventions. The benefits of measuring fidelity during a feasibility trial (as with PRIDE) is that problems of fidelity and engagement can be improved, before an intervention is delivered on a larger scale (Moore et al., 2015). On the other hand, measuring fidelity at a later stage during a definitive RCT (as with COTiD-UK) provides evidence about what was delivered across sites and can help to understand whether and how the intervention should be implemented on a wider scale (Moore et al., 2015). It may therefore be beneficial to factor in costs of measuring fidelity during both the development and evaluation stages of intervention design. By measuring fidelity and engagement at both stages, this knowledge can be used to understand and improve delivery and engagement following a feasibility trial and also used to inform the interpretation of final outcomes following the RCT.

7.2.3 Factors which influence fidelity of delivery of, and engagement with, psychological and social interventions for people with dementia

In dementia research, intervention manuals have not been consistently used (Spector et al., 2013). Findings from the DAW interviews indicate that this may be due to concerns over needing to tailor PRIDE to each participant (see Chapter 5). Findings suggest that DAWs were trying to adhere to the manual whilst also trying to tailor it to participants. This knowledge, along with the findings which suggest that tailored components were infrequently delivered (Chapter 4), indicate that maintaining fidelity in tailored interventions for people with dementia requires skill and additional training to attain and improve these skills. DAWs reported worries about “coming across badly” to participants due to a lack of knowledge on how to adapt PRIDE whilst maintaining fidelity (see Chapter 5). However, most people with dementia and supporters reported that they had good relationships with their DAW, indicating that the therapeutic alliance was not jeopardised if DAWs followed the manual. This indicates that it may be possible to deliver PRIDE (a tailored intervention) moderately as planned, whilst also ensuring that DAWs maintain good relationships with their participants.

For both fidelity of delivery and engagement, this thesis found that the wider environment is key in influencing behaviour. Fidelity of delivery varied across providers and sites in the PRIDE and COTiD-UK intervention (see Chapter 4). Furthermore, findings from the qualitative interviews build on this finding by identifying that logistical constraints including organisational factors and social support for delivery influenced whether PRIDE was delivered as planned (see Chapter 5). Together, these findings provide insight into the crucial role of organisations on delivery of interventions. This supports previous research which suggests that organisational factors such as the availability of resources influence delivery (Damschroder et al., 2009; Dugmore et al., 2015; Lawrence et al., 2012; McKenna et al., 2014) but also provide support for the view that this is particularly important in dementia interventions (Kitwood, 1997b). Kitwood (1997b) proposed that employees vary in skill and experience and motives to do their job and that organisations must offer a facilitate working environment. This thesis extends these findings by providing empirical evidence for the differences in delivery that may result from organisational factors and provides insights into which factors support delivery and which factors hinder delivery. Furthermore, this thesis provides recommendations which can be adapted for use by intervention providers to enhance delivery for all providers, despite differences in organisation or experience (see Chapter 6).

Previous research suggests that fidelity and engagement should be considered together as part of a model of fidelity (Bellg et al., 2004). However, few studies in behavioural or dementia research have measured both fidelity and engagement (see Chapter 2; Walton et al., 2017). The findings reported in this thesis suggest that it is necessary to measure both fidelity of, and engagement with dementia interventions simultaneously, as they are not separate processes (see Chapter 5). For example, findings from the interviews indicate that within PRIDE, participant engagement was a key factor influencing delivery. Furthermore, social support provided by the DAW when delivering the intervention was a key factor influencing engagement for people with dementia and supporters. These findings highlight a potential relationship between fidelity and engagement within dementia interventions that could be explored further.

Participants had high levels of engagement with PRIDE (see Chapter 4). This finding suggests that people with mild dementia can engage with interventions, refuting suggestions that older age, dementia or cognitive impairments makes it difficult for people to engage with interventions (Borrelli, 2011; Ong et al., 1995; Safeer & Keenan, 2005; Williams et al., 2002). Findings from the interview study highlighted a number of factors which facilitated or hindered engagement with PRIDE for people with dementia and supporters, including having the interest, opportunity and ability to engage (see Chapter 5). These findings support the social model of disability which proposes that environmental influences and personal experience are important, and that society needs to be inclusive and focus on people's abilities rather than losses (Gilliard et al., 2005; Tregaskis, 2002, see Chapter 1, Section 1.1.1.2). According to the biopsychosocial model, environmental factors contribute towards a diagnosis of dementia (Spector & Orrell, 2010). To encourage people with dementia to engage with interventions and chosen activities to facilitate independence, these findings indicate that it is important to develop strategies to change adaptable factors (including the environment), after a diagnosis of dementia (see Chapter 1, Section 1.1.1.2).

Together, the findings from Chapter 5 which indicate that participants' attributes, capability and opportunity to engage, influenced participants' engagement with PRIDE support Kitwood's (1997b) Enriched Model of Dementia and the biopsychosocial model of dementia (Spector & Orrell, 2010). Kitwood's model proposed that to understand the person with dementia, we need to consider their social relationships, life history and biography, personality, neurology and health (Kitwood, 1997b; Brooker & Latham, 2016). The biopsychosocial model proposes that we need to consider a person's biological, social and psychological factors (Spector & Orrell, 2010). For example, the findings reported in Chapter 5 highlighted that social support from the supporter, family members and DAW facilitated engagement with PRIDE. This finding supports the need for an enriched social environment (Brooker & Latham, 2016; Kitwood, 1997b; Spector & Orrell, 2010). Findings reported in Chapter 5 also highlighted barriers of physical and psychological capability which hindered engagement with PRIDE. This highlights the importance of physical health and cognitive factors (Kitwood, 1997b; Spector & Orrell, 2010). Furthermore, interview findings reported in Chapter 5 highlighted that participants' attributes including preferences and emotional responses influenced engagement. This supports the biopsychosocial model and Enriched Model of Dementia which suggest that psychological factors (Spector & Orrell, 2010), biography, life history and personality (Kitwood, 1997b) help us to understand the person with dementia's experiences. The findings outlined in this thesis, combined with previous findings on person-centred care (Kitwood, 1997b; Brooker & Latham 2016) and factors influencing engagement with dementia interventions (Boulton et al, 2018; Bunn et al, 2007; Rimmer et al, 2004; Roberts & Bailey, 2011) emphasise the need to consider the whole person with dementia when implementing an intervention and to ensure that the person's whole environment facilitates engagement.

Participant engagement was also found to vary across participants, providers and sites (see Chapter 4). Findings from the qualitative interviews build on this finding by identifying that there were many factors that influenced engagement including from the DAW, their supporter and the wider support network (see Chapter 5). The findings highlighting the role of the supporter in facilitating the person with dementia to engage in their activities supports the concept of personhood which proposed that everybody exists within the context of relationships (Kitwood & Bredin, 1992). Findings reported in Chapter 5 demonstrate that practical support facilitated engagement for all people with dementia and their supporters, yet the types of support varied for different participants. For example, the concept of interdependence (Kitwood & Bredin, 1992) was supported by findings indicating that participants wanted to do activities together but also that support was important for planning and carrying out their activities. Furthermore, the importance of independence was highlighted by some participants who spoke about how they want to take responsibility for doing the activity themselves. These findings indicate that the balance between independence, interdependence and dependence (see Chapter 1, Section 1.1.2.2 for more information) may be relevant when considering engagement within dementia interventions.

The findings from the qualitative interviews with DAWs, people with dementia and their supporters also highlighted the role of cognitive factors on both engagement and fidelity of delivery (see Chapter 5). Findings indicated that cognitive factors such as memory, understanding and communication influenced a person's ability to engage with the intervention and was discussed in relation to the level of support needed by supporters. Furthermore, interview findings indicated that participants' ability to engage influenced the extent to which providers could implement PRIDE as planned (see Chapter 5). This supports previous research which suggests that all people with dementia experience symptoms differently and so different symptoms may be present despite all participants in PRIDE having been diagnosed with mild dementia (Hoe & Thompson, 2010). This further highlights the importance of person-centred care and the consideration of differing health, neurology, personalities, life history and therefore levels of support (Kitwood, 1997b). Whilst recommendations have been developed (see Chapter 6) to potentially improve engagement, these recommendations will need to be implemented with some flexibility to ensure that they can be delivered to varying degrees depending on the level of support needed to engage. Furthermore, some of these cognitive factors may change throughout the course of the three-month intervention. Therefore, DAWs may need to provide differing levels of support to account for this, at each of the different sessions.

Previous research indicated that observation of intervention sessions might change providers' and participants' behaviour (Moncher & Prinz, 1991). This is called the measurement reactivity effect (French & Sutton, 2010). It was not clear whether this would apply to dementia interventions. The findings from the interview study (see Chapter 5) were consistent with the measurement reactivity effect, indicating that measuring fidelity may change behaviour. During the interviews, providers discussed how audio-recording made them anxious and that completing checklists and recording sessions in some cases made them more conscious of trying to deliver the intervention as planned. These findings also indicated that audio-recording was not acceptable for DAWs until they got used to it. By measuring fidelity and engagement in PRIDE using self-report and observational measures, fidelity and engagement may have been improved. Whilst interviews were not carried out in the COTiD-UK study, these findings suggest that audio-recording sessions may also have changed the way that OTs delivered COTiD-UK to participants.

7.2.4 Improving fidelity of delivery of, and engagement with psychological and social interventions for people with dementia

Previous research indicated that interventions are not described well enough for replication or to measure fidelity (Glasziou et al., 2008; Glasziou et al., 2010; McDermott et al., 2018; Michie et al., 2009; Vernooij-Dassen et al., 2010). By taking a behavioural science approach to measuring fidelity of delivery of PRIDE and COTiD-UK, the components of these interventions have been identified, operationalised and are described in sufficient detail to enable replication. This is important in dementia interventions, which are not always clearly reported (McDermott et al., 2018; Vernooij-Dassen et al., 2010). Fidelity checklists were developed and can be used to measure fidelity in future PRIDE and COTiD-UK trials (see Chapter 3). Furthermore, the development of initial recommendations to improve fidelity of delivery and engagement have been systematically identified to potentially reduce identified barriers to delivery and engagement, within the context of the PRIDE intervention (see Chapter 6).

7.3 Implications

7.3.1 Implications for research

First, this research highlights that high-quality measures are rarely developed, reported and used to evaluate intervention fidelity and engagement. The research described in Chapters 3 and 4 provide a clear, worked example of the development of high-quality measures to assess fidelity and provides examples of how these can be used in practice to measure fidelity of, and engagement with, complex dementia interventions. The checklists developed for use in the PRIDE and COTiD-UK interventions can only be used to measure fidelity of delivery of those specific interventions (Breitenstein et al., 2010a). This is because all interventions have different components. However, this thesis has demonstrated that the same method for developing checklists can be applied across two different interventions (see Chapter 3). As such, the transferability of the method described in Chapter 3, suggests that it could potentially be applied to develop reliable measures of fidelity for other complex psychological and social interventions for people with dementia, or interventions more generally.

Secondly, the research outlined in this thesis demonstrates how quantitative and qualitative methods can be combined to evaluate fidelity of delivery of, and engagement with interventions. In this thesis, a combination of observation, self-report and qualitative methods were used to evaluate fidelity of delivery and engagement. To evaluate fidelity of delivery of, and engagement with, the PRIDE intervention, three stages of research were presented in this thesis. These were: (i) reviewing measures, (ii) developing and using high-quality measures, and (iii) identifying and using factors influencing fidelity and engagement to develop recommendations for good practice. The worked example of these stages in this thesis could be applied to evaluate other complex interventions for people with dementia, and more generally. Whilst the methods used in this thesis were developed for use in PRIDE and COTiD-UK, the stages could also be adapted for use in services, or interventions for people with other mental health conditions or health conditions.

Thirdly, this research points to ethical issues that may arise when conducting qualitative research as part of larger trials (Cooper et al., 2014). In this study, the use of mixed methods led to some challenges, particularly in the PRIDE feasibility trial which had small sample sizes, raising ethical considerations relating to maintaining confidentiality. In this thesis, individual percentages of fidelity across individual DAWs and OTs were not reported in Chapter 4 due to concerns over identification of sites and individual providers. The decision was made not to report job roles or gender alongside quotes within Chapter 5 due to the risk of jeopardising anonymity of DAWs. In order to maintain anonymity, care must be taken when reporting observational data and qualitative findings within fidelity research.

7.3.2 Implications for policy

The number of people receiving a diagnosis of dementia is rapidly increasing (Alzheimer's Society, 2017; see Chapter 1, Section 1.1). Due to a decline in cognitive abilities, it is difficult for those diagnosed with dementia to live independently (Potkin, 2002; Spector et al., 2013). It is therefore important that interventions which aim to improve independence, meaningful activity and well-being for people with dementia, such as PRIDE and COTiD-UK are developed and evaluated. If these interventions are found to be effective, they could have the potential to improve wellbeing, independence and meaningful activity on a large scale for people with dementia.

Findings from this thesis inform whether and how PRIDE and COTiD-UK should be implemented more widely. The outcomes of PRIDE and COTiD-UK are not yet available, but findings can help to interpret effectiveness once available. PRIDE and COTiD-UK were delivered with moderate fidelity (see Chapter 4). If PRIDE and COTiD-UK are effective, any PRIDE and COTiD-UK intervention effects were likely to be the result of the planned interventions. This would indicate that the interventions have the potential to improve the quality of life, meaningful activity and independence of people with dementia and their supporters. Furthermore, if PRIDE and COTiD-UK were effective and were implemented in practice, this research could inform the extent to which they might need to be delivered and engaged with in order to be effective, and how to refine the interventions to achieve this. If the interventions were found not to be effective, findings would indicate that the intervention content was not effective or that other factors which were not measured may have influenced effectiveness (for example, for COTiD-UK other factors may include lack of engagement or contamination of usual care). This can help policy makers determine whether interventions are effective and whether and how they should be implemented on a wider scale.

The findings from this research highlighted environmental barriers which limited engagement with PRIDE (see Chapter 5). For example, the accessibility of activities for people with dementia was limited by difficulties using public transport and the lack of availability of suitable activities. This suggests that policymakers may need to support the development of policies to enable people with dementia to access services, and to develop services which facilitate people with dementia to take part in activities. By improving the accessibility of communities to services, this could help to overcome the accessibility barriers identified in this thesis, and help people with dementia to engage in various activities and maintain independence; which could slow the progression of cognitive decline (Andersen et al., 2004; Jing et al., 2016; Kitwood, 1997a).

7.3.3 Implications for practice

The findings from this thesis indicated key difficulties delivering PRIDE and COTiD-UK. Components that were difficult to deliver in PRIDE and COTiD-UK (see Chapter 4), and barriers and facilitators to delivery of PRIDE were identified (see Chapter 5). Together, these findings along with the recommendations outlined in Chapter 6 can be used to improve training for providers. This would ensure that healthcare providers have the required skills, attributes and facilitative work environment to deliver and tailor PRIDE and COTiD-UK as planned.

For people with dementia and their supporters, the findings highlight difficulties people face when trying to engage in activities with PRIDE. People with dementia and their supporters need to have the relevant personal attributes, capability and opportunity to engage in activities. These factors may also be relevant for people with dementia and supporters who did not take part in PRIDE, but who are trying to find ways to engage in activities. This knowledge can be used to ensure that interventions and services are developed and delivered in a way that reduces barriers and maximises people’s potential to engage. One example is to encourage people to work on activities that they like or want to do (as demonstrated within PRIDE and COTiD-UK) rather than asking everyone with dementia to take part in the same activities. If the PRIDE intervention is found to be effective and recommendations were found to be useful for improving fidelity and engagement, there is a potential to maximise intervention outcomes and therefore help people with dementia to improve their independence.

7.4 Strengths

To the author’s knowledge, this is the first study to use behavioural science approaches (such as the COM-B model and BCW) to measure fidelity of delivery and engagement, understand factors influencing fidelity of delivery and engagement and develop recommendations to improve fidelity of delivery of, and engagement with, an intervention for people with dementia. The research used a thorough, theory-based, person-centred approach to evaluate fidelity of delivery and engagement. To ensure that the interviews comprehensively identified factors which influenced behaviour, both the COM-B model (Michie et al., 2011a) and TDF (Cane et al., 2012) were used to inform the development of interview schedules to identify factors influencing fidelity of delivery and engagement. The BCW provided a systematic approach for developing initial recommendations to improve fidelity of delivery and engagement. This behavioural science approach to evaluating fidelity of delivery and engagement may therefore be appropriate for use in other psychological and social dementia interventions.

MRC guidance for process evaluations of complex interventions recommends that qualitative and quantitative methods are needed to fully evaluate interventions

(Moore et al., 2015; see Chapter 1, Section 1.4.2). This research used mixed methods to evaluate fidelity of delivery of, and engagement with, PRIDE. By conducting a thorough interview study alongside the measurement of fidelity and engagement, these findings provided better insights into what was delivered and engaged with and why (see Chapter 5). Combining fidelity and engagement outcomes with interview findings provided insights into why the intervention was not fully delivered as planned and engaged with and provided details of how relevant behaviours could be changed to improve these. The in-depth assessment of two complex behaviours (fidelity of delivery and engagement) provided information with which to develop recommendations to refine the PRIDE intervention and improve fidelity and engagement.

A key strength of this thesis is that it includes both PRIDE and COTiD-UK. This enabled researchers to investigate whether similar methods could be used to develop fidelity measures across two different interventions for people with dementia which were in different stages of intervention evaluation (feasibility trial vs RCT). The use of audio-recording across both studies enabled researchers to develop a feasible method for achieving inter-rater agreement within fidelity assessments.

This research measured fidelity of delivery of, and engagement with PRIDE (see Chapter 4) and the factors influencing these behaviours (see Chapter 5) from different participant perspectives, including researchers, DAWs, people with dementia and supporters. This thesis triangulated methods to measure and understand fidelity of delivery and engagement. This is consistent with previous recommendations which suggest that multiple approaches should be used to address the same question (Munafo & Smith, 2018). The use of multiple methods in fidelity research has been used in many studies (as demonstrated in Chapter 2). This helps to overcome the limitations associated with each measurement (Keller-Margulis, 2012; McKenna et al., 2014; Moncher & Prinz, 1991; Munafo & Smith, 2018). Triangulation of methods is therefore a key strength of this thesis.

Previous research has highlighted the importance of the person-centred approach, and that people with dementia should be included in dementia research (Boersma et al., 2015; Department of Health, 2012; Kitwood, 1993; Nolan et al., 2002, Reid et al., 2001). People with dementia have frequently been involved in assessments of intervention outcomes (e.g. Brod et al., 1999) and qualitative evaluations of interventions (see Dugmore et al., 2015 for examples), but there has been little research including people with dementia in the evaluation of fidelity of delivery and engagement. This research took a person-centred approach to process evaluation. These findings suggest that people with dementia and those delivering interventions for people with dementia can and should be included throughout multiple stages of the evaluation, including measuring fidelity and engagement and identifying factors which influence fidelity and engagement. The involvement of people with dementia offered key insights in this study. It provided information about how people with dementia and supporters experienced and engaged with the PRIDE intervention, and helped to identify key barriers to and facilitators for engaging with PRIDE so that the intervention can be improved.

Reliability was a key consideration throughout this thesis. This included: calculating agreement in screening decisions for the systematic review (see Chapter 2), categorising the reported quality of measures (see Chapter 2), achieving and maintaining inter-rater agreement on fidelity coding for PRIDE and COTiD-UK (see Chapters 3 and 4) and double coding all quotes into COM-B domains during the content analysis of interview data (see Chapter 5). Finally, the trustworthiness of the thematic analysis was increased by having a second researcher code three transcripts to pilot the coding frame. Final themes were reviewed by the second researcher and discussed with supervisors (see Chapter 5). Achieving agreement helped to assure that findings were reliable.

7.5 Limitations

One limitation of this thesis is that the intervention results for PRIDE and COTiD-UK are not yet available. However, the MRC guidance for process evaluation proposes that analysing process evaluation outcomes such as fidelity and engagement prior to knowing the intervention outcomes separately may reduce biases in analysis of data (Moore et al., 2015). Whilst this means that the findings cannot be interpreted fully in relation to the intervention outcomes in this thesis, this may also be a strength of this study as analysis was not influenced by intervention outcomes. Findings from this thesis can inform how results will be interpreted once they are available.

The COM-B model and BCW were used to evaluate and develop initial recommendations to improve fidelity of delivery of, and engagement with, PRIDE. Whilst comprehensive and systematic, this framework has some limitations. For example, links between BCTs and intervention functions are based on expert consensus (Michie et al., 2014) and do not necessarily reflect effectiveness of BCTs. The use of the COM-B model and TDF to inform the development of interview schedules may have influenced the responses that DAWs, people with dementia and supporters gave. However, this limitation was minimised by using open questions and prompts using the TDF.

The fidelity assessment of COTiD-UK was already planned and ethical approval had been sought prior to HW's involvement, therefore there was little scope for aspects of intervention implementation other than fidelity of delivery to be included. It was not possible to investigate engagement with COTiD-UK, factors influencing delivery of, or engagement with, COTiD-UK, or to develop recommendations to improve COTiD-UK.

7.6 Future research

7.6.1 Developing measures of fidelity of delivery and engagement

There is a need to determine which of the reported psychometric and implementation qualities identified in Chapter 2, are particularly important when measuring fidelity of delivery and engagement with complex face-to-face health behaviour change interventions. This was not within the scope of this PhD. However, future research could achieve this by conducting an expert consensus study, in which experts in fidelity and engagement could be asked to highlight which psychometric and implementation qualities were most important and to rate which qualities should be given the most weight when delivering and evaluating fidelity of delivery and engagement measures. These findings could then be used to improve the measurement of fidelity of delivery of, and engagement with, dementia interventions (such as PRIDE and COTiD-UK), but also health behaviour change interventions. These findings could be used to support the identification of a gold standard method for measuring engagement, for both dementia interventions and health interventions.

Other areas of research such as education and addiction have developed fidelity frameworks which can be applied to measure the fidelity of more than one intervention (see Chapter 1 for more details; e.g. Century et al., 2010; Carroll et al., 2000). This may be beneficial within dementia research. Currently, there are many complex interventions for people with dementia which have multiple components (see Chapter 1, Section 1.1.3). Future research could focus on reviewing dementia interventions to create a matrix of intervention components to investigate what is common across all interventions, and what is unique to certain interventions. This could lead to the development of a dementia fidelity framework. However, in order for this to be possible, the components used in dementia interventions need to be clearly reported, which is currently limited (McDermott et al., 2018; Vernooij-Dassen et al., 2010).

7.6.2 Measurement of fidelity of delivery and engagement

To date, there has been a reliance on using descriptive statistics to describe how interventions are delivered and engaged with (see Chapters 2 and 4; Walton et al., 2017). Future research could use multilevel modelling to measure fidelity of delivery and engagement across sites and providers. Fidelity studies have many levels, including sites, providers, participants, and multiple sessions. Therefore, guidance on sample sizes for multilevel fidelity studies is required, as larger sample sizes are needed with more levels of data (Heck et al., 2014). Guidance would enable researchers to conduct larger fidelity studies and investigate statistical differences between sites, providers, sessions and participants. By identifying which components are delivered and whether delivery differs across settings and populations, fidelity research can help to understand which components (and combination of components) are effective in which situations.

Further research is needed to understand the relationships between fidelity and engagement and intervention outcomes. There is a lack of consensus regarding whether high fidelity, moderate fidelity or low fidelity lead to better intervention outcomes (see Chapter 1, Section 1.3.2.2.1). This study has not explored this relationship due to small sample sizes. It is likely that the effectiveness of an intervention may depend on what the intervention is and how effective it is for changing the target behaviour or outcome. For example, providers could deliver an average of 70% of components (moderate fidelity). This 70% of components could be made up of a range of effective, moderately effective and less effective components. Delivering 70% of effective intervention components may be more likely to lead to better intervention outcomes than delivery of 70% components that have little effect. Therefore, future research should focus on the effectiveness of components as well as investigating whether there is an optimal level of fidelity.

7.6.3 Understanding and improving fidelity and engagement

To determine whether fidelity of delivery and engagement can be improved within PRIDE, the initial recommendations to improve fidelity and engagement, developed in Chapter 6, could be iteratively revised following stakeholder feedback, and then implemented in practice and evaluated in future versions of PRIDE.

Interviews provided in-depth information about barriers to, and facilitators for engagement with PRIDE; but other methods could be explored to identify factors that help and hinder engagement with other dementia interventions. One such method could be the use of ‘Photovoice’ (Sutton-Brown, 2014), in which participants are asked to take photos of themselves engaging in their planned activities during the course of the intervention. To explore factors influencing engagement, these photos could then act as memory prompts during post-intervention interviews. ‘Photovoice’ may help the person with dementia to recall taking part in the intervention and putting their plans into practice, and could also offer a method for measuring the extent to which participants engaged.

7.7 Conclusion

The research presented in this thesis aimed to evaluate the implementation of two interventions to help people live well with dementia. The research outlined in this thesis provided worked examples of how behavioural science principles can be applied to psychological and social interventions for people with dementia to measure, understand and potentially improve fidelity of delivery and engagement behaviours, thus potentially increasing the effectiveness of interventions for people with dementia, to enhance independence and quality of life.

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Note: Studies included in the systematic review in Chapter 2 are marked with *Study number

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Appendix

Appendix 2-1. Characteristics of included studies

Authors (and date)	Methods	Participants	Facilitator characteristics and training	Description of intervention Intervention groups	Target behaviour	Delivery mode, sessions, duration
Apter et al (2011) [1]	Randomized controlled trial	Primary care and asthma practices. 333 (165 in PS, 168 in control) adults with asthma	Research coordinators (college graduates). 3-week training using manuals	Problem solving intervention. Control: Standard asthma education.	Improve adherence to asthma treatment	4 face-to-face 30 minute sessions. Control: Four 30 min sessions.
Arends et al (2014) [2]	Process evaluation of cluster randomized controlled trial	Occupational health services in Netherlands. 109 workers in intervention, 64 process evaluation -	126 physicians. 2-day training. Experienced trainers. Three feedback moments.	SHARP intervention. Control group: care as usual.	Minimise recurrent sickness absence	Two to five face-to-face consultations within 3 months.
Baker et al (2001) [3]	Randomized controlled trial	Community based. 56 participants (over 55) (23 control/23 intervention) with knee osteoarthritis.	Not provided	Home based progressive strength training program and attention control group.	Exercise	Face-to-face. 3 times per week for exercise. 2 home visits for 3 weeks and once every fortnight after 12 weeks.
Bailey et al (1990) [4]	Repeated measures design	Pulmonary Medicine Clinic, individuals with asthma diagnosis (101 usual care, 124 intervention)	Health educator delivering programme.	Self-management intervention vs usual care	Asthma self-management practices	One to one face-to face counselling session (1 hour)
Binkley et al (2014) [5]	Pilot study (pre/post)	12 homes (2 cohorts). 25 residents with IDD. 21 caregivers	Trained at baseline. No information.	Oral health strategy with four components.	Oral hygiene practices	2 face-to-face coaching sessions (1.5-2 hours, 30 min – 2 weeks apart)
Black (2014) [6]	Quasi experiment (pre/post)	Community setting. 120 caregivers of older adults.	Bachelor level social worker. 8 hr training	CAREs intervention. 4 phases.	Caregiver skills	Face-to-face, 3-12m
Brug et al (2007) [7]	Randomized controlled trial	9 home care organisations in Netherlands. 209 patients with diabetes.	37 dieticians (bachelor's degrees, (2 to 20 years' experience), 2 days training by senior dieticians in MI	MI intervention and no MI intervention.	Changes in dietitians counselling style	2 face-to-face one week sessions. Participants = 4/5 counselling sessions (30-35 mins /15mins)
Butler et al (2012) [8]	Randomised controlled trial	66 GPs in Wales, 142 clinicians. (34 practices in intervention)	Clinicians (intervention: 127 clinicians, control 135 clinicians)	Blended learning experience and usual care.	Reduce antibiotic dispensing	Face-to-face and online

Campbell et al (1998) [9]	Randomized controlled trial	19 General practices in N.E Scotland. 673 patients in intervention, 670 in control	28 District nurses/practice nurses. Day and a half training on manual and techniques. Phone support.	Clinic visits and control.	Secondary prevention (aspirin use/BP management, exercise, diet.	Face-to-face clinics for a year (first session 45 mins, follow up 20 mins)
Chesworth et al (2015) [10]	Open cluster randomized feasibility trial	12 NHS stroke services (England/Wales). 413 stroke patients	Intervention protocol. Online and face-to-face training	Intervention, Supported implementation, Usual care.	Management of UI after stroke	Face-to-face
Cheung et al (2015) [11]	Quasi experiment (pre/post)	11 NGOs. 243 cases. Caregivers in Hong Kong (6m+), and individuals with dementia	85 providers (social workers 1yr+ experience). Training: supervised, video recordings, manual	REACH II. Individualized psychoeducational and skills training based NPI.	Caregiver skills and reduce behavioural problems	Nine in home face-to-face 1 hr sessions and three 0.5 hr telephone sessions
Dannhauser et al (2014) [12]	Open label study (pre/post)	Home/community based. 70 individuals with MCI	Training and materials for tutors	ThinkingFit programme. (Exercise, group based CST, individual CST)	Exercise	12 face-to-face sessions (one per week) 20-45 mins. + 2.5hr sessions + 30m x 3 per week
DeWalt et al (2006) [13]	Randomised controlled trial	University medicine practice. 127 participants using furosemide (62 intervention/62 control)	Clinical pharmacist/health educator	Education session vs control group (general education pamphlet)	Self-management skills	Hour face-to-face session. 5-15 min follow up calls
Driessen et al (2010) [14]	Process evaluation of a cluster RCT	4 Dutch companies (railway, airline, steel, university). Depts. With 3000 workers, 2 years 20hours+	Ergocoaches. 40 implementers followed 4-hour training	Stay@work intervention. Control	Reduced episodes of neck and back pain	One 6hr face-to-face working group meeting. Three short movies.
Dubbert et al (2002) [15]	Randomized controlled trial	Medical Centre. 181 participants (59 PC, 62 PC and AC, 60 NC)	None mentioned	Clinic based activity counselling and follow up calls (x20, x 10 or none).	Exercise	One Face-to-face session then telephone (x20, x 10 or none)
Duff et al (2013) [16]	Uncontrolled intervention + process evaluation (pre/post)	250 bed private hospital in Sydney, Australia. 85 nursing staff. 98 patients	Registered nurse – expert VTE knowledge (20+yrs). 2-day workshop	Educational outreach visits.	Provide prophylaxis based on VTE risk	1 face-to-face educational visit
Duncan et al (2003) [17]	Randomised controlled trial	One HF clinic, participants with an ejection fraction of 40% or less, receiving pharmacologic therapy	None mentioned.	Exercise with adherence facilitation, exercise only.	Exercise	Face-to-face 3 times a week then asked to do two /three times a week at home.
Ettinger et al (1997) [18]	Randomised single blind clinical trial	2 clinical centres at universities. 439 Community dwelling adults over 60 with knee osteoarthritis	Not provided.	Aerobic exercise training, resistance exercise training, health education control	Exercise	8 face-to-face 1 hour sessions a week (10-15 people). Home based (4 visits and 6 calls).

Farmer et al (2007) [19]	Three arm open parallel group randomized trial	General practices. 453 patients with type 2 diabetes (152 usual care/150 less intensive/ 151 more intensive)	Research nurses. Training: Psychological theory and trained in behaviour change techniques.	Less intensive self-monitoring, more intensive self-monitoring, usual care.	Regular blood glucose monitoring	Face-to-face (after randomisation, one, three, six and nine months.
French et al (2015) [20]	Cluster randomized trial	36 GP's. 7 practices (53 GPs control, 45 practices 59 GPS to intervention). Participants with acute non-specific LBP	Each session = 2 or 3 facilitators. 4 GPs, 2 were allied health clinical professionals	Two session workshop. And control group.	Reducing referrals of patients with back pain for x-ray	Two session workshops (3 hour) face-to-face sessions.
Gabbay et al (2013) [21]	Randomized controlled pragmatic trial	12 primary care clinics. Patients with type 2 diabetes (313 in control, 232 in intervention)	Three nurses. Standardised training by HCPs certified in M. (80 hour)	Intervention vs usual care.	Self-management behaviours	Hour long face-to-face sessions. Phone call/email. Control visits every 3m
Goyder et al (2014) [22]	Process evaluation of three arm parallel group randomised controlled trial.	Deprived areas of Sheffield between 40-64 years, not achieving recommended exercise. 282 randomised (control 96, mini booster, 92, full booster 94).	Research assistants trained by MI trainer. 6 days formal training, supervision. 3 years' experience + physical activity experience	MI intervention, control, no intervention.	Physical activity	Full booster = 2 face-to-face sessions (20-30 mins), mini booster two physical activity MI consultations by telephone
Griffin et al (2010) [23]	Process evaluation	12 sites across US. 4689 participants in 328 groups.	Multiple trainings for program staff (phone calls and meetings).	Active for Life	Physical activity	20 face-to-face weekly classes. One to one counselling and eight telephone calls.
Grubbs et al (2015) [24]	Secondary analysis of an RCT.	17 primary care clinics in California, Washington and Aransas (4 sites). 1004 patients –PD, GAD, SAD, PTSD. 501 usual care 503 intervention	Care managers: master's degrees in social work/nursing. Supervised by clinical psychologist	Collaborative care intervention. Medication CBT both or neither. Usual care	Reduce anxiety symptoms	8 face-to-face CBT sessions, optional monthly relapse prevention by phone
Hankonen et al (2015) [25]	Randomised controlled trial	34 general practise in 4 areas of England. Participants with type two diabetes. 229 intervention, 239 control	3 trained lifestyle facilitators. Two background in nursing, social work. Training = 7 days	Intensive diabetes treatment plus behaviour change intervention (Addition plus). Control: Diabetes treatment only.	Physical activity	1 year face-to-face and telephone. 1 hour introduction meeting, 6 30 min meetings and four brief phone calls.
Hardeman et al (2008) [26]	Fidelity analysis of ProActive Trial	UK, 52 participants from Proactive trial. 27 participants.	Dietician, two nurses and physical fitness instructor. 5-day training + manual	Three trial arms: Brief advice, face-to-face intervention, distance intervention.	Physical activity	Face-to-face intervention. 4 sessions at participants' home. Phone calls and monthly contact

Harting et al (2004) [27]	Quality assessment of a randomized controlled trial	University hospital Maastricht and 35 GPs of 25 practice units. 2743 high risk of cardiovascular event within 10 year patients.	10 cardiologists and 35 GP's. Four health advisor. 2-day practical course + 2-day training. Feedback sessions	High risk intervention.	Reduce behavioural cardiovascular risk factors	No more than 6 face-to-face consultations (45 then 30min)
Hermens et al (2001) [28]	Nationwide prospective cohort study	Random sample of 1/3 of all 4758GPs in Netherlands. 1586 GPs	Educational materials. Support by outreach visitors + training	National prevention programme.	Adherence to cervical cancer screening guidelines	Face-to-face
Holtrop et al (2015) [29]	Mixed methods study	5 practices in Michigan USA. Intervention practices in a larger intervention	2 researchers (co-investigator/research assistant)	Intervention: Chronic care model. Control group.	Diabetes management	Face-to-face
Hunt et al (2001) [30]	Process evaluation of a nutrition RCT	6 group practices (Harvard Pilgrim Healthcare). 230 patients 274 in control	28 providers (intervention), 50 (control). Telephone counsellors (master's students). 2 4h training workshops + weekly meetings	EatSmart intervention. Control group.	Health behaviours (diet)	Brief face-to-face PCP endorsement, 2 counselling calls, consultation with dietician.
Yu-Yahiro et al (2009) [31]	Randomised controlled trial.	Home based. 91 Women over 65, with hip fracture	Trainer randomized. Previous experience.	Exercise program, plus or motivational component, and usual care.	Exercise	5 days a week face-to-face exercise sessions. 3 trainer supervised exercise sessions per week (2 months)
Jansink et al (2013) [32]	Cluster randomised trial.	58 general practices in Netherlands. Patients with type 2 diabetes.	Nurse led. 4 half day training session	Intervention group and usual care.	Lifestyle behaviours	Face-to-face
Keith et al (2010) [33]	Mixed methods sequential exploratory design of quasi experiment	4 medical centres (2 tertiary, 2 primary). 457 patients with chronic heart failure.	18 clinicians	Nurse practitioner case management program.	Inpatient resource use	Face-to-face
Lawrence et al (2014) [34]	Non-randomised controlled trial	Sure start centres. All play, family support and community development workers. 148 practitioners	Training delivered by researchers experienced in behaviour change.	Intervention vs no healthy skills training.	Health behaviour change – client centred skills	Three face-to-face 3-hour group sessions over 3-5 weeks.
Lazovich et al (2000) [35]	Randomised controlled trial	6 primary care clinics in Washington. 28 practices, Individuals with an appointment (1010 intervention, 1111 control).	Brief (20/30 min) training session. Introduce intervention	Intervention (written materials physician verbal message, follow up support)	Diet	Face-to-face
Lobb et al (2004) [36]	Randomised controlled trial	14 health centres in low income multi ethnic neighbourhoods 1088	97 physicians, nurse practitioners and physician	Healthy directions health centre's intervention.	Health behaviours (diet, physical	Face-to-face clinician endorsement (1hr). 2

		participants aged 18-75	assistants. Previous experience. 16 hrs training, 8hr social training, ongoing support,	Control group.	activity)	health counselling sessions. 4 telephone calls.
Matei et al (2015) [37]	Mixed methods analysis of an uncontrolled trial (pre/post)	Sheltered housing and community and faith centre. Participants (more than 6 hours daily sitting times, 60-75 years old.	None mentioned	Intervention.	Reduce sedentary behaviours	Face-to-face
McCarthy et al (2015) [38]	Mixed method process evaluation (pre/post)	HF clinic within large urban hospital. 20 ethnic minority adults 18+ with stable HF (60% male)	3-day workshop with feedback	Exercise counselling, 12-week telephone follow up, daily diary for self-monitoring.	Exercise	1 face-to-face exercise counselling session. 12 weeks of calls
McCurry et al (2012) [39]	Pilot Randomised controlled trial	37 homes. 47 residents with dementia and sleep problems	MSW trainer 15 years' experience. 2r training with PI, weekly supervision, tape review	Sleep education program. Usual care control.	Improving sleep	4 face-to-face sessions.
McGillion et al (2008) [40]	Randomized controlled trial	3 university teaching hospitals in Canada with large cardiac outpatient programs. 130 CSA patients living in community, 66 CASMP	Facilitator manual. Registered nurse (8-15 patients)	Chronic angina self-management program (group). Wait list control.	Self-management skills	Weekly 2 hr face-to-face sessions for 6 weeks
McNamara et al (2015) [41]	Complex educational intervention	10 community pharmacies in Victoria/Tasmania (5 rural/5 metropolitan). 70 patients aged 50-74 years taking high BP medicine.	12 experienced pharmacists. Instructed in health education and behaviour change	Clinical report and action plan, report highlighted risk, suggest goals.	Reduce CVD risk (health behaviours)	Five face-to-face sessions (30 mins then 15 mins) at monthly intervals
Metzelthin et al (2013) [42]	Process evaluation of cluster Randomized controlled trial using mixed methods	6 GP practices in South Netherlands. 194 frail older people (77.49, 55% female)	12 GPs and 7 practice nurses. Bachelor degree, expertise, effective communication and problem solving. 3m meeting supervision and feedback.	Prevention of care approach. Usual care.	Self-management skills	Face-to-face
OBarzanek et al (2007) [43]	Randomised trial	Four clinical centres. Healthy adults, 810 participants	Trained certified staff	2 treatment groups: behavioural intervention and Established Plus DASH, advice control group.	Physical activity and healthy eating	Face-to-face
Ockene et al (2012) [44]	Randomised intervention	Massachusetts. 312 Latino participants who are at high risk for diabetes (150 usual care, 162 intervention	3 Spanish speaking community individuals delivered intervention (undergraduate in nutrition). Training = role play and mock sessions + annual booster	Lifestyle intervention or usual care	Diet/physical activity	3 individual and 13 face-to-face group sessions over 12m. (Session 1 1.5 hours, rest 1 hour).

			sessions led by a behavioural psychologist/dietitian)			
Olsen et al (2012) [45]	Single centre randomized controlled trial	Single centre. Diagnosis of OSA, clinical recommendation for CPAP. 106 participants	Three nurses with 2-16 years sleep medicine training. Full day training. Regular supervision	MINT intervention: vs standard care.	Sleep	30 min face-to-face session.
Osborn et al (2010) [46]	Randomised controlled trial.	Primary care clinic, 129 participants	40 hours training. Bilingual medical assistant.	Intervention vs usual care.	Health behaviours	90 min face-to-face session.
Pettman et al (2008) [47]	Evaluation of parallel Randomised controlled trial	Community based. South Australia. 153 overweight volunteers' Metabolic syndrome. 103 intervention, 50 control.	Leader's manual. PowerPoint slides. Supporting materials.	Shape up for life intervention. Control group.	Diet/physical activity	16 face-to-face weekly lifestyle sessions (2hrs) and one exercise session per week (45-60 min)
Pill et al (1998) [48]	Parallel process study of a randomised controlled trial	19 GPs in South Glamorgan. Patients diagnosed with type 2 diabetes over 1 year aged 18-70.	GP research nurse and psychologist. Training = open exploration.	Intervention vs control group.	Encourage clinicians to negotiate individual care plans	Face-to-face (at least 2 training sessions, 3 hours)
Roy-Byrnes et al (2010) [49]	Randomised controlled effectiveness trial	17 Primary care clinics in 4 US cities.	14 ACS personnel (11 women, 3 men (social workers/MSc psychologists, doctoral psychologist). 4 familiar with CBT 7 previous training	CALM intervention vs usual care.	Reduce anxiety symptoms	6 to 8 weekly face-to-face sessions for CBT. Single medication training. Telephone/email consultations
Saunders et al (2014) [50]	Evaluation of a group Randomised controlled trial	Community based project in 128 African American churches. 37 intervention, 31 control	Pastor. Full day training, cook training, monthly mailings and technical assistance	FAN Intervention. Delayed churches (15m)	Physical activity, healthy eating	Face-to-face
Skidmore et al (2014) [51]	Non-randomised pilot study	2 inpatient rehabilitation units within an academic health centre. 10 individuals with an acute stroke diagnosis. 5 in intervention	Trained Occupational therapists (one in each condition). Manualised procedures	Strategy training. Attention control session in addition to usual rehabilitation care.	Activities of daily living	Daily face-to-face sessions, five days per week 30-40 min) for whole rehabilitation
Slade et al (2015) [52]	Cluster randomized controlled trial	2 mental health NHS trusts in England. 210 participants with a clinical diagnosis of psychosis in intervention, 193 in control	12 hours (personal recovery), 16 hours (recovery coaching) training, telephone support and booster sessions, 6 reflection groups, reflective tool	REFOCUS intervention and usual treatment.	Staff behaviour to increase focus on values, preferences, strengths and goals of patients with psychosis.	Face to face 1 year intervention.

Smith et al (1997) [53]	Randomized pilot study	22 Women with NIDDM aged 50 or over	Team of interventionists (nutritionist, three psychologists and an exercise psychologist.	Behavioural weight program vs standard behavioural weight control program.	Exercise, diet	16 face-to-face sessions. Intervention = 3 MI sessions.
Smith et al (2010) [54]	Observational study	14 GPs in a mixed urban rural area of Scotland. 1584 participants between 18 and 64 – low mood/depression /adjustment disorder	Mental health clinicians, psychology graduates, primary care liaisons (experienced nurses/OTs). 30hr training + 2h weekly supervision	Doing well intervention (health centres).	Antidepressant use, alcohol, exercise	Face-to-face (50 min)
Stanley et al (2013) [55]	Pilot randomised controlled trial	Outpatient clinics at medical centre. 182 Participants with a dementia diagnosis and possible anxiety	Masters level graduate students and a pre-doctoral intern. Extensive training.	Peaceful mind vs usual care.	Reduce anxiety symptoms (behavioural skills)	12 weekly face-to-face in home sessions over initial 3 months and 8 telephone appointments
Suzuki et al (2012) [56]	Randomised controlled trial.	Community centre in Japan. 50 Elderly individuals (over 65) with MCI.	Two physiotherapists and three well trained instructors.	Multicomponent intervention vs education control group.	Exercise	90 min per day, 2 days a week, 80 times over 12 month face-to-face. Control: 3 education classes
Thyrian et al (2007) [57]	Evaluation of Randomised controlled trial	Maternity wards of six hospitals in Germany. 163 Women who smoke before pregnancy (mean 26.28)	Counsellors trained experts in MI – weekly supervision.	Counselling vs usual care.	Smoking cessation	1 face-to-face counselling session and two follow up counselling sessions by phone.
Thyrian et al (2010) [58]	Evaluation of a randomised controlled trial	Maternity ward of six hospitals in Germany. 84 women smoked before pregnant.	Four counsellors- trained experts in MI. Weekly supervision meetings.	Counselling vs usual care.	Smoking cessation	1 face-to-face counselling session (45 min) and telephone support.
Tomasone et al (2014) [59]	Process evaluation within CMCL intervention	Within CMCL in Canada. 97 HCPs	Delivered by HCP and physically active individual with a disability. 66 were HCP 26 were not	Changing minds, changing lives.	Increase professional behaviour (prescribing physical activity)	Single face-to-face sessions (1hr)
Van de Glind et al (2012) [60]	Mixed methods multiple case study – multicentre Randomised controlled trial	5 purposively selected healthcare settings in Netherlands. Main trial = 11 sites. 53 leg ulcer patients in program, 45 evaluation period	12 women nurses. Nurse scientist, clinical psychologist, MI trainer delivered training	Lively legs program. Usual care.	Health behaviour (physical activity/adherence)	6 face-to-face sessions (45-60 min then 20 mins)

Wallace et al (1998) [61]	Randomised controlled clinical trial.	Senior community centre. 100 adults Over 65 and ambulatory	None mentioned.	Multiple risk factor intervention.	Exercise, nutrition, safety, smoking, alcohol	30-60 min visit, 60 min exercise session, 3 weekly sessions (6m)
Weinberger et al (2002) [62]	Randomised controlled trials	36 community drug stores. Participants with COP/asthma and specific prescription	4-hour pharmacist training	Intervention vs peak flow monitoring control group	Pharmacist behaviours	Face-to-face
Welch et al (2011) [63]	Randomized trial	Large hospital medical centre. 234 Participants 30-70 years, poor control blood glucose.	Two days of workshop training and group conference call session, Individual phone feedback.	Standard education, computer alone, MI alone, MI with computer.	Blood glucose control	One hour session followed by three 30 min sessions.
West et al (2007) [64]	Randomized controlled clinical trial	Birmingham. Women with type two diabetes.	Intervention: clinical psychologists. Control: Master's degree health educators	Group based behavioural obesity treatment, plus experimental condition: MI/behavioural obesity/attention control.	Glycaemic control	All: 42 face-to-face session weight management, weekly for 6 months, biweekly 6 months and monthly (45 mins). Control: Matched to intervention
Wieland et al (2012) [65]	Pilot study	Rochester, Minnesota, Community based participatory research approach. 45 women (22-68) in communities	Trained community focus group mediators	Fitness program – 2 classes per week, exercise, nutrition components.	Physical activity, diet	Two face-to-face classes per week (90 min)
Windsor et al (2014) [66]	Process evaluation of a non-randomised matched comparison group design	All RFTS clients reported smoking at screening and were over 18. 1303 clients (age 34.3 vs 23.8).	SCRIPT training (performance reports and quality improvement process).	SCRIPT program vs control group	Smoking cessation	Face-to-face sessions.

Appendix 2-2. Details extracted from the methods and results sections of papers on fidelity of delivery and engagement

Study	Fidelity framework used (if applicable)/ terms and definitions	Fidelity / engagement	Method	Results
Apter et al (2011) [1]	None mentioned	Fidelity	**Procedure & measures:** 1. Observation of research-patient interactions by project managers (early stage) 2. Unannounced observation (later stage) Measures not described **Sample** – Not provided **Analysis method:** Procedures and problems discussed at weekly team meetings with primary investigator. Percentages used to quantify	100% fidelity to the protocol
		Engagement	Not measured	Not measured
Arends et al (2014) [2]	Based on Steckler and Linnan's (2002) framework. The authors define 'fidelity' (quality), 'dose delivered' (completeness), 'dose received' (exposure), as is defined in Steckler and Linnan's (2002) model	Fidelity	**Procedure & measures:** Self-report questionnaires (physician and participant) collected at 3m follow up to assess dose delivered in intervention and control group (questions about number and type of assignments and whether stimulated them) and fidelity in intervention only (core components: number of participants who received two key elements). Dose delivered scored 5 point Likert scale (totally disagree-totally agree) and fidelity scored yes/no. **Analysis method:** Descriptive statistics, regression analyses, multilevel analysis. Used participants' blinded responses	Intervention vs control. Assignments received from OP (73% vs 8%): 1 (66%), 2 (54%), 3 (48%), 4 (48%), 5 (36%). OP being involved 3.9 vs 3.5, OP stimulating making own decisions 3.8 vs 3.6. Topics related to RTW: Problems at work 84% vs 63%, possible opportunities 49% vs 27%, solutions 58% vs 34%, realising opportunities 45% vs 36%, who can help 55% vs 22%, action plan 25% vs 25%, evaluation of RTW 46%vs 55%. Physician report: 63% delivered 2 consultations with OP and delivered first assignment. Participant report: 64% delivered 2 consultations with OP and first assignment completed. >2 consultations with OP and first assignment completed by participant 64%
		Engagement	**Procedure & measures:** Self-report questionnaire (physician and participant) collected at 3m follow up in intervention and control group to assess dose received (number and type of assignments completed by participants, number and type of topics discussed, number of participants who had two consultations with physician and completed first assignment). **Analysis method:** Descriptive statistics, multilinear regression, multilevel analysis	Assignments completed: 70%, (1 (66%), 2: 48%, 3 (40%), 4 (42%), 5 (27%))
Baker et al (2001) [3]	No framework mentioned. 'Adherence' used as a term for participant engagement.	Fidelity	Not measured	Not measured
		Engagement	**Procedure & measures:** Self-report questionnaires to physicians (home visit logs) and participants (exercise and food logs) in intervention groups. Dietary logs in control group. Attention control group kept diet	Exercise group mean adherence = 84 ± 27%, with a range of 24-100%. Control: 65 65 ± 32% with a range of 27-100%

	No definition given.		logs 3 days of every two weeks for 24 days over 4 months. **Analysis method:** Two or fewer missing logs = considered 100% adherence. Number of logs returned were counted and divided by 46 for adherence. If no logs were returned it was assumed they were not kept. Descriptive statistics used.	
Bailey et al (1990) [4]	No framework or definitions provided	Fidelity	Not measured	Not measured
		Engagement	**Procedure & measures:** Observation and provider self-report. 10 item observational checklist, developed by project staff (demonstrated as having good reliability and validity) used to assess inhaler use skills**.** Adherence to medications and inhaler use measured by two scales (based on prototype self-report scales described by Morriskey et al., 1986). Adapted for applicability to asthma. Project staff member rated adherence on 3 point scale (poor, fair, excellent). Measured at baseline and 12m follow up in both intervention and control. **Analysis method:** Not reported – descriptive statistics	Inhaler use – all 10 items correct: baseline 10, 12 month follow up 51.2. Control: 14 baseline, 10 at 12 month follow up. Project staff rating: Intervention 57.5 baseline, 78.3 follow up, control: 50 baseline, 51 12 month follow up. Inhaler adherence scale – adherent on all 6 items: intervention: 30.4 baseline, 58.3 12month follow up, usual care 59.3 baseline, 61.7 12m follow up.
Binkley et al (2014) [5]	No framework mentioned. 'Dosage' (caregivers present for entire or part session, or not present. 'Implementation fidelity' (adherence) (whether key points were completely/partially/not covered). No term used for engagement measures (discussed under 'dosage')	Fidelity	**Procedure and measures:** Self-report questionnaire (providers) to document level of adherence and video camera observations at post assessment (due to technical problems, provider self-report used. Fidelity (adherence) measured whether key points were completely covered or partially covered/not covered. **Analysis method**: Descriptive statistics: Percentage fidelity and counts of participation	Intervention fidelity high, (81%-90% for ¾ components): Planned action component: 71% of CG completed contract, 71% of CG updated 2 oral health plans, 9% updated 1 oral health plan. Capacity building: Didactic training: 86% all, 9% partial. Observational learning video 86% all, 9% partially. Observational learning demo 76% all, 19% partially. Environmental adaptation 90% all (dental devices), 90% all adaptation strategies. Reinforcement coaching 91% achievement of health goals.
		Engagement	**Procedure and measures:** Caregiver participation self-reported by provider (whether caregivers made changes in implementing components and why)**.** Caregiver daily checklist completed by the caregiver each time they provided OH support relating to oral hygiene, dental devices used, rewards and monitoring**.** Data collected 7 days before implementation and 7 days after completing intervention. Dose – caregivers presence for entire session, part session or not at all **Analysis method:** Frequency data (percentage completion)	19/21 caregivers completed daily checklist (pre-assessment), 16/21 (post assessment) – 76% retention rate. 20/21 caregivers participated in didactic training and assessment, 18/21 demonstration training and assessment. 16/21 two coaching sessions and assessment (retention 76%). Dose: Planned action: 95% attended briefing, completed baseline. Capacity building: 86% entire, 9% part. Environmental adaptation: 90% entire, 10% part. Reinforcement: 71% had 2 coaching events, 9% had 1.
Black (2014) [6]	Based on the NIH treatment fidelity model (Bellg et al., 2004).	Fidelity	**Procedure and measures:** An Essential Practices Checklist developed for providers to address the model's 10 principles over the four phases. 120 cases (all cases audited). **Analysis method:** Continuous review on ongoing basis, percentages.	100% compliance ensured

	'Delivery of treatment' (provided as intended; Bellg et al., 2004) 'Receipt' (ability to understand and perform changes; Bellg et al., 2004) 'Enactment'; ability to perform learned strategies in life situations; Bellg et al., 2004).	Engagement	**Procedure & measures: Treatment receipt**: Verbal verification of understanding and application of changes with the facilitator. Understanding documented in the care plan (audited to ensure compliance). Caregivers instructed to self-monitor behaviour change as a result of the intervention if applicable and programs assessment tools tracked changes at intake and six month intervals. **Treatment enactment:** Opportunity for the caregiver to share and reflect on lessons learned, extension of the program until facilitator is assured that the client is self-sufficient in specific goals created and verification of enactment of skills assessed upon termination in follow up testing **Analysis method:** Reviewed on ongoing basis, descriptive (percentages)	Receipt of treatment = documented 100% of the time. Enactment of skills or lessons were documented and verified for 100% of cases
Brug et al (2007) [7]	No framework/definitions given - 'Adherence'/'infidelity' used	Fidelity	**Procedure and measures:** 2 consultations audiotaped for each dietitian within 1 month after training and second between 5 and 6 months (Intervention and control). Transcripts made of first 15 minutes. Analysed using Motivational interviewing treatment integrity (MITI) code (Moyers et al., 2003) and manual for motivational interviewing skill code (Miller et al., 2003) (blinded). Evaluator scores on MI relevant criteria e.g. proportion of time client talked, empathy, number of reflections. **Analysis method:** Researcher blinded, one way ANOVA to compare characteristics of control and intervention	First test: MI adherence 1(low)-17(high) – MI dieticians 9.4(5.4) vs controls 6.6(6.1), p difference between groups .15. MI infidelity: 1(low)-17(high) – 9.4(5.4) vs 6.6(6.1), p=0.15. Second test: MI adherence – MI dieticians 6.4(4.0), controls 6.9(4.7), p=.75. Infidelity: 1.6 (3.7), 3.8(4.0), p=0.01
		Engagement	Not measured	Not measured
Butler et al (2012) [8]	No framework/definitions. Term used: 'Uptake of the intervention'	Fidelity	Not measured	Not measured
		Engagement	**Procedure and measures:** Attendance at session/use of online modules. Intervention clinicians had to complete each online learning component before they could access the next **Analysis method:** Not reported – data count, descriptive	All but one completed 4 parts of online training. Only 10 clinicians did not attend. 76 completed optional booster session at 6 months. 11 clinicians entered new threads but there were 81 posts and 1485 viewings on these posts.
Campbell et al (1998) [9]	No framework/definitions	Fidelity	Not measured	Not measured
		Engagement	**Procedure and measures:** Attendance at clinic **Analysis method**: Not reported – percentage	Intervention: 82% attended at least one clinic. Nurse and health visitors spent 915 hours running clinics, 1h and 22m per patient per year.
Chesworth et al (2015) [10]	NIH behaviour change consortium (Bellg et al., 2004) framework. 'Fidelity to treatment delivery'	Fidelity	**Procedure and measures:** Self-report measures included completion of intervention documentation (three day diaries and daily clinical logs for participants on bladder training and prompted voiding) to measure adherence to the protocol. Clinical logs used by healthcare staff, (nursing staff and healthcare assistants) to undertake and record delivery of the SVP each day (one log per patient per day – document voiding time/best	Clinical logs: Returned and analyzed (25% participants) (Intervention: 396 (40 patients), Supported implementation: 320 (31 patients). Percentage of logs according to prompted voiding and bladder training PT 90.4% patients PV, 9.6% BT (intervention). PT 100%, BT 0% (supported implementation). Stage 1: % voiding interval present and correctly documented

			practice components achieved). Sample: Logs sampled from all 8 sites. Stratified sampling. Two time periods of 14 days were sampled from each stratum. Site samples comprising between six and nine 14 day periods. **Analysis method:** Descriptive quantitative analysis of how well logs performed (% median hours) by 2 researchers. Clinically justifiable responses/10% of data input checked by senior researcher (Thomas, 2015). Missing or incorrect intervals/voiding times not included.	(Intervention: 83.3%, Supported implementation 89.4%). Stage 2: % both voiding interval and schedule of proposed voiding time present and correctly documented (Intervention 38.9%, Supported implementation: 31.9%). No of clinical logs that achieved both stage 1 and stage 2: (Intervention 154, Implementation: 102). For clinical logs that achieved stage 1 and stage 2: Stage 3: voiding time within 30 minutes (Intervention 54.8%, Implementation 56%), encouragement documented (Intervention 58.4%, Implementation 57.5%), patient asked if they were wet (Intervention 57.9%, implementation 65.9%)
		Engagement	**Procedure and measures:** Nurses submitted 3 day diary for participants. Those catheterized not eligible. **Analysis method:** Diary assessed using filtering system, data input terminated if failed to achieve key quality indicator for stage. Assessment of 'yes'/'no' entered into SPSS (from Thomas et al., 2015). Analysed using percentages.	68.8% diaries received (intervention group), 80.5% supported implementation group). Diaries completed: (Intervention: all, Supported implementation – 5 blank. Entry on each of the 3 days: (Intervention: 52/102 (51%). Supported implementation: 54/82 (65.9%). Entries for 'time went to the toilet' on each day (13/102, 12.7%) or three entries in the corresponding 'leaked' columns completed (10/102, 9.8%).
Cheung et al (2015) [11]	No framework mentioned. 'Program evaluation' and 'treatment implementation'. Discusses Re=AIM model in discussion; (Damschroder et al., 2009)	Fidelity	**Procedure and measures:** Participant (caregiver) self-report at follow up, including satisfactions and benefits, how much they learned and adopted components, extent to which interventionists implemented intervention and whether intervention taught components (0=no, 1=yes) **Analysis method:** Analysed using percentages	Implementation of components (range 77.0% (thought-records) to 95.9% (stress reduction techniques). (Stress reduction techniques – 194 replies, 95.9% taught. Pleasant events - 191 answers, 90.1% taught. Thought record - 191 replied, 77.0% taught.)
		Engagement	**Procedure and measures:** Participant (caregiver) self-report at follow up, including satisfaction/benefits, how much they learned and adopted components, extent to which interventionists implemented intervention, perceived helpfulness (0 not at all, 2 very much) and whether they are currently using (0 not at all, 2 very much) **Analysis method:** Means and percentages	Cases returned: at least 1 behavioral prescription out of 243- 73.7% returned. 95% of "perceived helpfulness" (stress reduction techniques and pleasant event) = "little" to "very much."). **Breakdown of techniques:** Stress reduction techniques: perceived helpfulness 185 replies (62.2% little, 34.1% very much). Currently using at least one technique 182 responded (58.8% little, 28% very much). Pleasant events: Perceived helpfulness (171 replies Mean (SD): 1.28 (0.55). 62.6% 1, 32.7% 2. Currently using: 167 replies. Mean (SD): 1.22 (0.58). 61.7% 1, 29.9% r 2. Thought record: Perceived helpfulness: 142 replies. Mean (SD): 1.03 (0.61). 63.4% 1, 19.7% 2. Currently using 143 replies. Mean (SD): 0.86 (0.62). 59.4% 1, 13.3% 2. Management of problem behaviour: Perceived helpfulness (0 = not at all, 1 = little, 2 = very much) 191 replies. Mean (SD): 1.19 (0.58). 63.4% 1, 27.7% 2.

				Currently using at least 1 technique 190 replies. Mean (SD): 0.97 (0.62), 62.1% 1, 17.4% 2
Dannhauser et al (2014) [12]	No framework mentioned. Term: Adherence to activities' (percentage confirmed completion of the offered 28 DSD activities, 36 physical activities and 10 GCSE sessions and 10 supervised ICST sessions.	Fidelity	Not measured	Not measured
		Engagement	**Procedure and measures:** Self-report methods and observational methods, including: feedback entries (date, location, comments, 4-point Likert scale) for DSD activities, direct observation for the physical, GCST and ICST activities, data from the logger and entries on the calendar on the participant poster for physical activities. 1) Physical activity: 7 home visits for supervision at set intervals – more frequent visits to facilitate adherence initially and telephone contact to promote adherence. 2) Group based cognitive stimulation training (GCST): supervision and structure and diversifying activities which could reduce engagement. **Analysis method:** Percentage confirmed completion of the offered: 28 DSD activities, 2) 36 physical activities, 3) 10 GCST sessions and 4) 10 supervised ICST sessions.	Activity adherence rates were high. 63/67. Participants completed more than 50% of activities offered: DSD activities = 83%; Physical activity = 71%; GCST = 83%; ICST = 67%. The mean duration of exercise = 36.3 mins, SD = 8.6 min. The intervention was provided to 10 groups across 5 different locations. Participants received a mean of 4.70 telephone contacts (SD = 2.89, range 1-13).
DeWalt et al (2006) [13]	No frameworks or terms mentioned	Fidelity	Not measured	Not measured
		Engagement	**Procedure and measures:** Participant self-report: Heart failure self-management behaviour (measured at 12m) assessed by asking patients how often they weighed themselves **Analysis method:** Percentage scores, inferential statistics not specified	Intervention: 79%, control: 29%, reported daily weight measurement at 12m (P<0.001)
Driessen et al (2010) [14]	Adapted version of the Linnan and Steckler framework. 'Fidelity' ('extent to which steps of PE programme were delivered as intended').	Fidelity	**Procedure and measures:** Provider self-report: 4 months after working group meeting, completed a short questionnaire on components of fidelity. Scored using a 10 point scale (very bad to very good). Perceived implementation: yes, partly, not implemented. Measure classified by two researchers independently. **Analysis method:** Percentage average	65/81 responses to questionnaire (80%). 34% ergonomic measures implemented, 26% partly implemented, 40% not implemented. Perceived implementation ranged 26%-79%
	'Dose delivered' ('perceived implementation of ergonomic measures according to implementers'). 'Dose received' ('perceived implementation of prioritised measures according to workers' and 'implementation of	Engagement	**Procedure and measures:** Intervention receipt: Participant self-report – 6 months follow up questionnaire. Question asking whether implemented – yes/no/don't know. Workplace implementation yes/no **Analysis method:** Percentages	Participant level. Dose received: 833 workers completed questionnaire (26% perceived the ergonomic measures as implemented, 36% as partly implemented, 38% as not implemented at the departments.). Compliance to watching movies = 67% in intervention group

	measures according to workers')			
Dubbert et al (2002) [15]	No framework used. 'Adherence'	Fidelity	Not measured	Not measured
		Engagement	**Procedure and measures:** Participant self-report (weekly activity diaries) and objective accelerometer (51 participants wore accelerometers.) Participants interviewed about minutes walked for exercise. 7 day PA recall was administered to estimate hours. Validation of walking performed by contacting significant others by telephone to inquire of walking. Nurse blinded to walking diary data and self-report. Received 1$ canteen coupons for each week diary was returned **Analysis method:** Average monthly percentage adherence as primary self-report activity- number of walking sessions divided by number of sessions prescribed. Missing data = considered non-walking. Displays of accelerometer counts were examined visually.	50%+ participants initiated walking program meeting study goal. Almost 50% walking at 6m and 40% still recording meeting goal at 10m. Adherence = stable over time. Direct observation confirmed by reports from significant others for 83% of PC, 91% of P and AC and 71% of NC. Accelerometer records matched 72% reported diary walking.
Duff et al (2013) [16]	No framework. Process measures (acceptability and utility). 'Acceptability' – no definition 'Utility' – how the EOV was implemented and degree to which the intervention was implemented as intended	Fidelity	**Procedure and measures:** Self-report data collection form (measuring intervention delivery: conducting EOV, number of interruptions, time and location and whether commitment was gained from participant to trial practices)**.** Facilitators self-assessed adherence to elements of the protocol. Two trial visits with self-reflection before **Analysis method:** Percentage (median and IQR)	Fidelity: 90% (IQR, 87.5–92.5): Amount of times to make contact with participant to arrange an EOV: 2 (IQR, 1–2), Cancellations: 0 (IQR, 0–1), Time spent on each EOV: 63 minutes (IQR, 49–85), Arranging EOV: median, 20 minutes; IQR, 15–20), Customizing the material (median, 10 minutes; IQR, 10–15), Waiting for the participant (median, 20 minutes; IQR, 0–30), Conducting the EOV (median, 11.5 minutes; IQR, 10–15).
		Engagement	**Procedure and measures:** Self-report, post intervention surveys (at the end of EOV), containing: questions on effectiveness of EOV at increasing knowledge and addressing concerns, question on effectiveness (5 point scale 1-5), questions on future participation. Facilitator questions measured on a 5 point Likert scale. **Analysis method:** Percentages	Participant ratings: 84/85 (99%) participants verbally committed to trial new practices. 74% likely/extremely likely to participate in another EOV. 74 (97%) likely/extremely likely to influence clinical practice. Facilitator ratings: **Participants perceived interest 79 (95%) high/very high).** 31, (41%) very high, 43 (54.2%) high, 4 (4.8%) average, 0 (0) low, 0 (0) very low. **Participation: 79(95%) high/very high.** 34, (41%) very high, 45 (54.2%) high, 4(4.8%) average, 0(0) low, 0 (0) very low. **Comprehension: 71 (85%)**. 45(54.2%) very high, 26(31.3%) high, 12(14.5%) average, 0(0) low, 0(0) very low
Duncan et al	No framework used.	Fidelity	Not measured	Not measured

(2003) [17]	'Exercise adherence' – defined as number of exercise sessions completed. 'Attendance'.	Engagement	**Procedure and measures:** Exercise adherence (number of exercise sessions completed) measured using exercise diaries. Patient reported attendance 100% agreed with staff recorded attendance. **Analysis method:** Two tailed independent t tests to determine differences between groups	Group sessions completed: Intervention: 12 weeks: 63.3 (6.4) 24 weeks 59.6(10.6). Control: 12 weeks 59.3 (11.1) 24 weeks 41.2 (9.7)** (P<0.01)
Ettinger et al (1997) [18]	No framework mentioned. Terms used: 'Compliance' and 'attendance'	Fidelity	Not measured	Not measured
		Engagement	**Procedure and measures:** Participants maintained exercise log books (all phases of intervention) + recorded number of prescribed exercise sessions completed and length of session. Attendance determined through provider records. Home based attendance calculated using exercise logs. **Analysis method:** Compliance (number of sessions), measured in all three groups by dividing by total number of sessions prescribed (3 x a week). If not completed, assumed not exercising. Descriptive – percentages.	Compliance with exercise prescription = 68% in aerobic training group and 70% in resistance training group. Declined during the trial - 85% at 3 months, 70% 9 months, 50% at 18m. No statistical different in compliance between 2 exercise groups. Compliance for the health education program was 91% during first 3 months and 95% for remainder of study.
Farmer et al (2007) [19]	No framework used. Terms used: 'Delivery of intervention' and 'adherence to the intervention'	Fidelity	**Procedure and measures:** Provider (nurses) self-review of taped consultations and external review by sociologist. Prompts built into patient diaries to help patients adhere to intervention.	Not reported
		Engagement	**Procedure and measures:** Patient diaries for goals, reviews and activities. Prompts built into patient diaries to help them adhere to intervention **Analysis method:** Kaplan Meier plot	Use of meter: Ninety nine (67%) less intensive vs 79 (52%) more intensive used metre at least twice a week for 12 months (P=0.012)
French et al (2015) [20]	Used Bellg et al (2004) framework. 'Intervention fidelity' (whether delivery of the intervention is faithful to protocol	Fidelity	**Procedure and measures:** Workshops audio-recorded and transcribed (apart from workshop content and prompt practice/role play – not captured by recorder). Developed coding guidelines. Observed adherence assessed by coding transcript for BCTs, across facilitators and sessions. Coder recorded whether BCT applied (1) or not applied (0). Some sections double coded (two codes). Coding results discussed and coding frame modified until 80% or more agreement. Random 10% check of coding undertaken by independent researcher, 10% remaining coding undertaken by independent researcher. Facilitator self-reported adherence using a checklist completed at end of each session. **Analysis method:** Summary statistics to assess observed adherence and to compare self-report and observed adherence. Observed adherence = number of BCTs delivered/number of BCTs planned. Difference in adherence between facilitators assessed using Pearson chi squared test	The observed adherence all workshops was 79% overall, ranging from 33% to 100% per session. BCTs: Persuasive communication: Session 1 21/25 (84%), session 2 18/30, (60%), both sessions: 39/55 (71%). Information provision: Session 1: 14/15 (93%), Session 2: 18/18 (100%), both sessions 32/33 (97%). Provide info on consequences: Session 1: 15/15 (100%), session 2: 4/12 (33%), both sessions: 19/27 (70%). Social comparison. Session 1: 10/10 (100%), session 2: 11/18 (61%), both sessions: 21/28 (75%). Barrier identification: Session 1: 10/10 (100%), session 2 10/12 (83%), both sessions 20/22 (91%). Provide instruction: session 1 0, session 2 14/18 (78%), both sessions 14/18 (78%). Time management: 0, session 2: 5/6 (83%), both sessions 5/6 (83%). Total: session 1: 70/75 (93%), session 2 80/114 (70%), both sessions 150/189 (79%). Sensitivity of self-reported adherence against gold standard

				(identifying when did occur) = 95% (88-98). Specificity – correctly identifying when a section of a workshop did not occur according to observed adherence = 30% (11-60)
		Engagement	Could not be measured	Not measured
Gabbay et al (2013) [21]	No framework. Terms used 'fidelity'/'engagement'	Fidelity	**Procedure and measures:** MI experts monitored audiotape sessions monthly using the Behaviour change counselling index (BECCI) - reliable and valid tool (Lane et al., 2005). Providers were given feedback based on these evaluations. Nurse practitioner reviewed audio-tapes (weekly reviews, providers and investigators met to review progress biweekly/more frequently if needed) **Analysis method:** Not reported	Not reported
		Engagement	**Procedure and measures:** Monitoring of completion of the study/visits **Analysis method:** Not reported – descriptive percentages	197 (85%) completed study. Of these, 75 (32% of intervention group) lost engagement (didn't see NCM in last 8 months of study).
Goyder et al (2014) [22]	Treatment fidelity framework (Bellg et al., 2004). Terms: 'Fidelity' (delivered as per protocol), 'receipt', 'enactment'	Fidelity	**Procedure and measures:** Audio-recorded sessions independently coded using the motivational interviewing treatment integrity (MITI; Moyers et al., 2007) assessment (global ratings of evocation, collaboration, autonomy, direction and empathy). Minimum levels based on levels of competence stated in MITI coding system. MI adherence behaviours (e.g. asking permission, affirming, emphasising personal control), MI non-adherent behaviours (e.g. advising, confronting, directing), open compared with closed questions and simple and complex reflections. **Analysis method:** Counts of MI adherent and MI non adherent behaviours made across each RA and domain - descriptive statistics	73% (136/186) received the intervention as per protocol [77% (71/92) in the mini booster arm and 69% (65/94) in the full booster arm]. % MI adherent (means): RA1 88%, RA2: 50%, RA3: 100%, RA4: 100%. RA5 100%, RA6: 100%. Motivational interviewing treatment integrity ratings (proficiency is 3.5, competency is 4) means: Evocation: RA1 3.5, RA2: 2.5, RA3: 4, RA4: 3, RA5: 4, RA 6: 3. Collaboration: RA1: 3.5, RA2: 3.5, RA3: 3.5, RA4: 3.5, RA5: 3, RA6: 3. Autonomy: RA1: 3.5, RA2: 2, RA3: 3, RA4: 3.5, RA5: 4, RA6: 3 . Direction: RA1: 4, RA2: 5, RA3: 5, RA4: 4.5, RA5: 4, RA6: 2. Empathy: RA1: 4.5, RA2: 3, RA3: 3, RA4: 3.5, RA5: 4, RA6: 4. Average global rating: RA1: 3.5, RA2: 3, RA3: 3.5, RA4: 3.5, RA5: 3.6, RA6: 3. % Complex reflections: RA1: 45, RA2: 18, RA3: 18, RA4: 34, RA5: 38 RA6: 40. % Open questions: RA1: 40, RA2: 36, RA3: 45, RA4: 41, RA5: 30, RA6: 33. Reflection to question ratio. RA1: 2.6, RA2: 1.2, RA3: 1.2, RA4: 1.2, RA5: 1.8, RA6: 1.6
		Engagement	Mentions measuring receipt and enactment	N/A
Griffin et al (2010) [23]	No framework used. 'Program delivery' and 'fidelity' (extent to which the intervention was delivered as planned) (Saunders et al., 2005).	Fidelity	**Procedure and measures:** Program staff completed data entry worksheets corresponding to essential elements (group size, deliver all 20 sessions, completion of check-in activity, incentives provided, stage of readiness for change, learning activity implementation, modifications made to session, home assignments given). Dose and fidelity captured through electronic reporting system. Reviewed for completeness	An overall high level of implementation fidelity was observed. Group sizes ranged from 4-33, 6% of sessions were combined. **Components:** Check In completed % (all years) 95.7% (88.9-99.1), Incentives provided % of sessions, all years – 51.7% (14.70099.6), Sessions staged: 4.1 (1.1) (3.8-4.3), Learning activities per session 3.4 (1.6) (3.3-3.6), Learning modification ^

	'Participant level engagement' (dose/attendance/participation)		**Analysis method:** Percentage of sessions delivered as intended (out of 20), as opposed to combined with other sessions. Percentage of sessions that included a check in activity.	of sessions 15.8 (1.7-26.6), Home assignments given per session 4.2 (2.0) (3.3-4.6)
		Engagement	**Procedure and measures:** Participant self-report. Two measures of participant engagement: completion of home assignments (20 sessions) and participation in self-monitoring activities – percentage of participants who tracked thoughts, types of PA, days and minutes and steps. **Analysis method:** Percentages	Attendance: average attendance rate of 65%. Homework completion % of participants: 72.2% (52.9-83.3%). Tracking PA (self-monitoring % participants 38.3 (8.9-62.1). Tracking activity by type of activity % of participants 47.9 (8.9-64.5). Tracking steps, % of participants 62.8% (34.6-78.1). Tracking activities by days and minutes of activity % of participants 27.1 (6.7-50.2). Any type of tracking % across sites 67.6 (28.2- 80.2)
Grubbs et al (2015) [24]	No framework. 'Dose of CBT' and 'Engagement' – homework adherence and commitment to CBT	Fidelity	**Procedure and measures:** Data entered by the care manager following each clinical encounter for those randomised. CBT dose measured in the intervention group (number of sessions, participation in relapse prevention calls, interruption in treatment, number of CBT modules completed and total number of exposure exercises completed) **Analysis method:** Means and percentages/odds ratios (descriptive plus inferential)	Amount receiving services (all these are labelled 'dose'): 87% received CBT, 33% received CBT alone, 54% received CBT and pharmacotherapy, 9% received pharmacotherapy alone, 4% received no service. Relapse prevention *received relapse prevention phone calls following completion = 1.38 (odds ratio). CALM CBT modules * mean number of CBT modules completed during course of treatment = 1.17 odds ratio. CALM CBT exposures *total number of exposure modules completed during course of treatment = 2.44 odds ratio. Number of CBT sessions 1.18 (odds ratio). Interrupted treatment (odds ratio) 1.04
		Engagement	**Procedure and measures:** Engagement was measured in the intervention group by clinicians at the completion of each session and included homework adherence (4-point scale; 1 missed most, 4 missed none) and commitment to CBT (0–10 point scale; 1 none, 10 complete) **Analysis method:** Means and percentages/odds ratios (descriptive plus inferential)	Attending psychotherapy sessions: Women attended a greater number of CBT psychotherapy sessions than men, (7.3 vs. 6.5; O.R. = 1.18, p = .01). Mean number of sessions for each group were within the recommended range (6–8 sessions). Relapse prevention *received relapse prevention phone calls following completion = 1.38 (odds ratio). CALM CBT modules * mean number of CBT modules completed during course of treatment = 1.17 odds ratio. Greater for women (OR=2.44 p=.01). CALM CBT exposures *total number of exposure modules completed during course of treatment = 2.44 odds ratio. Homework adherence: Odds ratio = .93. CBT anxiety commitment: Odds ratio 1.26. The clinician-rated measure of commitment (O.R. = 1.26, p = .04) was significantly higher for women
Hankonen et al (2015) [25]	No framework used. 'Enactment' – use of BCTs in daily life	Fidelity	Not measured	Not measured
		Engagement	**Procedure and measures:** Participants in the intervention group completed a questionnaire (previously piloted), assessing use of eight BCTs (increasing physical activity) and eight BCTs (eating lower fat diet)	Out of 239 intervention participants, 210 (87.9 %) participants provided valid data on all variables at 1 year. 35.7% participants all 16 BCTs. BCT use ranged from 61.5% to 88.3%. 40.5%

			in the past 11 months (e.g., goal setting, action planning, self-monitoring. Used a binary scale (yes/no). **Analysis method:** Examined if BCTs used differed across ages and genders. BCT use categorised into three groups: 1) used all 16 BCTs, 2) 11-15 BCTs, 3) 0-10 BCTs. ANOVA and ANCOVA used.	participants used all 8 PA BCTs and 46.2% reported all 8 diet BCTs. Individual BCTs: Goal setting: PA 34 (15.40%) no, 187 (84.6% yes), diet 26 (11.70% no, 196 (88.30% yes). Action planning: PA 54 (24.50% no, 166 (75.5% no. Diet 43 (19.5% no, 178 80.5% yes). Using prompts/reminders PA 84 38.5% no, 134 61.5% yes. Diet, 73 33.3% no, 146 66.7% yes. Motivating oneself 44 (20%) no, 176 80% yes. Diet 34 15.5% no, 185 84.5% yes. Social support PA 81 (36.8%) no, 139 63.2% yes. Diet, 58, 26.4% no, 162 73.6% yes. Self-monitoring PA 64 (29.1% no 156 70.90% yes). Diet 70 31.70% no, 151 68.3% yes. Goal review 69 31.20% no, 152 68.8% yes, Diet 67 30.3% no, 154 69.70% yes. Preparing for/dealing with setbacks 85 38.5% no, 136 61.5% yes. Diet: 73 33% no, 148 67% yes
Hardeman et al (2008) [26]	Bellg et al (2004). 'delivery'/'fidelity'/ 'adherence'	Fidelity	**Procedure and measures:** Assessed fidelity using a protocol which specified various behaviours against transcripts of tape recorded sessions (0, not applied, 1 applied). Coding frame developed for each session. Two researchers classified, 2 independent raters validated (72% agreement). Observed adherence = number of component behaviours applied divided by number of behaviours. Coding frame piloted (discussed disagreements until at least 75%) using 22 transcripts. Median interrater agreement 82% in remaining 19 rounds (78-91%). Independent rater assessed 108 transcripts (purposively sampled), second rater assessed sessions 1 and 4 for all participants (54) (interrater agreement over 75% for 76/86 (88%) behaviours). Median agreement = 86% - similar for session 1 and four and intra-class correlation was high at 0.96 for all behaviours across sessions. Facilitators reported delivery of nine techniques after each session (0 not covered, 1 covered). **Analysis method:** Variability in adherence assessed using Page test. Differences in adherence to each technique – t test.	Mean adherence to individual techniques across all sessions ranged from 25% (generalising skills to other behaviours, e.g., healthy eating) to 66% (summarising, defining the agenda), with an **overall mean of 45%**. Observed components (across all sessions): Building support 43.3% (24.2). Strengthening motivation 50.8% (19.8). Goal setting 62.2% (18.6). Action planning 50.3%(17.4). Self-monitoring 49.7% (18.0). Using rewards 54.1% (22.8). Goal review 42.8% (14.9). Using prompts 33.9% (15.2). Preventing relapse 26% (18.5). Building habits 36.1% (20.6). Generalising skills to other behaviours 24.6% (23.3). Eliciting questions 51.3% (26.7). Summarising, defining agenda 66.2% (24.7). Providing information 50% (19.6). Total 44.8 (15.9). Use of techniques by facilitators varied considerably across participants (18–71%), with a median (IQR) of 44% (35–62%). Differences between observed and facilitator-reported adherence. 44% for observed adherence and 100% facilitator reported adherence (97-100%)
		Engagement	Not measured	Not measured
Harting et al (2004) [27]	No framework used. 'Quality of health counselling'	Fidelity	**Procedure and measures:** Used video-recordings to rate fidelity using an observation list (acceptable internal consistency) which covers regulating skills and therapeutic alliance (Part 1: therapeutic alliance, part 2: general interview skills, part 3: exploration of aspects of behaviour change, part 4: basic counselling attitude). Each part = several	Overall quality of counselling: 2.85 (sufficient score = 3 or 66%) Regulating skills – 2.65, Interview skills – 2.85, Steps of behavior change = exploration: 2.79, Steps of behavior change Intervention = 2.66, Steps of behavior change basic counselling attitude = 3.15, Health advisors basic counselling attitude (3.15 –

			subscales, all measured by one+ items and overall mark. Scored on one of two four point rating scales: 'unsatisfactory, doubtful, satisfactory, good' and 'not at all, hardly, slightly, considerably, strongly'. Also not applicable. Sufficient overall score = 66%. Sample: 64 video recordings. Not randomly selected. Recordings made on previously defined days. **Analysis method:** All 64 assessed by three independent observers. Reliability assessed using weighted kappa and multi-rater kappa. Descriptive statistics to quantify fidelity	satisfactory), Interview skills (2.85)
		Engagement	Not reported	On average, participants attended 2.31 counselling sessions which took a total of 83 minutes.
Hermens et al (2001) [28]	No framework. Use of term 'exposure'	Fidelity	**Procedure and measures:** Self-report questions about exposure to programme elements: (a) informed about the programme (yes/no); (b) type of contact with project staff (outreach visitor or district GP coordinator): contact through CME or small group education for GPs (yes/no), contact through CME or small group education for practice assistants (yes/no), contact through one or more practice visits (yes/no), and number of practice visits; (c) use of the specific software (yes/no). **Analysis method:** Percentages	94% informed about national prevention programme, 70% Contact with outreach visitor or district GP, 30% CME or small group education for GPs, 30% CME or small group education for practice assistants. For practice visits that had contact with an outreach visit (40%), mean practice visits were 2 (1-13)
		Engagement	Not reported	Facilitating software used by 474 practices (48%) either in full or in part.
Holtrop et al (2015) [29]	RE-AIM framework. Terms: 'adoption'/'implementation'	Fidelity	**Procedure and measures:** Observation and interview ratings by multiple independent raters. Implementation rated as excellent, good, fair or poor. Research team independently rated each practice on how well and often they used processes on a 4 point scale (4 used well, 3 used well but not often, 2 a mix of used well and not well and 1 not used or not used well). Discrepancies resolved and consensus agreed. Ratings given from review of interview data (conducted by two researchers, in 5 practices) about knowing how to use program, reported use, meaning, value, enthusiasm, support + observations of practices. Field notes collected using a structured observation template to describe: physical environment, practice personnel and culture and patient population + RAs completed a one page summary report describing key findings **Analysis method:** 5 researchers developed coding guidelines, interviews coded, interrater reliability evaluated, met to reconcile scores and resolve discrepancies. Descriptive	Practice A: Good, B: Good, C: Fair, D: Fair, E: Poor. (Qualitatively derived ratings).
		Engagement	**Procedure and measures:** Adoption: The number of providers referring to CM. Maintenance: Patient follow up completion rates	Adoption (proportion of providers referring 5 or more patients to care manager: A: 3/3, B: 6/6, C: 7/8, D: 2/4, E: 6/8. Maintenance:

			Analysis method: Percentage and number of patients.	(6 month follow up rate of patients with the care manager for the scheduled assessment: A: 70.3%, B: 52.1%, C 40%, D 48%, E 38%.
Hunt et al (2001) [30]	No framework or terms/definitions given – discussed as 'process variables'	Fidelity	**Procedure and measures:** Participant self-report, at end of telephone interview. Participants asked: whether they saw provider as scheduled, whether they spoke about nutrition, whether they reviewed the Eat smart recommendations and how many minutes they spent talking about nutrition. Provider self-report (n=28; 75% response rate) at end of intervention. Providers given a 6 item survey. Asked how often talked with participants about benefits of healthy eating, when provided nutrition information, how often considered Eat smart recommendations, time taken to discuss. Response options: Never, most of time, often, always and do not remember **Analysis method**: Percentages	71% discussed diet health relationship/tailored recommendations with providers, 57% reported discussing complete diet health endorsement, 71% providers reported acknowledging the diet health relationship often or always, 62% said they gave eat smart recommendations often or always.
		Engagement	**Procedure and measures:** Participant self-report, at end of telephone interview. Participants asked: whether they saw provider as scheduled, whether they spoke about nutrition, whether they reviewed the Eat smart recommendations and how many minutes they spent talking about nutrition. Response options: Never, most of time, often, always and do not remember. Invited 230 patients to participate, 217 completed first interview, 183 completed second interview. **Analysis method:** Percentages	89% reported setting goals, 57% reported reaching first goal, 74% reported fruit and vegetable consumption being emphasized. 16% reported primary focus as red/processed meats, 16% low fat dairy products and 10% whole fat dairy products. 7/230 participants referred to registered dietitian.
Yu-Yahiro et al (2009) [31]	Resnick et al (2005). 'Delivery of treatment' (delivered as intended)	Fidelity	**Procedure and measures:** 70 randomly selected home observations by 2 observers (nurse researcher + exercise physiologist) measured using a checklist during the entire study intervention period across all intervention groups. Participant exercise log books monitored to assess fidelity. Feedback to the interventionist was provided and ranged from specific exercise intervention techniques to reminders to use the exercise calendars, review the exercise booklets, or incorporate verbal encouragement. Quarterly treatment fidelity visits (by 2 investigators) for each provider. **Analysis method:** Percentages	Adherence to the delivery: 91%. 92% of participant's demonstrated evidence that they received the intended intervention during these observations.
		Engagement	Not reported	Average number of visits (intervention) : 36.2 (65%). If one trainer visit, average number: 44 (78.5%)
Jansink et al (2013) [32]	No framework. 'Exposure'	Fidelity	Not measured	Not measured
		Engagement	**Procedure and measures:** Exposure of nurses to intervention measured by recording attendance at training sessions. Asked nurses if	93% nurses attended at least three of 4 sessions, 74% discussed social maps and diabetes protocols. Most nurses

			they used the instruction chart. Recorded number of nurses who received three telephone follow up calls and participation in meeting. **Analysis method:** Percentages	used chart during or after consultations.
Keith et al (2010) [33]	'Fidelity of implementation' ('consistency and quality of targeted organisational members use of the specific innovation' (Klein & Sorra, 1996), 'Satisfaction' – enthusiasm, 'Quality' – competence and knowledge, 'Consistency' – frequency used the intervention based on guidelines	Fidelity	**Procedure and measures:** Qualitative rating based on participant interviews with 18 clinicians. 1. Delineate 8 components of intervention. 2. Rate intervention components (a) satisfaction, perceptions of quality, consistency of use of components), b) matrix for each participants, c) two authors code text for 5 transcripts – 25% of data, d) codebook to specify rules. e) One author coded and assigned ratings. f) 4 authors reviewed and agreed on final categories. g) Reviewed and discussed matrix. h) FOI scale amended to 5 category scale to include high and low compliance. i) differences in opinions discussed). Organizational members' commitment to use was rated on a scale consisting of five categories: (1=nonuse, 5=committed use). Sample: Purposive sampling **Analysis method:** Assessed at organizational member level, overall medical centre (aggregated) - descriptive	Average ratings: A: 3.4, B: 3.6, C:3.5, D:, 3.0 (1 = nonuse, 2 = low compliance, 3 = compliant, 4 = high compliance 5= committed) FOI ratings for components: Availability of nurse practitioner case manager (A 4, B 4, C 3, D 3). Collaboration between primary care providers and NP case managers (A 3, B 4, C 3, D 3). Coordination between primary care centers and inpatient centers (A- , B 4 , C 4 , D 3). Provision of video conferencing sessions (A 3, B 5, C 4, D 4). Provision of telemedicine technology (A 1, B 3, C 1, D 1). Provision of patient education documentation (A 3, B –, C 5, D -). Provision of laptop computers (A 5, B 3, C 3, D 3). Provision of case manager training (A 5, B 2, C 5, D 2)
		Engagement	Not measured	Not measured
Lawrence et al (2014) [34]	No framework	Fidelity	**Procedure and measures:** Observed how many times trainers modelled the skills during training (Used Flanders Interaction Analysis technique – every 10 seconds, researchers recorded whether trainers were asking exploratory questions (skill 2), modelling the skills, speaking using other forms of question or instruction and speaking or undertaking an activity. Not possible to record use of reflection (skill 3). Recorded who did most of the talking and time spent asking open questions. SMARTER planning recorded (skill 5). Observed all trainees and attended as many sessions as possible. Telephone call fidelity assessed by checking questions asked against those on script. **Analysis method:** Percentage of time trainers were modelling skills and trainees were undertaking activities were calculated as measures of fidelity to the manual. Skill 2 was assessed through making a tally of the questions asked and categorising them into either open discovery questions or other responses.	76% of training sessions spent doing activities/speaking. Open questions used nearly 1/3 of time.
		Engagement	Not measured	Not measured
Lazovich et al	No framework – just	Fidelity	**Procedure and measures:** Flexible about implementation to minimise	Provider report: 92.5% received intervention.

(2000) [35]	referred to as 'process evaluation'		disruption. Intervention physicians recorded on a physician script whether the intervention was delivered. Participants asked about delivery 3 months later. **Analysis method:** Descriptive statistics. A Mantel-Haenzel X2 statistic was used to evaluate differences in use according to who delivered the booklet and the amount of time spent discussing it.	Participant interview: 96% received booklet, 50% from doctor, 27% from nurse/other clinic member, 18% researcher assistant, rest in mail. 62% reported the intervention lasting 2 mins or less.
		Engagement	**Procedure and measures:** Participants interviewed 3 months later. Intervention: Asked about receipt of booklet, when visited doctor, job title of provider, amount of time discussing diet change, use of booklet (self-reported reading of one+ section of booklet by 3months). Asked control participants at 3m interview if they received any written materials on diet. **Analysis method:** Descriptive statistics.	92.8% said they had read some or all of the booklet. Participants were more likely to read booklet if they discussed between 1-3mins.
Lobb et al (2004) [36]	No framework. 'Dose of intervention delivered', 'Fidelity to intervention protocol', 'Dose of intervention received'	Fidelity	**Procedure and measures:** Self-report on computerised process tracking system**.** Dose delivered (length and completion of activity on laptop after activity). Extent: How many intervention activities per participant, average number of telephone calls completed and average number of tailored materials mailed. Fidelity: Proportion of participants who received key intervention components as planned, ICS on the same day as the clinician visit, physical activity clearance on the same day as the ICS, ICS at the health centres, and mean length of initial counselling session, telephone sessions and proportion of call attempts. Protocol – scored a 1 if completed or a 0 if not completed. Index of six = all activities complete. Certified motivational counselling trainer reviewed 10% of audio-recorded sessions with health advisors to assure compliance and adherence to protocol. **Analysis method:** Percentages	Implementation score: 5.4 (0-6 activities). The overall implementation score was 5.4 (0–6 activities). Counselling session delivery: 96% participants. All four telephone counselling sessions: 81% 79% participants received clinician endorsement on same day as ICS. 79% received PA clearance on same day as ICS. 86% completed at the health centre. 67% index of 6 for protocol completion – majority completed all activities, 90% >5. Dose: Mean length = 25 min.
		Engagement	**Procedure and measures:** Self-report (for tailored materials only) 8 month follow up survey to measure patients' receipt of tailored materials. Asked how many of the materials they read, how helpful they were in setting personal goals for changing habits. Scored using 'yes/no/don't recall', 'most, all, some, none', 'very helpful, neither helpful nor unhelpful, very unhelpful' **Analysis method:** Percentages	842/1088 participants (77%) received the clinician endorsement). A total of 967 (89%) intervention participants responded to the follow-up survey. 876 (91%) reported that they received tailored materials from Healthy Directions-HC. 76% reported reading most or all of the materials.
Matei et al	No framework. Term:	Fidelity	Not measured	Not measured

(2015)[37]	'adherence to tips'	Engagement	**Procedure and measures:** Participant self-report using 7 day tick sheets to record adherence to tips. For one tip, which recommended setting a manageable walking target, participants were asked to record their daily target and whether it had been achieved. **Analysis method:** Weekly adherence: summing number of ticks that week divided by 7. Mean total adherence summing all ticks for each tip and dividing by 49 (7days x 7 weeks). Global mean adherence summing mean total adherence to each of 16 tips and divided by 16. All rates were x 100 to express percentages	92% returned at least 8 tick sheets (both samples), one didn't return anything (sample 1,2) one returned 5 (sample 2). Global mean adherence: 40.48% (sample 1) and 57.86% (sample 2). Sample 1: Mean total adherence rates were highest for Tip 2 ('make ad breaks active'; 60.85 %, range 45.45 % to 67.53 %) and lowest for Tip 5 ('tiptoe through the queue'; 14.84 %, mean per-week adherence range 6.49 % to 35.06 %). Sample 2: Mean total adherence rates were lowest for Tip 5 ('tiptoe through the queue'; 38.97 %, range 31.97 % to 42.21 %), and highest for Tip 1 ('leave the house daily'; 81.63 %, range 71.43 % to 85.71 %). Sample 1: Highest adherence observed between weeks 2 and 4, with the exception of Tips 9c ('toe rises'; weeks 2 and 6) and 9 g ('lift a tin of food in each hand'; week 7). Lowest adherence for all tips was observed at weeks 7 or 8. Sample 2: Highest adherence was typically observed between weeks 2 and 4, and lowest adherence between weeks 5 and 8, most typically at week 8. Sample 1: Mean adherence was above 50 % for five of the sixteen tips (Tips 1, 2, 9a, 9b, 10), indicating these were typically more often enacted than not. Sample 2: Mean adherence above 50% for eleven tips (Tips 1, 2, 3, 4, 7, 8, 9a, 9b, 9c, 9e, 10).
McCarthy et al (2015)[38]	No framework. Implementation of intervention according to protocol (including fidelity, dose and context), 'Engagement'	Fidelity	**Procedure and measures:** All 20 exercise counselling sessions audiotaped. Four (20%) sent to an independent expert in MI for review and assessment. Assessed for: average of spirit global, reflection to question ratio, percent open questions, percent complex reflections, percent MI adherent, scored each session). 90% reflects beginning proficiency. Dose: examining the quantity or amount of intervention delivered to participants. This consisted of three components: the exercise counseling session, telephone follow-up, and use of the daily diary. Participation in each component was calculated **Analysis method:** Percentages	100% audiotaped. All essential elements covered as planned. Adherence to principles of MI was 40–50% in subject 4 and 5 (low adherence). Increased to 100% and 80% in subject 16 and 20. (168/180 calls with collected data (93% of calls successfully made/step data collected). Global spirit clinician rating: 2.3 and 2.7 (two interviews) – lack of proficiency compared to 3.5 average. Adherence to MI improved to 80–100%, but the other ratings are not all consistently higher.
		Engagement	**Procedure and measures:** Adherence to daily dairy was tallied for each of four activities (daily step- counts, body weight, use of the hand weights, Borg scale). **Analysis method:** The total number of actual recorded data for each	Step count recorded: 801/1260 = 64% of days. Borg scale: 628/1260 = 50% of day. Daily weight: 651/1260 = 52% of days. Hand weight use: 400/1260 = 32% of days

			activity was divided by the number of potential diary recordings (15 participants ×84 days = 1260). This resulted in the percent adherence in each activity.	
McCurry et al (2012) [39]	NIH Behaviour change consortium (Bellg et al., 2004). Data on: Treatment delivery (SETP implemented in a standardised way across settings). Receipt (whether SEP concepts and components were understood by participating staff caregivers). Enactment (whether staff caregivers followed treatment recommendations with their residents)	Fidelity	**Procedure and measures:** Self-report checklist completed after each session indicating which of the 13 SEP topics had been covered (keeping a sleep log, assigned readings, sleep changes in dementia, behavioural treatment rationale, developing a sleep plan, monitoring problematic sleep behaviours, identifying activators for problem behaviours, changing caregiver responses to behaviours, implementing sleep plans, improving communication with residents effects of light, daytime activity and pleasant events on sleep and mood). All sessions audio-recorded and reviewed by PI who provided feedback. **Analysis method:** Not reported – descriptive statistics/percentages	Sleep Education Program was delivered as intended in active treatment. All topics covered, coverage varied. Sleep log monitoring and resident sleep plans discussed every visit. Relationship between sleep and dementia, monitoring behaviours and activators discussed in 60Other components delivered in first two or last two sessions. Assigned as homework: Sleeping schedule 90% (89%-92%), Reduced napping: 89% (83%-92%), Increased exercise 64% (61-67%), Light changes 48% (40-54%), Other 26% (23-32%). Sessions averaged 41.5 minutes (range: 6–80 minutes).
		Engagement	**Procedure and measures: Receipt:** Provider self-report (Staff caregiver attendance at SEP sessions and clinical impressions (staff interest, understanding, willingness to make changes, conduciveness of AFH environment) rated by trainer after session. Recorded whether staff-caregivers able to identify sleep related target behaviours for change, potential activators and consequences and develop behavioural sleep plans for upcoming week. Rated on 0-3 scale (0 not at all, 3 fully). Willingness, interest and supportiveness on a 1-5 scale (1=not at all, 5 extremely) **Enactment –** Provider reviewed homework at every SEP session, rated compliance (attempted, not attempted), assisted staff caregivers in problem solving. Rated success implementing treatment recommendations **Analysis method:** Descriptive and inferential stats – (inferential stats not specified)	**Attendance at sessions:** 27 (73%) caregivers participated in all four individual sessions (mean: 3.6 sessions, range: 1–4). **Compliance with actigraph recorders:** 88% residents provided 6 or more days of actigraph data at each of the three sampling points. **Receipt:** 7% fully understood concepts session 1, 67% fully understood in session 4 (p<0.0001). 62% staff intervention condition extremely interested, 48% extremely willing to participate, 69% supportive environment. **Enactment:** 16% established ABC plans in session 2, vs 88% session 4 (p<0.0001). 13% scheduled increased pleasant events in session 2 vs 92% session 4 (p<0.0001). **Homework attempted:** Sleeping schedule changes: 76% (71-87%), Reduced napping 66% (57%-73%), Increased exercise 45% (39%-56%), Light changes 41% (39%-45%), Other environmental changes 23% (21%-24%)
McGillion et al (2008) [40]	No framework. ‘Intervention delivery’ /process evaluation (‘attendance’)	Fidelity	**Procedure and measures:** All sessions audio-taped. Random sample (10%) externally audited to ensure standard intervention delivery.	Not reported
		Engagement	**Procedure and measures:** An attendance record was kept to track the number of CASMP sessions attended by the treatment group participants. **Analysis method**: Percentages	93% attended all six program session, 7% attended three or more. Average number of sessions attended: 5.8
McNamara et al (2015) [41]	No framework. ‘Intervention fidelity’. 1) Appropriateness and	Fidelity	**Procedure and measures:** Community pharmacists documented issues about each session to monitor nature of counselling**.** Goals and strategies only included if related to health behaviours. Perceived	Pharmacists felt competent to deliver intervention 94% patients. **Weight loss: 53/63, 84**% goal recommended for adoption, % with a documented strategy to address goal (n-64). Dietary 58

	suitability of intervention structure, retention of patients, time taken to deliver intervention. 2) Appropriate targeting and delivery of intervention (Recruitment, recommendation of goals addressing risk factors, patient agreement, strategies to address risk factors, identification of barriers/enablers. 3) Perceived success of behaviour strategies. 4) Perceived competence		success of behaviour change strategies. Self-assessed perceived competence by pharmacists to deliver intervention after session 5. - Pharmacist perceived need for further support - Perceived success: yes/no – yes = success - Perceived competence – yes/no after session 5. **Analysis method:** Percentages	(91%), alcohol, 11 (17%), physical activity 56 (88%), other weight 15(23%). % of participants who agree with participants to pursue a goal relating to this 53 (100). % with a related written strategy. Dietary 47/53 (89%), alcohol 10/52 (18%), physical activity 48/53 (91%), other weight 15/53 (28%). **Increase physical activity:** % with a goal recommended for adoption 47/63 (75%). % with a documented strategy to address goal (n-64). 56 (88%). % of participants who agree with participants to pursue a goal relating to this 44 (94%). % with a related written strategy. 40 (91%). **Improve diet:** % with a goal recommended for adoption 52/62 (84%). % with a documented strategy to address goal (n-64). 58 (91%). % of participants who agree with participants to pursue a goal relating to this 51 (98%). % with a related written strategy. 46 (90%). **Reduce salt intake:** % with a goal recommended for adoption 8/62 (13%). % with a documented strategy to address goal (n-64). 58 (91%). % of participants who agree with participants to pursue a goal relating to this 8 (100%). % with a related written strategy. 8 (100%). **Improve medication adherence:** % with a goal recommended for adoption 11/62. % with a documented strategy to address goal (n-64). 17 (27%). % of participants who agree with participants to pursue a goal relating to this 11 (100). % with a related written strategy. 6 (55). **Lower risky alcohol intake:** % with a goal recommended for adoption 8/62. % with a documented strategy to address goal (n-64). 11(17%). % of participants who agree with participants to pursue a goal relating to this 8(100). % with a related written strategy. 5/7 (72%). **Quit smoking:** % with a goal recommended for adoption 6/62. % with a documented strategy to address goal (n-64). 3 (5). % of participants who agree with participants to pursue a goal relating to this 5. % with a related written strategy. D3 (60) Dose: Session 1: mean of 34 min, Session 2: 22 min. Further sessions: 15– 20 min for subsequent sessions.
		Engagement	**Procedure and measures:** Community pharmacists documented issues about each session to monitor the nature of counselling provided (patient agreement with suggested goals, progress towards behavioural goals and barriers experienced, and agreed changes to goals). In sessions 2–	Completing sessions: Session 1: 66 (96%), Session 2: 62 (90%), Session 3 59 (86%), Session 4: 57 (83%), Session 5: 56 (81%)

			5, pharmacists were asked to rate, as a binary outcome (yes/no), if any success had been achieved for each agreed patient strategy noted in the previous session. At the end of the intervention, pharmacists were asked to document those areas where they felt patients had made major achievements, **Analysis method:** Percentages	
Metzelthin et al (2013) [42]	Framework: Baranowski and Stables (reach, dose delivered, fidelity, dose received (exposure and satisfaction) and barriers (Baranowski and Stables, 2000; Linnan and Steckler, 2002; Saunders et al., 2005). 'Fidelity of delivery' (delivered in intended manner). 'Exposure'/'adherence' (extent of active engagement in and receptiveness to care approach)	Fidelity	**Procedure and measures:** Practice nurse evaluation form (self-report) and qualitative interviews. Dose: Logbooks contained information about amount of care. **Analysis method:** Data analysed by three members of research group. Qualitative and quantitative data integrated to cross validate findings. Percentages	Step 2: Assessment by practice nurse: 98.9% 186, Additional assessment GP (43.6%) 82 occupational therapist, 19.1% 28Physiotherapist 14.9% 28, other 9% 17. Step 3: Analysis and preliminary treatment plan: Practice nurse 12.2, %, bilateral meeting (nurse and GP) 64.4%, extended team meeting 22.3%. Step 4: analysis and preliminary treatment plan Practice nurse 23 (12.2%), Bilateral meeting 121 (64.4%), Extended team meting 42 (22.3%). Step 5: Agreement on treatment plan: practice nurse 51.6%.97 Step 6: Executing the treatment plan - use of toolbox parts: Meaningful activities (32: 17.0%), adapting the environment activities or skills 48 (25.5%), social network and social activities 27 (14.4%), daily physical activity 36 (19.1%), stimulate health 41 (21.8%), other interventions 27 (14.4%). Step 6: Evaluation and follow up: Nurse and older person 50%, bilateral meeting 18.6%, extended meeting 28.7% Dose: Log books filled in for 188 people (6 logbooks missing).82 (43.6%) seen by their GP during assessment phase
		Engagement	**Procedure and measures:** Practice nurse evaluation form – asked to judge the frailty of the participants (reach), ability to understand the goal and working method of care approach and adherence to commitment/exposure (Baranowski and Stables, 2000; Linnan and Steckler, 2002; Saunders et al., 2005). **Analysis method:** Percentages	75.8% understood the goal and procedure. Adherence assessed by nurse as very good (72, 48.3%), sufficient 46(30.9%), poor 30(20.1%), 11 (7.4%) not applicable)
OBarzanek et al (2007) [43]	No framework. 'Adherence'	Fidelity	Not measured	Not measured
		Engagement	**Procedure and measures:** Self-report using the DASH adherence index. The DASH adherence index is a simple average of sub-indices measuring daily intake of dairy servings, fruits and vegetables servings and percent saturated fat. Score of 0-1 = within target range. 1+ indicates intake better than target range. Less than 0 = worse than target range. Validity tested.	(score between 0 and 1 indicates adherence) Advice only baseline -1.1 (0.7), 6 month change 0.2(0.8)*, 18 month change 0.1(0.8*). Established intervention mean (sd) baseline -1.1 (0.7), 6 months 0.2(0.8) ***, 18 month change 0.1(0.8)**. Established and DASH mean -1.0 (0.7), 6 month change 1.1 (0.9)***, 18 month change 0.9(0.9)***

			Analysis method: Descriptive and parallel analyses – multivariate models	
Ockene et al (2012) [44]	No framework. No terms	Fidelity	**Procedure and measures:** Mentioned but not included	Not reported
		Engagement	**Procedure and measures:** Attendance Analysis method: Descriptive statistics/percentages	Attendance: Median of 6 group sessions, Median of 8 total sessions. Attendance at group sessions = low: 60% at first session to 20% last session
Olsen et al (2012) [45]	No framework. 'Treatment integrity'	Fidelity	**Procedure and measures:** 25% of MINT sessions were recorded and rated for treatment integrity by two independent raters using the Behaviour Change Counselling Index (BECCI; Lane et al., 2005). The nurses involved each recorded a subset of their sessions. Each nurse recorded one or two sessions when they had access to the recorder. Measured on a scale of 0-4. Higher scores = greater demonstration of skills. Checks conducted at end of intervention phase. **Analysis method:** Consistency between raters for the treatment integrity checks was conducted using intra-class correlation coefficients (ICC) for the BECCI rating. Descriptive statistics	BECCI score: between 3.7 and 3.81 out of four. Delivering intervention to a great extent. Inter rater consistency for these scores was excellent (Session one ICC=0.87; Session two ICC=0.99; Session three ICC=0.99).
		Engagement	Not measured	Not measured
Osborn et al (2010) [46]	No framework used. No terminology/definitions	Fidelity	Not measured	Not measured
		Engagement	**Procedure and measures:** Participants asked if they attended the optional diabetes support group. Response options were never, less than 3 months ago, 4 to 6 months ago, 7 to 9 months ago, 10 to 12 months ago, 1 to 2 years ago, and less than 2 years ago **Analysis method**: Descriptive statistics	Participation in the diabetes support education group: Never 13 (27%), <3 months ago 12 (25%), 4-6 months ago 6 13%), 7-9 months ago 3(6%), 10-12 months ago 4(8%), 1-2 years ago 7(15%), > 2 years ago 3(6%). Control group never 7(16%), <3 months ago 9(21%), 4-6 months ago 9(21%), 7-9 months ago 2(5%), 10-12 months ago 3(7%), 1-2 years ago 7(16%), > 2 years ago 6(14%),
Pettman et al (2008) [47]	No framework. Compliance (attendance)	Fidelity	Not measured	Not measured
		Engagement	**Procedure and measures:** Compliance with intervention assessed using self-report attendance records and weekly food and PA logs. Weekly attendance recorded each individual for information and PA sessions. If absent, rang to find out why**. S**ubjective assessment was made by two research staff (one actively engaged, one no direct contact) to judge accuracy of records A score was allocated by mutual agreement between the two research staff, of 0 = effectively non-compliant; 0.5 = uncertain or partly-compliant (e.g. not attending exercise sessions, but reported doing additional PA outside of sessions); or 1.0 = appears compliant. **Analysis method:** Percentage	Attendance: Info session (77%), exercise session (66%), logs (poorly maintained, 1/3 not completing or returning weekly records, 1/3 not completed fully or accurately.). Average = 0.51 (part compliant).

Pill et al (1998) [48]	No framework. ‘Clinician competence’, ‘Use of the intervention’	Fidelity	**Procedure and measures:** Audiotaped consultations analysed to assess clinician competence. Clinicians asked to submit recordings which demonstrated use of the method and were a fair reflection and typical interview. Tapes numbered, transcribed and coded blind using coding framework (which had been refined over several months to ensure reliability/validity). **Analysis method:** Comparison of audiotaped consultations across groups used the individual consultation as the unit of analysis, where a chi square test was used to compare whether or not the desired behaviour was significantly more likely to be found in the intervention group consultations.	Consultation tapes were provided by all but one of the 29 practices, 51 from 26 experimental group clinicians and 46 from 24 control clinicians. Nurses produced more tapes than doctors (68 vs 29). Nurses covered more topics in the consultation 4.22 vs 2.48 p <0.000) and more often mentioned diet p=0.006 and alcohol use p=0.000, smoking p=0.015, and weight p=0.016) Components from the 68 nurse tapes (36 intervention, 32 control): Patient decides topic to discuss: 83 vs 72, Patient affirms current behaviour: 100 vs 81 (p=0.006), Patient initiates discussion of change: 50 vs 25 (p=0.03), Any target set 58 vs 41 (NS), Patient sets target 36 vs 28 (NS), Patient takes lead in target setting 28 vs 22 (NS)
		Engagement	**Procedure and measures:** Use of the intervention was assessed by telephone interview at the end of the study - how much they were using it in practice **Analysis method:** Percentages	71% of clinicians used visual aids frequently, 22% occasionally. Nurses = more attendance (therefore engagement). 2.5 years after the study - 2/3 of the clinicians (22/32) were rated as having a moderate to good understanding of the method and principles. Only six (19%) reported that they were regularly putting it into practice. Relationship between understanding of method and implementation 30 months after recruitment (intervention only). Poor implementation and poor understanding 10, Poor implementation moderate understanding 8, Poor implementation good understand 5, Moderate implementation good understanding 3, Good and good 6
Roy-Byrnes et al (2010) [49]	No framework. ‘Quality of care’	Fidelity	**Procedure and measures:** Self-report measures of dose, adherence, number and consistency of CBT elements occurring in sessions. For patients in intervention group more detailed information on number and type of sessions extracted from web-based management system. **Analysis method**: Descriptive statistics	At both 6-month (54.8%;95% confidence interval [CI], 51.0%-58.7%; vs 9.98%; 95% CI, 6.08%-13.88%) and 12-month (21.6%; 95% CI, 18.2%-25.1%; vs 9.31%; 95% CI,5.83%-12.79%) assessments, significantly more patients in the intervention group received psychotherapy with at least 3 of 6 CBT elements (e.g., exposure, relaxation, cognitive restructuring, homework) usually or always delivered.
		Engagement	Not measured	Not measured
Saunders et al (2014) [50]	Possible frameworks: Baranowski & Stables, 2000; Linnan and Steckler, 2000. Implementation fidelity (extent to which church	Fidelity	**Procedure and measures:** Participant self-report and provider self-report. Congregant survey: implementation variables for healthy eating and physical activity. ‘‘Getting the message out’’ (healthy eating) assessed by three items; ‘‘providing opportunities’’ by one item; and ‘‘pastor support’’ by one item. ‘‘Getting the message out’’ (physical activity) was assessed by three items; ‘‘providing opportunities’’ by three	1. Physical activity: Getting the message out: Intervention: Pre 2.09 (0.53) vs post 2.34 (0.52). Control: Pre 2.23(0.51)) vs post 2.2690.48). Opportunities: Intervention: pre 1.44(0.25) vs post 1.89 (0.58). Control: pre 1.44(0.21) vs post 11.42(0.23). Pastor support: Intervention: pre: 1.67 (0.34) vs post (1.97(0.47). Control: pre: 1.84(0.35) vs post

	committees made changes in the environment (Wilcox et al., 2010)		items; and ''pastor support'' by two items. All items were rated on four-point scales and church-level means were calculated to reflect level of implementation (higher score = greater implementation). **Interviewed health directors, pastors and cooks after intervention to assess organisational policies, practices and guidelines in church.** Each item (healthy eating and physical activity) coded yes (1) or no (0) and mean score for each calculated. Lower scores, less implementation. Rarely = 1, Sometimes = 2, Often = 3, Most/all of the time =4 **Analysis method:** descriptive statistics, mediation and ANCOVA	(1.77(0.30). PA policy: Intervention: pre NA post 0.31(0.45). Social support: Intervention: Pre 2.53(0.30) vs post 2.7(0.31). Control: Pre 2.61(0.21) vs post 2.66 (0.32). Self-efficacy: Intervention: pre 2.70(0.24) vs post 2.64 (0.28). Control: pre 2.76(0.24) vs post (2.70 (0.24) 2. Healthy eating: Getting the message out: Intervention: Pre 3.12(0.51) vs poster2.28 (0.54). Control: Pre 2.11 (0.49) vs 2.15 (0.42). Opportunities Intervention: pre 2.87 (0.39) vs post (3.09 (0.43). Control: pre 2.94 (0.32) vs post (3.04 (0.32). Pastor support Intervention: (2.19 0.55) vs 2.55 (0.60). Control: 2.30 (0.38) vs post 2.36 (0.39). PA policy Intervention: NA vs 0.80 (0.27). Control: NA vs 00.30 (0.30). Social support: Intervention: 2.46(0.36) vs 2.64 (0.37). Control: 2.55(0.23) vs 2.64 (0.32). Self-efficacy Intervention: 3.12 (0.16) vs 3.14 (0.24). Control: 3.10 (0.20) vs 3.16 (0.21)
		Engagement	Not measured	Not measured
Skidmore et al (2014) [51]	No framework. Participants' comprehension and engagement. Fidelity.	Fidelity	**Procedure and measures:** All sessions videotaped and 20% from each group randomly selected and rated for fidelity (intervention and control group) against manual using checklists. Checklists developed and validated. Examined treatment integrity (adherence to specified principles, competence in execution, measured by independent raters using yes/no specified principles and 'inadequate, adequate or exceptional' competence) and differentiation (raters assessed adherence to determine degree to which it was adhered to and how much the control session did not include elements of intervention. Conditions considered different if adherence ratings were significantly higher for strategy training than attention control. **Analysis method:** Descriptive statistics and inferential stats not specified	Strategy training: 94% manualized procedures adhered to (85/90). Attention control: 100% manualized procedure adherence. Intervention Therapist demonstrated acceptable/exceptional competence 100% of procedures. Attention Control therapist demonstrated acceptable/exceptional for 99% procedures. The strategy training therapist demonstrated acceptable or exceptional competence for 100% of the completed procedures. Sampled strategy training sessions adhered to 94% of manualized procedures on the strategy training protocol (85 out of 90), Sampled attention control sessions did not contain any of the manualized procedures on the strategy training protocol, indicating good treatment differentiation. Dose: Amount of intervention sessions: M 11.2 vs control 9.5 (T8=-0.53, p=0.61). Duration of sessions: (strategy training M = 37.7 vs 36.8 control (T8=0.19, p=0.86)
		Engagement	**Procedure and measures:** Rated participants understanding using a 3 point scale (1-minimal understanding, 2-some understanding, 3-good understanding). Rated participants' engagement using the Pittsburgh Rehabilitation Participation Scale, a 6 point valid and reliable scale assessing effort and motivation (1-no engagement, 6-excellent	Understanding of information: Mean = 2.2 intervention vs 2,6 control (T8=0.84, p=0.43). Participant engagement: strategy training M=4.3 intervention vs 4.0 control (T8=0.31, p=0.77). Strategy training completed 96% of sessions (48/50), attention control 92% of sessions (46/50)

			engagement). Both measures scored during each session by research therapist. **Analysis method:** Mean understanding used in analysis. T tests.	
Slade et al (2015) [52]	No framework. Attendance and engagement	Fidelity	Not measured	Not measured
		Engagement	**Procedure and measures:** The recovery practice scale used to assess self-rated skills, behavioural intent and behaviour in relation to achieving goals and partnership relationships (15 items. 0-310. High = desirable score). The Participation Scale used to rate attendance and engagement with the personal recovery training, coaching training and team reflection sessions (3 items. Very low to very high. High = desirable score). The Participation scale and recovery practice scale = a non-standardised measures. £10 given to patients after attending assessment and entered into £50 prize draw. Same staff member collected staff data where possible. Data entry protocol followed for consistency and data validation rules applied to reduce transcription errors. All missing data checked manually. Random 20% of RPS checked against paper copies. **Analysis method:** Not reported – descriptive statistics	Self-rated adherence (average cluster size 9, range 4–16). RPS: Intervention - Skills: 2.79 (0.64). Behavioural intent: 1.66 (0.34), Behaviour 1.78) (0.78). Control - Skills: 2.73 (0.66), behavioural intent 1.68, 09.37), behaviour 1.74 (0.77). Briefing sessions (14): Attendance = 0-25 patients and from 50% to 80% of staff per team. 41/42 personal recovery training sessions: median attendance = 14.4 (range 8-24) session 1, 13.1 (4-21) session 2, 10.4 (6-15) session 3. 42 coaching session run – 14.7 (12-12) team members session 1, 12.0 (7-19 session 2, 11.3 5-14 session 3. Cannot quantify how many staff attended training. 12/36 team reflection groups. Mean attendance 10.0 (5-21). No records kept of reflection groups.
Smith et al (1997) [53]	No framework. Treatment adherence (attendance, returning diaries)	Fidelity	Not measured	Not measured
		Engagement	**Procedure and measures:** Behavioural measures of adherence: attendance at group meetings, number of diaries turned in, number of days calories were recorded, exercise frequency and number of day's home blood glucose was monitored. Intervention and control groups. **Analysis method:** Kruskall Wallis test, analysis of covariance and descriptive statistics	Sessions attended Motivation: 13.3 +- 2.0 vs Standard 8.9 +-2.0 (P=0.01*), Food diaries submitted: Motivation: 15.2 +- 1.8, vs standard: 10.1 +- 2.6 (p=0.01*). Self-monitored blood glucose: Motivational: 46.0 +- 16.1 vs standard: 32.2 +- 10.2 (p=0.05*), Reported exercise Motivational: 35.2 +- 13.2 vs standard: 23.7 +-11.6 (p=0.07*), Recorded calories Motivational: 76.8 +- 15.2 vs standard: 55.7 +- 24.7 (p=0.07*)
Smith et al (2010) [54]	No framework/definitions	Fidelity	**Procedure and measures:** Mentions that all care and assessments carried out in keeping with protocol, but not included	Not reported
		Engagement	**Procedure and measures:** Monitoring of session attendance **Analysis method:** Descriptive statistics	78% attended at least once (1169) – 44% 656 participants completed treatment, 13% transfer of cares, 21% disengaged. 21% people 'disengaged' from treatment after being seen at least once. The mean number of contacts for people completing treatment was 5.0 (median 5), and for those disengaging from treatment was 4.1 (median 4). Total mean contact time was 151 min for patients completing treatment (median 135 min), and mean contact time for people who disengaged was 95min (median 80). Response in the treatment complete group was

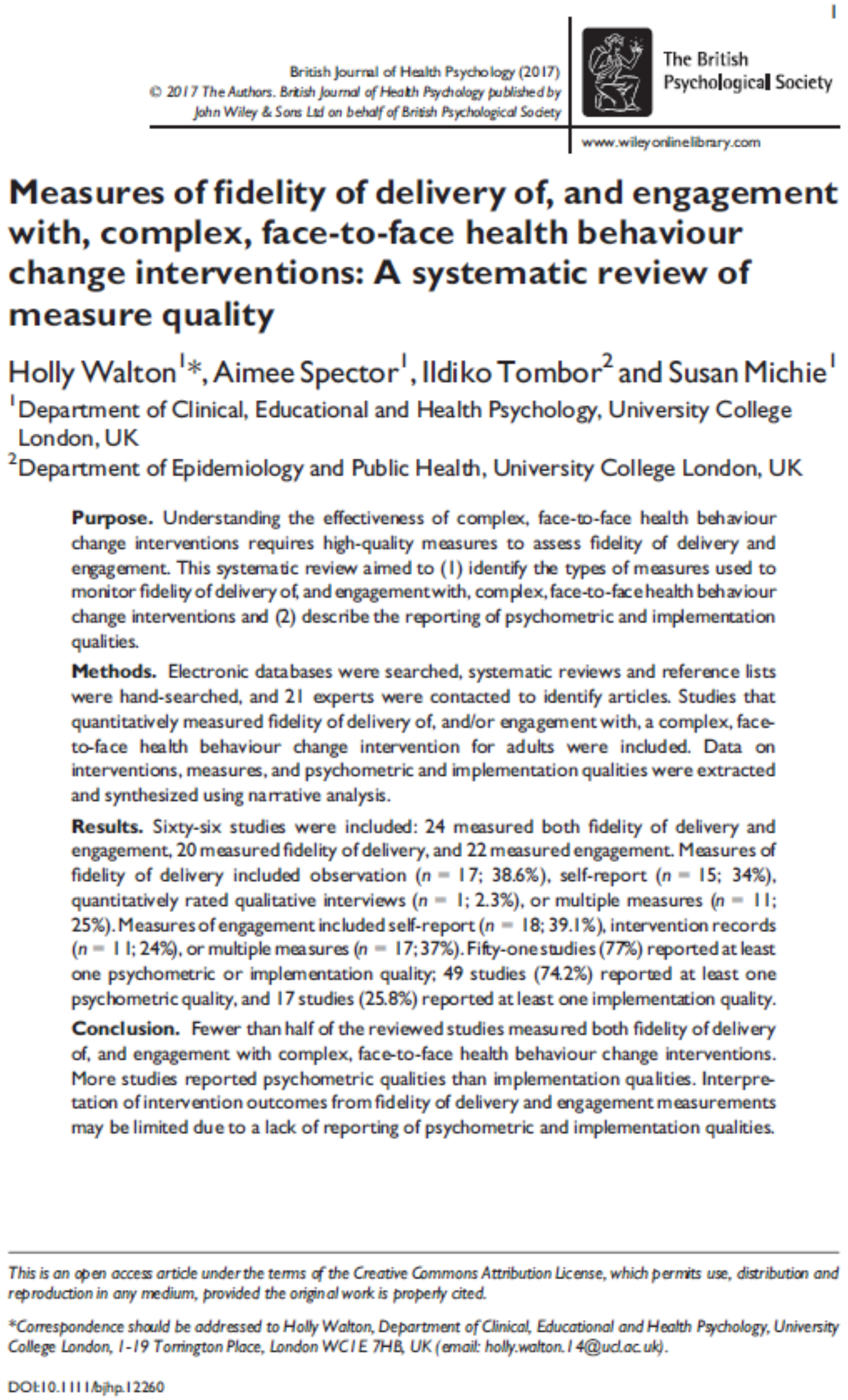
				maximal at four to five contacts.
Stanley et al (2013) [55]	No framework. Treatment characteristics/adherence	Fidelity	**Procedure and measures:** All sessions audiotaped, and a random 20% were reviewed by an independent treatment integrity rater (did not provide clinical care). Scored: adherence (0 [no adherence] to 8 [optimal adherence]) and competence (0 [no competency] to 8 [excellent competency]). **Analysis method:** Not reported – percentages	Adequate adherence (5.6 [SD = 1.5]) and competency (5.4 [SD = 1.08]). Thirteen patients (92.9%) learned behavioural activation, nine (64.3%) learned coping self-statements, and four (28.6%) learned sleep-management skills.
		Engagement	**Procedure and measures:** Collateral questionnaires. 1 (dissatisfied to 4 very satisfied – via telephone **Analysis method:** Not reported – descriptive statistics	Patients completed an average of 3.5 (SD = 2.15) homework exercises per week and spent an average of 81.3 hours (SD = 63.19 hours) per week with the collateral. Four patient-collateral dyads (25%) received handouts to address communication, stress reduction for collaterals, and/or dementia education. Between months 3 and 6, dyads received an average of 5.4 (SD = 3.16) of a possible eight telephone booster calls (66%). 81% collaterals reported using at least one program skill (58% breathing, 50% behavioural activation, 41% calming thoughts)
Suzuki et al (2012) [56]	No framework/definitions	Fidelity	Not measured	Not measured
		Engagement	**Procedure and measures:** Attendance at intervention sessions **Analysis method:** descriptive statistics	The mean adherence to the exercise program was 79.2%. 17 subjects (68.0%) more than 80% adherence.
Thyrian et al (2007) [57]	No framework/ MI treatment adherence	Fidelity	**Procedure and measures:** Sessions audio-recorded and fidelity was assessed within a single review of a random 20 minute segment of the sessions using the Motivational interviewing treatment integrity (MIT) code - a brief behavioural coding system to measure treatment fidelity for MI. The MITI assesses interviewer behaviour (global ratings and seven behaviour accounts). Global ratings (1=low, 7=high). Behaviour counts do not require a rating but counting of verbal behaviour. **Analysis method:** Not reported – percentages	Good adherence 66 (48%). Low to moderate adherence 71 (52%)
		Engagement	**Not measured**	**Not measured**
Thyrian et al (2010) [58]	No framework. Treatment fidelity for MI	Fidelity	**Procedure and measures:** Sessions audio-recorded and fidelity rated using a single review of a random 20 minutes of therapy session using the Motivational interviewing treatment integrity (MIT) code - a brief behavioural coding system to measure treatment fidelity for MI. The MITI assesses interviewer behaviour (global ratings and seven behaviour accounts). Global ratings (1=low, 7=high). Behaviour counts do not require a rating but counting of verbal behaviour. Two researchers (who received supervision regularly) coded every third tape together to assess reliability. Inter rater reliability = fair (r=0.45 for empathy and -.43 for	Good MI adherence: Total 27 (40%). Low to moderate 40 (60%)

			spirit. For behavioural counts – poor to excellent (r=0.25, MI non adherence 4=0.47, complex reflections 0.53, simple reflections 0.58, mi adherent 0.80, giving info r=0.90. Poor interrater reliability for non-adherence to MI may be due to the small range of counts (m=0.84**).** Out of 299 counselling sessions, 161 (54%) were taped, and 84 counselling sessions with current smokers were used in the analysis. **Analysis method:** Not reported – percentages	
Tomasone et al (2014) [59]	No framework. Intervention delivery components	Engagement	Not measured	Not measured
		Fidelity	**Procedure and measures:** Presenter checklist completed after each seminar. Seven intervention components (number of attendees, duration, parasport athlete present, parasport equipment available, educational resources attributed, inclusion of audio-visual component, and partner with community organisations. Measured with yes/no. As a reliability check the first author attended and completed a presenter checklist for two CMCL seminars delivered by two different presenters. Checklist items included in the current study (n=7) agreement between the researcher and presenters were high (86% and 100%) **Analysis method:** Not reported – descriptive statistics	Completed for 14/15 seminars delivered. Number of attendees presents 8–77. Duration (minutes) 60–120. Parasport athlete present 85 yes 7 no. Parasport equipment available for viewing and use 42 yes 50 no. Educational resources about LTPA for people with a physical disability distributed 87 yes 5 no. Inclusion of audio-visual component (e.g., photos, videos) not part of standard CMCL curriculum 14 yes 78 no. Partner with community organization 21 yes 71 no
Van de Glind et al (2012) [60]	Hasson et al (2010) proposed a framework for evaluation of implementation – based on Carroll et al (2007). Program adherence	Engagement	Not measured	Not measured
		Fidelity	**Procedure and measures:** Quality of the delivery of implementation strategies (implementation fidelity): registration by the researchers and checking to what extent strategies were carried out as planned in interviews with nurses and managers. *Frequency and duration* of counseling sessions registered by nurses on an evaluation form. The *content* of the counseling was categorized by analyzing patient files (patient files reviewed to see if anamneses carried out (yes/no), how many info leaflets handed out, goals formulated and written down (at least one), patients motivation assessed and registered (at least one) (yes/no), self-efficacy assessed and registered (at least one) (yes/no). barriers and facilitators discussed and written down (at least one) (yes/no). Development of measure – literature, linked the factors by two researchers, considered theories, presented a timetable of what when and who should do what, decided strategies that were compulsory/desired and sent this for feedback to key people. To create a final version **Analysis method:** Coverage score computed and written down – percentage of components delivered as planned. 80-100% = high. 50-	Moderate to good adherence to protocol (65%–90%). Perceived implementation success (1-10) (interviews with nurses). Case 1: 5, Case 2 4.9, Case 3 6.0, Case 4 5.3, Case 5 7.0. Frequency: Amount of consultations: Case 1: 100%, 2.7, Case 2: 100% 2.5, Case 3: 100% 2.3, Case 3: 100% 1.4, Case 5: 1.4. Duration: Mean in minutes: Case 1: 100% 159, Case 2: 100% 108, Case 3: 100% 124, Case 4: 100% 98, Case 5 100% 60. Content: Anamneses: Case 1: 100%, Case 2 100%, Case 3 100%, Case 4 100%, Case 5 100%, Information leaflet: Case 1: 80%, Case 2 100%, Case 3 100%, Case 4 100%, Case 5 100%, Goal setting: Case 1: 57%, Case 2 95%, Case 3 71%, Case 4 38%, Case 5 60%, Motivation assessment: Case 1: 43%, Case 2 83%, Case 3 86%, Case 4 25%, Case 5 40 %, Self-efficacy assessment: Case 1: 29%, Case 2 83%, Case 3 86%, Case 4 25%, Case 5 40%, Barriers and facilitators assessment: Case 1: 14%, Case 2 58%, Case 3 86%, Case 4 38%, Case 5 40-%, Coverage % elements delivered per patient: Case 1: 65%, Case 2 90%, Case 3 91%, Case 4 66%, Case 5 73%

			80% moderate. Less than 50% = low.	
		Engagement	Not measured	Not measured
Wallace et al (1998) [61]	No framework/definition	Fidelity	Not measured	Not measured
		Engagement	**Procedure and measures:** Attendance records and nurse follow up phone interviews (reading of tip sheets/use/meeting goals) **Analysis method:** Percentages	Attendance at classes: 90%+. After 6m trial, 51% controls joined intervention, half intervention continued to attend. 92% read nutritional tip sheets, 82% reported they were useful, 90% reported meeting some or all of nutritional goals.
Weinberger et al (2002) [62]	No framework. 'dose of the intervention'	Fidelity	**Procedure and measures:** Log file captured each time the intervention pharmacists accessed a patient's record from the study computer or documented their actions on the computer. Frequency with which pharmacists documented actions was used to estimate the dose of the intervention **Analysis method:** Descriptive statistics and odd ratios**.** Repeated measures approach **–** compound symmetry variance covariance structure	Number of visits: program (mean 19.4 (16.8) visits and COPD (22.4 (17.4) visits). Accessed data: asthma 10.3 (7.5 visits) COPD 11.8 (10.5) visits. Documented actions: (asthma 6.2 (5.8 visits) COPD 6.2 (7 visits). When pharmacists documented more care actions patients exhibited less noncompliance with breathing medication (OR 0.96 CI 0.92-0.99). and hospital visits (OR 1.06, 1.04-1.07, p<0.001)
		Engagement	**Not measured**	**Not measured**
Welch et al (2011) [63]	No framework. Treatment fidelity	Fidelity	**Procedure and measures:** Sessions audio-recorded, random sample of 24 sessions chosen midpoint of intervention phase assessed by independent researcher using Motivational Interviewing skills code (1-7 Likert scale – frequency of educator behaviours, behaviour count and count of client responses)**.** Treatment fidelity in training phase assessed using Motivational Interviewing Treatment integrity code (MITI) v2. **Analysis method:** Descriptive statistics and t test	MEAN MI spirit rating: ICC: 0.77, MI threshold proficiency >5. MI trained educators 4.43, non-mi trained educators 2.65, t= 11.26, p<0.001. Ratio of reflections to questions: ICC=0.65, proficiency 1:1. MI trained educators, 1.92, non-mi trained 0.23, t= -6.59, p<0.001. Percentage of open questions: ICC = 0.93, MI threshold proficiency 50%, MI trained 0.27, non-mi trained 0,06, t=-7.37, p<0.001. Mean count of MI inconsistent responses ICC = 0.75, proficiency n/a, MI trained educators 3.27, non-MI trained 12.19, t=9.38 p<0.001. Mean count of client change talk ICC = 0.66, MI trained 13.88, non-MI trained 9.02, t=-2.93, p=0.004
		Engagement	Not measured	Not measured
West et al (2007) [64]	No framework. 'Fidelity monitoring'	Fidelity	**Procedure and measures:** Ongoing clinical supervision of MI skills and fidelity were combined in weekly supervision sessions Randomly selected audio-tapes were reviewed weekly by two clinical psychologists using a standardised coding format modelled on other studies of MI proficiency (assessed overall MI spirit, presence of behaviours, absence of behaviours and proportion counsellor spent talking), using a standardised tool **Analysis method:** Not reported	Not reported
		Engagement	**Procedure and measures:** To determine engagement, number of group	Attendance at individual MI/AC sessions: 0-6 months 1.9 +- 0.3,

			sessions attended, number of self-monitoring diaries submitted and average group leader rating of self-monitoring diary quality (3 point scale) were measured **Analysis method:** Percentages	6-12m 2.3 +1.0, Total (5) 4.2 +- 1.2. Attending >80% sessions (%): 81. Group sessions attended (%): 6m: Total: 72, MI 79, Control 71, 12m: 57, 62, 52, 18m: 48, 52, 43. Diaries submitted: 6m 15 +- 8 total, 17 +- 8, MI, 13 +- 8, control, 12m: 7 +9, 9 + 10, 5 + 7, 18m 5+9, 6 + 10, 3 + 7
Wieland et al (2012) [65]	No framework/definitions	Fidelity	Not measured	Not measured
		Engagement	**Procedure and measures:** Attendance was charted at each class. Satisfaction with the classes was assessed through seven items from the previously validated Physical Activity Class Satisfaction Questionnaire (Cunningham, 2007) (at end of the intervention). **Analysis method:** Descriptive statistics	Average attendance (each class) 22.5. 32 women completed evaluation
Windsor et al (2014) [66]	No framework. Fidelity	Fidelity	**Procedure and measures:** 7 script procedures documented by a process evaluation model using standardised tele forms. The SCRIPT PII documents the degree to which the seven core procedures were delivered with fidelity. DCC performance data were aggregated to compute an annual RFTS-SCRIPT program implementation index A PII = 100% would confirm that all clients of all DCCs received all SCRIPT program procedures. A SCRIPT PII 80% = good level of implementation (selected by committee). **Analysis method:** Percentages	The RFTS-SCRIPT Program Implementation Index (PII) improved from a PII = 65 % in 2006 to PII = 76 % in 2010. 20 % of DCCs had a PII B 50 %, and 25 % of RFTS clients (n = 103) who wanted SCRIPT in 2009–2010 did not receive it.
		Engagement	Not measured	

Appendix 2-3. Peer-reviewed publication of Chapter 2 reported in the thesis



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Measures of fidelity of delivery of, and engagement with, complex, face-to-face health behaviour change interventions: A systematic review of measure quality

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Purpose. Understanding the effectiveness of complex, face-to-face health behaviour change interventions requires high-quality measures to assess fidelity of delivery and engagement. This systematic review aimed to (1) identify the types of measures used to monitor fidelity of delivery of, and engagement with, complex, face-to-face health behaviour change interventions and (2) describe the reporting of psychometric and implementation qualities.

Methods. Electronic databases were searched, systematic reviews and reference lists were hand-searched, and 21 experts were contacted to identify articles. Studies that quantitatively measured fidelity of delivery of, and/or engagement with, a complex, face-to-face health behaviour change intervention for adults were included. Data on interventions, measures, and psychometric and implementation qualities were extracted and synthesized using narrative analysis.

Results. Sixty-six studies were included: 24 measured both fidelity of delivery and engagement, 20 measured fidelity of delivery, and 22 measured engagement. Measures of fidelity of delivery included observation ($n = 17$; 38.6%), self-report ($n = 15$; 34%), quantitatively rated qualitative interviews ($n = 1$; 2.3%), or multiple measures ($n = 11$; 25%). Measures of engagement included self-report ($n = 18$; 39.1%), intervention records ($n = 11$; 24%), or multiple measures ($n = 17$; 37%). Fifty-one studies (77%) reported at least one psychometric or implementation quality; 49 studies (74.2%) reported at least one psychometric quality, and 17 studies (25.8%) reported at least one implementation quality.

Conclusion. Fewer than half of the reviewed studies measured both fidelity of delivery of, and engagement with complex, face-to-face health behaviour change interventions. More studies reported psychometric qualities than implementation qualities. Interpretation of intervention outcomes from fidelity of delivery and engagement measurements may be limited due to a lack of reporting of psychometric and implementation qualities.

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Statement of contribution

What is already known on this subject?

- Evidence of fidelity and engagement is needed to understand effectiveness of complex interventions
- Evidence of fidelity and engagement are rarely reported
- High-quality measures are needed to measure fidelity and engagement

What does this study add?

- Evidence that indicators of quality of measures are reported in some studies
- Evidence that psychometric qualities are reported more frequently than implementation qualities
- A recommendation for intervention evaluations to report indicators of quality of fidelity and engagement measures

Most interventions aimed at changing health behaviours are complex in that they contain multiple components (Campbell *et al.*, 2000; Oakley *et al.*, 2006). The effectiveness of face-to-face interventions depends on providers delivering the intervention as intended and participants engaging with the intervention. However, delivering interventions with fidelity of delivery and ensuring that participants engage with interventions are not easy to achieve (Glasziou *et al.*, 2010; Hardeman *et al.*, 2008; Lorencatto, West, Bruguera, & Michie, 2014; Michie *et al.*, 2008). Furthermore, it is more difficult to ensure that complex interventions are delivered as intended and engaged with, than simple interventions (Dusenbury & Hansen, 2004; Greenhalgh *et al.*, 2004).

To understand, and potentially improve, intervention effectiveness, it is necessary to measure the extent to which the intervention is delivered in line with the protocol ('intervention fidelity') and engaged with by participants. Although many conceptualizations of engagement have been proposed (Angell, Matthews, Barrenger, Watson, & Draine, 2014), in this review, the term 'participant engagement' is used as an umbrella term to encapsulate constructs of fidelity that relate to participants' engagement with intervention content. This includes whether participants understand the intervention, whether they can perform the skills required by the intervention ('intervention receipt'), and whether they use these skills in daily life ('intervention enactment') (Borrelli, 2011). In doing this, the review makes a clear distinction between providers' behaviours (fidelity of delivery) and participants' behaviours (engagement). Both fidelity of delivery and engagement are necessary to understand the effects of the intervention; if effects are not found, this may be due to low fidelity of delivery and/or engagement and is therefore not a test of the potential of the intervention components ('active ingredients') to bring about change (Borrelli, 2011; Durlak, 1998; Lichstein, Riedel, & Grieve, 1994).

Fidelity of delivery has been assessed by self-report measures (Bellg *et al.*, 2004), and by audio-recording, which is considered to be the gold standard (Bellg *et al.*, 2004; Borrelli, 2011; Lorencatto *et al.*, 2014). Methods used to assess engagement include self-report measures (Bellg *et al.*, 2004; Burgio *et al.*, 2001; Carroll *et al.*, 2007), observation of skills (Burgio *et al.*, 2001), and homework reviews (Bellg *et al.*, 2004). Systematic reviews of measures used to monitor fidelity of delivery demonstrate that these measures have consistently been used in intervention research, in both educational (Maynard, Peters, Vaughn, & Sarteschi, 2013) and health settings (Rixon *et al.*, 2016). For example, a review of 55 studies found that intervention receipt was mostly measured by assessing understanding and performance of skills (Rixon *et al.*, 2016). Observational measures may provide a more valid representation of what is delivered than self-report measures (Breitenstein *et al.*, 2010) and avoid social desirability bias (Schinckus, Van den Broucke, Housiaux, & Consortium, 2014). However, observation is likely to require more time and resources (Breitenstein *et al.*, 2010; Schinckus *et al.*, 2014), and it may also change the behaviour of those being observed (McMahon, 1987; as cited in Moncher & Prinz, 1991).

To understand which components have been delivered and engaged with, suitable measures are needed. Researchers suggest that measures should be psychometrically robust, with good reliability and validity (Gearing *et al.*, 2011; Glasgow *et al.*, 2005; Lohr, 2002; Stufflebeam, 2000). Reliability is defined as achieving consistent results in different situations (Roberts, Priest, & Traynor, 2006), and validity is defined as measurement of the construct it aims to measure (Roberts *et al.*, 2006). Previous reviews found that few studies reported information on the reliability or validity of fidelity or engagement methods. A systematic review of fidelity of delivery in after-school programmes found that no studies reported reliability (Maynard *et al.*, 2013), and a systematic review of intervention receipt in health research found that 26% of studies reported on reliability and validity (Rixon *et al.*, 2016). This makes it difficult for researchers to fully interpret the quality of measures and therefore the results of intervention outcomes. In this review, we use the term 'psychometric qualities' to refer to the quality of the measures. Aspects of 'psychometric qualities' of measures in the fidelity literature include the following: using multiple, independent researchers to rate fidelity of delivery; calculating inter-rater agreement of measurements; and randomly selecting data (Bellg *et al.*, 2004; Borrelli, 2011; Breitenstein *et al.*, 2010; Lorencatto, West, Seymour, & Michie, 2013).

It is also necessary to ensure that measures are easy to use in practice and to minimize missing responses, which are common in health care self-report research (Shrive, Stuart, Quan, & Ghali, 2006). Researchers suggest that practicality and acceptability influence the extent to which measures are used in practice (Glasgow *et al.*, 2005; Holmbeck & Devine, 2009; Lohr, 2002). Practicality is defined as whether the measure can be used despite limited resources (Bowen *et al.*, 2009), for example, being short and easy to use, and reducing participant and provider burden (Glasgow *et al.*, 2005; Lohr, 2002). Acceptability is defined as whether the measure is appropriate for those who will use it (Bowen *et al.*, 2009), for example, by including alternative forms and language adaptations, and by ensuring that measures are easy to interpret (Lohr, 2002). In this review, we use the term 'implementation qualities' to refer to descriptions of how the measures were implemented in practice. Aspects of 'implementation qualities' of measures in the fidelity literature include time constraints, cost, and reactions to measurements (Breitenstein *et al.*, 2010).

Previous reviews have identified the measures used to monitor fidelity of delivery of after-school programmes (Maynard *et al.*, 2013), evidence-informed interventions (Slaughter, Hill, & Snelgrove-Clarke, 2015), and the measures used to monitor intervention receipt in health care settings (Rixon *et al.*, 2016). Furthermore, researchers have previously outlined some strengths and weaknesses of different measures of fidelity of delivery and engagement (e.g., Borrelli, 2011; Breitenstein *et al.*, 2010; Moncher & Prinz, 1991). To the authors' knowledge, no systematic reviews have been conducted to identify the measures used to monitor fidelity of delivery and engagement (including intervention receipt and enactment), in complex, face-to-face health behaviour change interventions. This review will also extend previous research by describing the reporting of both psychometric and implementation qualities of these measures. Synthesizing the psychometric and implementation qualities of fidelity of delivery and engagement measures is needed to determine the quality of measures and how easy they are to implement. 'Health' includes physical, mental, and social well-being, as recommended by the World Health Organisation (WHO, 2017).

This review aimed to:

1. Identify the types of measures used to monitor (1) the fidelity of delivery of, and (2) engagement with, complex, face-to-face health behaviour change interventions.
2. Describe these measures as reported in terms of both psychometric and implementation qualities.

Methods

The search and screening strategies were developed using the methods advocated by the Cochrane Collaboration (Higgins & Green, 2011; Lefebvre, Manheimer, & Glanville, 2011). Eligibility criteria for considering studies were specified using the 'Participants', 'Intervention', and 'Outcomes' criteria from PICO (O'Connor, Green, & Higgins, 2011).

Inclusion criteria

1. Participants: Adults aged 18 and over.
2. Intervention: Complex, face-to-face behaviour change interventions aimed at improving health behaviours. Health is defined as physical, mental, or social well-being (WHO, 1946; as cited in WHO, 2017). Other modes of intervention delivery, such as digital interventions, may have different issues in relation to fidelity of delivery and engagement; therefore, these were not included in this review.
3. Outcomes: Studies which described measures to monitor fidelity of delivery and/or engagement and reported outcomes for fidelity of delivery and/or engagement and intervention effectiveness using quantitative measures. Only quantitative studies were included to increase the ability to compare across studies.

Exclusion criteria

1. Review articles, articles not written in English, or articles not peer-reviewed
2. Articles in which the intervention outcome could not be clearly distinguished from the engagement or fidelity of delivery outcome.

Search strategy

Five electronic databases (PubMed, ScienceDirect, PsycINFO, Embase, and CINAHL Plus) were searched from the inception of each database up to November 2015. *Implementation Science* was searched, and reference lists of relevant known reviews (Carroll *et al.*, 2007; Durlak & DuPre, 2008; Toomey, Currie-Murphy, Matthews, & Hurley, 2015) were screened to identify additional studies. After the initial search, reference lists of reviews identified from the search (Clement, Ibrahim, Crichton, Wolf, & Rowlands, 2009; Conn, Hafdahl, Brown, & Brown, 2008; Gucciardi, Chan, Manuel, & Sidani, 2013; Reynolds *et al.*, 2014; Smith, Soubhi, Fortin, Hudon, & O'Dowd, 2012), relevant protocols (Gardner *et al.*, 2014), and forward and backward searching of included studies were screened to identify further articles. The articles generated by this search strategy were sent to 21 experts to ask whether they knew of relevant articles that were missing from the search results.

Initial search terms were piloted and refined iteratively with sequential testing to identify false-positive and false-negative results and ensure that the search captured all relevant keywords. A subject librarian was consulted in the development of the search terms.

Free and mapped searches (using Medical Subject Heading Terms) were conducted. Boolean operators were used to construct a search incorporating all search terms when combination searches were not possible. Search outputs were filtered for English full texts, peer-reviewed articles, adult participants and health topics. The final search strategy is in Appendix S1.

To access articles not available through the university library database, the authors were contacted or articles were accessed through library services.

This search strategy was not exhaustive, but was instead used to identify as many papers that measured and reported fidelity of delivery and/or engagement in sufficient depth to provide insight into the measures used.

Data collection and analysis

Study selection

One reviewer conducted the electronic searches and screened the reference lists of relevant articles. All identified titles and abstracts were downloaded and merged using EndNote. Duplicates were removed. Two reviewers independently screened all (1) titles, (2) abstracts, and (3) full texts against inclusion and exclusion criteria. Reviewers met after each stage to determine agreement and resolve discrepancies. Any articles which reviewers were unsure of were retained until data extraction, when more information was available (Higgins & Deeks, 2008). Inter-rater reliability was assessed using percentage agreement and kappa statistics. Scores from both the initial search screening and additional search screening were combined to calculate agreement scores. For the title screening, researchers achieved 64.9% agreement ($n = 802$, two missing responses, kappa .49, PABAK .47). For the abstract screening, researchers achieved 68% agreement ($n = 425$, three missing responses, kappa .36, PABAK .36). For the full-text screening, researchers achieved 71.8% agreement ($n = 266$; kappa = .46 and PABAK = .58). The full-text kappa scores (Cohen, 1960) indicated fair agreement (Orwin, 1994; as cited in Higgins & Deeks, 2008). This might reflect the difficulty identifying relevant articles due to differences in terminology in studies. Information on fidelity of delivery and engagement was often reported in separate articles than those reporting intervention outcomes.

Data extraction

A data extraction form was developed using a combination of standardized forms: Guidelines International Network-Evidence Tables Working Group intervention template (Guidelines International Network, 2002–2017) and the Oxford Implementation Index (Montgomery, Underhill, Gardner, Operario, & Mayo-Wilson, 2013). Data on the measures used to monitor fidelity of delivery and engagement and results were extracted, along with any qualities of measures that were reported. Psychometric qualities and implementation qualities were not pre-specified before data extraction; therefore, any information that was reported in the results and discussion section of the original articles in relation to the quality of the measures was extracted. As a minimum quality check (Centre for Reviews and Dissemination, University of York, 2009), an independent researcher checked 20% of data extraction forms. Minor errors of punctuation were identified; however, no further details were extracted, and therefore, one researcher extracted data from all studies.

Data synthesis

Narrative analysis was used to summarize the fidelity of delivery and engagement measures and the reporting of psychometric and implementation qualities by one researcher. If authors specified the type of engagement that they measured, for example, 'intervention receipt' or 'intervention enactment', these were reported separately within engagement. One researcher synthesized the information on methods. The extracts from the text that included descriptions of qualities were summarized, and the part of the procedure that the quality related to was recorded. Psychometric qualities included reliability (achieving consistent results in different situations; Roberts *et al.*, 2006) and validity (measures what it aims to measure; Roberts *et al.*, 2006). Implementation qualities included acceptability (appropriate for those who will use it; Bowen *et al.*, 2009), practicality (can be used despite limited resources; Bowen *et al.*, 2009), and cost. Researchers were open to other categories that may have emerged if qualities did not fit into these categories. Due to the heterogeneity of studies, a descriptive rather than quantitative synthesis of data was conducted (Deeks, Higgins, & Altman, 2008; Popay *et al.*, 2006).

Two researchers were involved in the categorization of psychometric and implementation qualities. The first author coded 10% of the qualities and asked an independent researcher to check responses. Disagreements were identified, and both researchers independently coded an additional 10% of qualities. Researchers met after each round to discuss disagreements. This process was repeated, until 80% agreement on the categorization of features was reached, as recommended by Lombard, Snyder-Duch, and Bracken (2002). After four rounds (40% of qualities were independently coded), reliability was achieved with 80.1% agreement between coders. The first author coded the rest of the qualities, based on discussions with the second researcher. Following this, the second researcher checked a further 10% of the researcher's independent coding and any qualities that the first author was unsure how to code.

Results

After duplicates were removed, 809 records were identified. Sixty-six articles were included in the analysis (Figure 1).

Study characteristics

Sixty-six studies (100%) were included (for a list of studies and their characteristics, see Appendix S2). All of the included studies described fidelity of delivery and/or engagement measures, in relation to a complex, face-to-face health behaviour change intervention. Forty-six studies (69.7%) were randomized controlled trials and 20 (30.3%) used non-randomized designs. Settings included medical settings (n = 40; 60.6%), community settings (n = 20; 30.3%), and companies (n = 1; 1.5%). Five studies (7.6%) did not specify their setting. Intervention recipients were patients (n = 31; 47%), members of the public (n = 17; 25.8%), health care professionals and practices (n = 11; 16.7%), caregivers and care recipients (n = 4; 6.1%), and workers (n = 3; 4.5%). Target behaviours included multiple health behaviours (n = 35; 53%), self-management skills (n = 11; 16.7%),

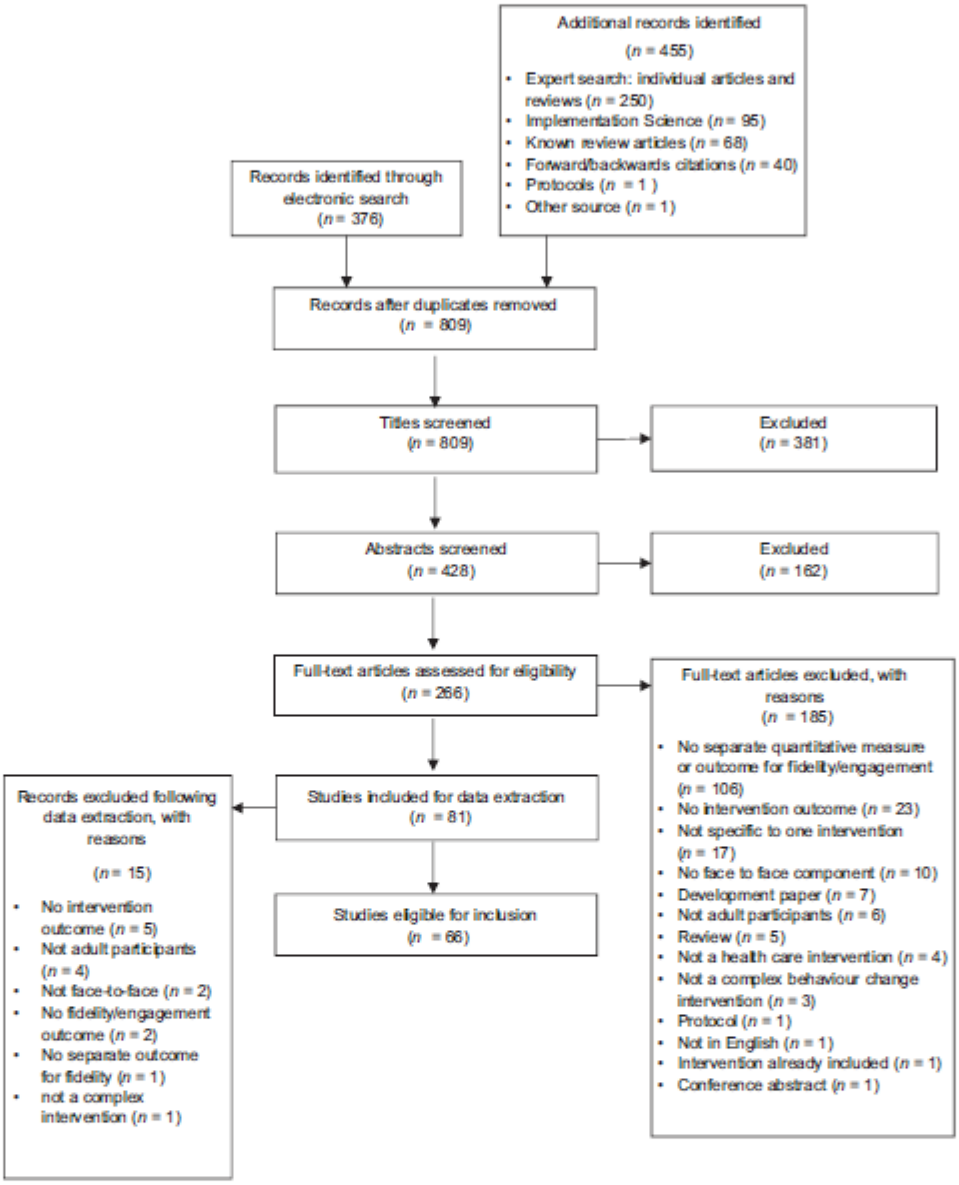

Figure 1. A flow diagram of the paper selection process (based on Moher, Liberati, Tetzlaff, and Altman's (2009) PRISMA flow diagram).

clinician behaviours ($n = 10$; 15.2%), anxiety-reducing behaviours ($n = 3$; 4.5%), work sickness absence ($n = 2$; 3%), caregiver skills ($n = 2$; 3%), treatment adherence ($n = 1$; 1.5%), patient resource use ($n = 1$; 1,5%), and activities of daily living ($n = 1$; 1.5%). Interventions were delivered by health care professionals ($n = 33$; 50%), people trained especially for the intervention (e.g., community mediators and outreach visitors) ($n = 11$; 16.7%), pharmacists ($n = 2$; 3%), postgraduate students ($n = 2$; 3%), and researchers ($n = 4$; 6%). Fourteen studies (21.2%) did not specify who delivered the intervention.

Table 1. A summary of the measures used to monitor fidelity of delivery and engagement

	Fidelity (*n* – 44; 100%)	Engagement (*n* – 46, 100%)
What was measured?	Delivery of intervention components compared with intervention protocol (*n* = 20; 45.5%)[1,5,6,10,11,16,20 (specifically BCTs) 26,28,29,30,31,35,39,40,51,55,59,60,66] Motivational interviewing adherence/fidelity/infidelity (*n* = 6; 13.6%)[7,22,57,58,63,64] Dose delivered and fidelity (*n* = 6; 13.6%)[2,14,23,36,42,49] Fidelity of delivery but unclear which aspect as results not reported (*n* = 2; 4.5%)[19,21] Dose of intervention components (*n* = 2; 4.5%)[24,62] Competence and success delivering behaviour change strategies (*n* = 1; 2.3%)[41] Treatment integrity/demonstration of skills (*n* = 1; 2.3%)[25] Extent to which environmental changes made (*n* = 1; 2.3%)[50] Consistency and quality of use of innovation (*n* = 1; 2.3%)[33] Motivational interviewing fidelity, dose, and context (*n* = 1; 2.3%)[38] 'Quality of counselling' – use of skills and therapeutic alliance (*n* = 1; 2.3%)[27] Number of times skills were modelled and telephone fidelity (*n* = 1; 2.3%)[34] Clinician competence/demonstration of intervention method (*n* = 1; 2.3%)[48]	Adherence to target behaviour (*n* = 7; 15.2%)[3,4(+Skills),13,15,19,37,43] Attendance (*n* = 7; 15.2%)[9,40,44,46,54,56,65] Understanding (receipt) and use of intervention skills (enactment) (*n* = 3; 6.5%)[6,35,48] Understanding and engagement (*n* = 2; 4.34%)[42,51] Compliance and attendance (*n* = 2; 4.34%)[18,47] Adherence to target behaviour and attendance (*n* = 2; 4.34%)[17,52] Completion of study visits (*n* = 2; 4.34%)[21,41,] Intervention enactment – use of BCTs (*n* = 1; 2.17%)[25] Receipt, enactment, homework compliance, and attendance (*n* = 1; 2.17%)[39] Dose received/exposure – assignments completed (*n* = 1; 2.17%)[2] Dose received – intervention receipt and compliance (*n* = 1; 2.17%)[14] How much learned/adopted, helpfulness, and current use (*n* = 1; 2.17%)[11] Effectiveness of intervention – trying practices, participating, influencing practice, comprehension, future participation (*n* = 1; 2.17%)[16] Adoption of intervention and maintenance (*n* = 1; 2.17%)[29] Dose of intervention received (*n* = 1; 2.17%)[36] Receipt and reaching goals (*n* = 1; 2.17%)[30] Participation in activities, dose, and checklist completion (*n* = 1; 2.17%)[5] Activity adherence, sessions delivered, telephone contact (*n* = 1; 2.17%)[12] Adherence to target behaviour and diary (*n* = 1; 2.17%)[38] Adherence to target behaviour, attendance, and diary (*n* = 1; 2.17%)[53] Exposure to intervention – attendance/receipt of calls (*n* = 1; 2.17%)[32] Uptake of intervention – attendance/use of modules (*n* = 1; 2.17%)[8] Attendance, reading materials, usefulness, meeting goals (*n* = 1; 2.17%)[61] Attendance and completion of diaries (*n* = 1;2.17%)[64] Completion of diaries (*n* = 1; 2.17%)[10] Completion of home assignments, self-monitoring, attendance (*n* = 1; 2.17%)[23] Homework adherence and commitment (*n* = 1; 2.17%)[24] Completion of homework, receipt of information, telephone calls (*n* = 1; 2.17%)[55]
Type of measures used	Observational measures (*n* – 17; 38.6%): Video (*n* = 2; 4.55%)[27,51] Audio (*n* = 13; 29.5%)[7,19,21,22,38,40,45,48,55,57,58,63,64] Non-specific (*n* = 2; 4.55%)[1,34] Self-report measures (*n* – 15; 34%): Provider (hand) (*n* = 7; 15.9%)[6,10,14,16,41,42,59] Provider (computer) (*n* = 3; 6.8%)[24,23,36] Participant (hand) (*n* = 2; 4.6%)[28,11] Participant (computer) (*n* = 1; 2.3%)[49]	Self-report measures (*n* – 18; 39.1%) Participant (*n* = 14; 30.4%)[11,13,14(R),16,19,25,30,35,36,37,38,43,48,55] Provider (*n* = 4; 8.7%)[10,41,42,51] Multiple measures (*n* – 17; 37%): Provider and participant self-report (*n* = 3; 6.5%)[2,3,5] Participant self-report and attendance records (*n* = 3; 6.5%)[18,23,32] Provider and participant self-report and attendance records (*n* = 2; 4.3%)[17,47]

Continued

Table 1. (*Continued*)

	Fidelity (*n* – 44; 100%)	Engagement (*n* – 46, 100%)
	Non-specific (computer) (*n* = 2; 4.6%)[62,66] Multiple measures (*n* – 11; 25%) Provider and participant self-report (*n* = 4; 9%)[2,30,35,50] Audio and provider self-report (*n* = 3; 6.8%)[20,26,39] Video + provider self-report (*n* = 1; 2.3%)[5] Observation and exercise log (participant) (*n* = 1; 2.3%)[31] Direct observation and rating (*n* = 1; 2.3%)[29] Participant self-report and patient files (*n* = 1; 2.3%)[60] Other measures (*n* – 1; 2.3%) Quantitative rated interviews with providers (*n* = 1; 2.3%)[33]	Attendance records and behaviour monitoring (*n* = 2; 4.3%)[53,64] Direct observation and provider and participant self-report (*n* = 1; 2.2%)[12] Non-specific observation and provider self-report (*n* = 1; 2.2%)[4] Provider self-report, attendance records, homework review (*n* = 1; 2.2%)[39(R&E)] Participant self-report and verbal verification (*n* = 1; 2.2%)[6(R&E)] Provider self-report and homework review (*n* = 1; 2.2%)[24] Participant self-report and objective verification (*n* = 1; 2.2%)[15] Provider self-report and attendance records (*n* = 1; 2.2%)[52] Intervention records (*n* – 11; 24%) Attendance/referral records (*n* = 10; 21.7%)[8,9,29,40,44,46,54,56,61,65] Study completion (*n* = 1; 2.2%)[21]
More details about measures	Who completed the measures? Researcher (*n* = 18; 40.9%)[1,7,21,22,27,29,33,34,38,40,45,48,51,55,57,58,63,64] Provider (*n* = 11; 25%)[6,10,14,16,19,23,24,36,41,42,59] Provider and participant (*n* = 4; 9.1%)[2,30,35,50] Provider and researcher (*n* = 4; 9.1%)[5,20,26,39] Participant (*n* = 3; 6.8%), [11,28,49] Participant and researcher (*n* = 2; 4.55)[31,60] Not specified (*n* = 2; 4.55)[62,66]	Who completed the measures? Participant (*n* = 14; 30.4%)[11,13,14(R),16,19,25,30,35,36,37,38,43,48,55] Researcher (*n* = 13; 28.3%)[8,9,21,29,40,44,46,53,54,56,61,64,65] Participant and researcher (*n* = 6; 13%)[6(R&E),15,18,23,24,32] Provider (*n* = 4; 8.7%)[10,41,42,51] Provider and participant (*n* = 3; 6.5%)[2,3,5] Provider and researcher (*n* = 3; 6.5%)[4,39(R&E),52] Provider, participant, researcher (*n* = 3; 6.5%)[12,17,47]
	Development of measures Not specified (*n* = 31; 70.45%)[1,5,11,14,16,19,23,24,27,28,29,30,31,33,35,36,38,39,40,41,42,48,49,50,51,55,59,60,62,64,66] Used a previously developed measure (*n* = 8; 18.18%) • Motivational interviewing treatment integrity code (Moyers *et al.*, 2003 as cited in[57,58], 2007, as cited in[22]): (*n* = 3; 6.8%)[22,57,58] • MITI + Motivational interviewing skill code (Miller *et al.*, 2003) (*n* = 2; 4.5%)[7,63] • Behaviour Change Counselling Index (Lane *et al.*, 2005) (*n* = 2; 4.5%)[21,45] • Flanders Interaction Analysis Technique (*n* = 1; 2.3%)[34] Developed own measure: (*n* = 5; 11.36)[2,6,10,20,26]	Development of measures Not specified: (*n* = 42; 91.3%)[2,3,5,6,8,9,10,11,12,13,14,15,16,17,18,19,21,23,24,25,29,30,32,35,36,37,38,39,40,41,42,44,46,47,48,53,54,55,56,61,64,65] Used previously developed measure (*n* = 3; 6.5%) • DASH adherence index: (*n* = 1; 2.17%)[43] • Pittsburgh Rehabilitation Participation scale (*n* = 1; 2.17%)[51] (engagement understanding not specified) • Participation scale and the participation scale and recovery practice scale (*n* = 1; 2.17%)[52] Developed own measure and used measures that were previously developed: (*n* = 1; 2.2%)[4]
	Responses on measures Not specified (*n* = 23; 52.3%)[1,6,7,10,16,19,21,22,23,24,31,34,35,38,39,40,42,48,49,51,62,64,66] Rating scales (*n* = 12; 27.3%) • 3-point scale (completely covered, partially covered, not covered) (*n* = 1; 2.27%)[5] • 4-point scale (*n* = 1; 2.27%)[45] • Two 4-point rating scales (unsatisfactory, doubtful, satisfactory, good', 'not at all,	Responses on measures Not specified: (*n* = 29; 63%)[2,3,5,6,8,9,12,13,15,17,18,19,21,23,29,30,32,35,37,38,40,42,44,48,53,54,56,61,65] Rating scales (*n* = 12; 26.1%) • 3-point scale adherence (poor, fair, excellent), others not specified (*n* = 1; 2.17%)[4] • 3-point scales: perceived helpfulness (0 not at all, 2 very much) + currently using (0 not at all, 2 very much) (*n* = 1; 2.17%)[11]

Continued

Table 1. (*Continued*)

	Fidelity (*n* – 44; 100%)	Engagement (*n* – 46, 100%)
	hardly, slightly, considerably, strongly' + Not applicable (*n* = 1; 2.27%)[27] • Two 4-point scales ('Excellent, good, fair, poor' and 'used well, used well but not often, used well and not well, not used or not used well) (*n* = 1; 2.27%)[29] • 5-point scale (Totally disagree – totally agree) (*n* = 1; 2.27%)[2] • 5-point scale ('Never, most of the time, often, always, do not remember') (*n* = 1; 2.27%)[30] • 5-point scale ('Non-use, low compliance, compliant use, high compliance, committed use') (*n* = 1; 2.27%)[33] • 7-point scale (low (1), high (7)) + behaviour counts (*n* = 2; 4.5%)[57,58] • 7-point scale (*n* = 1; 2.27%)[63] • Eight point scales (no adherence – optimal adherence and no competence – excellent competency) (*n* = 1; 2.27%)[55] • 10-point scale (very bad to very good) + three point scale (yes/partly/not implemented) (*n* = 1; 2.27%)[14] Dichotomous scale: (*n* = 8; 18.2%) • Yes/no (*n* = 5; 11.4%)[11,28,41,59,60] • Applied(1)/not applied (0) or completed (1)/ not completed (0) (*n* = 2; 4.5%)[20,26] • Completed)(1)/not completed(0) (*n* = 1; 2.27%)[36] Rating scale and dichotomous scale (*n* = 1; 2.3%) • 4-point scale (rarely (1), sometimes (2), often (3), most/all of the time (4) and yes (1)/ no (0) (*n* = 1; 2.3%)[50]	• 3-point scale (0 = effectively non-compliant, 0.5 = uncertain or partly compliant, 1 = compliant) (*n* = 1; 2.17%)[47] • 3-point scales (yes/no/don't know and 'very helpful, neither helpful nor unhelpful, very unhelpful'), four point scale (most, all, some, none), (*n* = 1; 2.17%)[36] • 3-point scale (Better than target range [>1], 0–1 within target range, worse than target range [<0]): (*n* = 1; 2.17%)[43] • 3-point Likert scale (very low to very high) (*n* = 1; 2.17%)[52] • 3-point scale (*n* = 1; 2.17%)[64] • 4-point scale (dissatisfied to very satisfied) (*n* = 1; 2.17%)[55] • 4-point scale (1 missed most–4 missed none) and 10 point scale (1 none, 10 complete) (*n* = 1; 2.17%)[24] • 5-point Likert scale: (*n* = 1; 2.17%)[16] • 6-point Likert scale (1 no engagement, 6 excellent engagement) and 3-point scale (1 minimal understanding, some understanding, good understanding) (*n* = 1; 2.17%)[51] • 7-point scale (Never, <3 months ago, 4–6 months ago, 7–9 months ago, 10–12-months ago, 1–2 years ago, <2 years ago) (*n* = 1; 2.17%)[46] Dichotomous scales (*n* = 3; 6.5%) • Yes/no: (*n* = 3; 6.5%)[10,25,41] Rating scale + dichotomous scale (*n* = 2; 4.4%) • 3-point scale (yes/no/don't know) and dichotomous scale (yes/no): (*n* = 1; 2.17%)[14] • 3-point scale (0 not at all, fully) – measure receipt. 5-point scale (1 not at all, 5 extremely) measure willingness, interest and supportiveness and dichotomous scale (attempted, not attempted) – to measure enactment (*n* = 1; 2.17%)[39]
Sample	How many participants were sampled? Not specified (*n* = 23; 52.3%)[1,2,5,7,11,14,16,19,21,22,23,28,34,35,41,42,49,50,57,58,60,62,66] Subsample (*n* = 16; 36.4%)[10,26,27,29,30,31,33,36,38,40,45,48,51,55,63,64] • Reported number of sessions sampled (*n* = 4; 9%)[26,27,31,63] • Reported number of clinicians/sites data was sampled from (*n* = 4; 9%)[10,29,30,33] • Reported the percentage of sessions sampled (*n* = 6; 13.6%)[36,38,40,45,51,55] • Reported sampling some but not all but did not specify how many (*n* = 2; 4.5%)[48,64] All (*n* = 5; 11.4%):[6,20,24,39,59]	How many participants were sampled? Not specified (*n* = 45; 97.8%)[2,3,4,5,6,8,9,10,11,12,13,14,15,16,17,18,19,21,23,24,25,29,32,35,36,37,38,39,40,41,42,43,44,46,47,48,51,52,53,54,55,56,61,64,65] Subsample (*n* = 1; 2.2%)[30] • Reported sampling a number of participants (*n* = 1; 2.2%)[30]
	How were participants sampled? Not specified: (*n* = 25; 56.8%)[1,2,5,7,11,14,16,19,21,22,23,28,29,30,34,35,36,38,41,42,49,50,60,62,66] Random (*n* = 8; 18.2%)[31,40,51,55,57 (random segment),58 (random segment),63,64,] N/A (sampled all: *n* = 5; 11.4%)[6,20,24,39,59] Purposive: (*n* = 3; 6.8%)[26,27 (previously defined days),33]	How were participants sampled? Not specified: (*n* = 46; 100%)[2,3,4,5,6,8,9,10,11,12,13,14,15,16,17,18,19,21,23,24,25,29,30,32,35,36,37,38,39,40,41,42,43,44,46,47,48,51,52,53,54,55,56,61,64,65]

Continued

Table 1. (*Continued*)

	Fidelity (n – 44; 100%)	Engagement (n – 46, 100%)
	Self-selected (n = 1; 2.3%)^{48} Opportunity: (n = 1; 2.3%)^{45} Stratified: (n = 1; 2.3%)^{10}	
	Which conditions were participants sampled from? Not specified (likely intervention only) : (n = 38; 86.4%)^{1,5,6,10,11,14,16,19,20,21,22,23,26,27,28,29,30,31,33,34,35,36,38,39,40,41,42,45,49,55,57,58,59,60,62,63,64,66} All: (Explicitly reported) (n = 4; 9.1%)^{48,51,7,50} Intervention(s) (n = 2; 4.5%)^{2,24}	Which conditions were participants sampled from? Not specified (likely intervention only): (n = 35; 76.1%)^{5,6,8,9,10,11,12,14,15,16,19,21,23,29,30,32,36,37,38,39,40,41,42,43,44,46,47,48,52,54,55,56,61,64,65} All (explicitly reported): (n = 9; 19.6%)^{2,3,18,35,4,13,17,51,53} Intervention(s) (n = 2; 4.3%)^{24,25}
Analysis method	Descriptive statistics (n = 29; 65.9%)^{1,5,6,10,11,14,16,22,23,27,28,29,30,31,33,34,36,38,39,41,42,45,49,55,57,58,59,60,66} Descriptive and inferential statistical techniques (n = 11; 25%)^{2,7,20,24,26,35,48,50,51} $^{(\text{inferential not specified})62,63}$ Not reported (n = 4; 9.1%)^{19,21,40,64}	Descriptive statistics (n = 37; 80.4%)^{3,4,5,6,8,9,10,11,12,14,15,16,18,19,21,23,29,30,32,35,36,37,38,40,41,42,44,46,47,48,52,54,55,56,61,64,65} Descriptive statistics and Inferential statistical techniques (n = 9; 19.6%)^{2,13} $^{(\text{inferential stats not specified})}$ ^{17,24,25,39,43,51,53}
Framework/ model	Framework not specified/mentioned (n = 53; 80.3%)^{1,3,4,5,7,8,9,11} $^{(\text{mentioned in discussion}),12,13,15,16,17,18,19,21,23,24,25,27,28,30,32,33,34,35,36,37,38,40,41,43,44,45,46,47,48,49,51,52,53,54,55,56,57,58,59,61,62,63,64,65,66}$ Used a framework (n = 13; 19.7%)^{2,6,10,14,20,22,26,29,31,39,42,50,60} • Steckler and Linnan's (2002, as cited in^{2,14,42,50}) framework (n = 4; 6.1%)^{2,14} $^{(\text{adapted version})42,50}$ • NIH Treatment fidelity model/NIH Behaviour change Consortium framework (Bellg *et al.*, 2004) (n = 6; 9.1%)^{6,10,20,22,26,39} • RE-AIM framework (n = 1; 1.5%)^{29} • Resnick *et al.* (2005) (n = 1; 1.5%)^{31} • Baranowski & Stables (2000): (n = 2; 3.3%)^{42,50} • Saunders *et al.* (2005) (n = 1; 1.5%)^{42} • Hasson (2010) based on Carroll *et al.* (2007) (n = 1; 1.5%)^{60}	
Definitions	Provided definitions (n = 18; 27.3%)^{2,5,6,12,14,16,17,20,22,23,25,31,33,38,39,41,42,50} • Fidelity (constructs that fit into fidelity): (n = 15; 22.7%)^{2,5,6,14,16,20,22,23,31,33,38,39,41,42,50} • Engagement (constructs that fit under engagement): (n = 9; 13.6%)^{2,6,12,14,17,23,25,39,42} Did not provide definitions (n = 48; 72.7%)^{1,3,4,7,8,9,10,11,13,15,18,19,21,24,26,27,28,29,30,32,34,35,36,37,40,43,44,45,46,47,48,49,51,52,53,54,55,56,57,58,59,60,61,62,63,64,65,66}	

Note. (R) – receipt; (E) – enactment; (R&E) – receipt and enactment.

Measures used to monitor fidelity of delivery and engagement

Of all included studies, 44 (66.7%) assessed fidelity of delivery and 46 (69.7%) assessed engagement. Of these, 24 studies (36.4%) measured both fidelity of delivery and engagement, 20 (30.3%) measured fidelity of delivery only, and 22 (33.3%) measured engagement only (see Appendix S3).

Table 1 provides an overview of the methods, including a summary of what was measured, the measures used, who completed the measures, the sample, analysis method, and the number of studies that used a framework/model and provided definitions for fidelity and engagement. For further details about methods and a summary of results, please see Appendix S4.

What was measured?

The majority of studies reporting measuring fidelity of delivery did so by measuring the delivery of intervention components against the intervention protocol (n = 20; 45.5%), adherence to motivational interviewing techniques (n = 6; 13.6%), and a combination of dose delivered and fidelity (n = 6; 13.6%). For engagement, there were a wide variety of measures, including adherence to target behaviour (n = 7; 15.2%), attendance (n = 7;

15.2%), understanding and use of intervention skills (n = 3; 6.5%), understanding and engagement (n = 2; 4.4%), compliance and attendance (n = 2; 4.4%), adherence to target behaviour and attendance (n = 2; 4.4%), and completion of study visits (n = 2; 4.4%). Please see Table 1 for a full list of what was measured.

Measures

Measures of fidelity of delivery were categorized into observational measures (n = 17; 38.6%), self-report measures (n = 15; 34%), quantitatively rated qualitative interviews (n = 1; 2.3%), and multiple measures (n = 11; 25%). Of the studies that used multiple measures, six (14%) used at least one type of observational measure and nine (20.5%) used at least one type of self-report measure. In total, 23 (52%) studies used at least one type of observational measure and 24 (55%) used at least one type of self-report measure (see Table 1 for details).

Measures of engagement were categorized into self-report measures (n = 18; 39.1%); intervention records (n = 11; 24%), for example, attendance monitoring; and multiple measures (n = 17, 37%). Of the studies that used multiple measures, 15 (32.6%) used at least one type of self-report measure. In total, 33 (76.7%) studies used at least one type of self-report measure (see Table 1 for details). Two studies reported measuring receipt and enactment[6,39], and one study reported measuring receipt[14] only.

Details of measures, sampling, and analysis

For fidelity of delivery, measures were completed by either the researcher (n = 18; 40.9%), provider (n = 11; 25%), or participant (n = 3; 6.8%); or both the provider and participant (n = 4; 9.1%), provider and researcher (n = 4; 9.1%), and participant and researcher (n = 2; 4.55%). It was not specified who completed the measures in two studies (4.55%).

For engagement, measures were completed by either the participant (n = 14; 30.4%), researcher (n = 13; 28.3%), or provider (n = 4; 8.7%); or both the participant and researcher (n = 6; 13%), provider and participant (n = 3; 6.5%), provider and researcher (n = 3; 6.5%), and the provider, participant, and researcher (n = 3; 6.5%).

The majority of studies (fidelity of delivery, n = 31; 70.45%; engagement, n = 42; 91.3%) did not report whether they developed their own measure or used a previously developed measure. For fidelity of delivery, eight (18.18%) used a previously developed measure and five (11.36%) developed their own measures. For engagement, three (6.5%) studies used previously developed measures and one (2.2%) developed own measures and used measures that were previously developed.

Many studies did not specify the type of scales used to quantify fidelity of delivery (n = 23; 52.3%) or engagement (n = 29; 63%). For fidelity of delivery, 12 studies (27.3%) reported using rating scales (which ranged from 3-point scales to 10-point scales), eight (18.2%) reported using dichotomous scales and one (2.3%) used rating scales and dichotomous scales. For engagement, 12 studies (26.1%) reported using rating scales (which ranged from 3-point scales to 10-point scales), three (6.5%) reported using dichotomous scales, and two (4.4%) reported using a combination of rating scales and dichotomous scales.

For both fidelity of delivery (n = 23; 52.3%) and engagement (n = 45; 97.8%), many studies did not specify how many participants they sampled. Five (11.4%) measured fidelity of delivery of all participants and 16 (36.4%) measured fidelity of delivery in a subsample of participants. Of those studies that measured fidelity of delivery in a subsample, four reported the number of sessions that they sampled, four reported the number of clinicians/sites data were sampled from, six reported the percentage of sessions that they sampled, and two did not specify how many but reported sampling some but not all participants. One (2.2%) study reported measuring engagement in a subsample of participants.

The sampling strategy used to measure fidelity of delivery included random sampling (n = 8; 18.2%), purposive sampling (n = 3; 6.8%), opportunity sampling (n = 1; 2.3%), stratified sampling (n = 1; 2.3%), self-selected sampling (n = 1; 2.3%), not specified (n = 25; 56.8%), and not applicable for the studies that measured all participants (n = 5; 11.4%). No studies specified a sampling strategy for measuring engagement.

The majority of studies did not specify whether they measured fidelity of delivery (n = 38; 86.4%) or engagement (n = 35; 76.1%) in all conditions; therefore, it is likely they measured the intervention group only. Four (9.1%) reported measuring fidelity of delivery in all intervention groups, and two (4.5%) reported measuring fidelity of delivery in the intervention group only. Nine (19.6%) reported measuring engagement in all intervention groups, and two (4.3%) reported measuring engagement in the intervention group only.

For fidelity of delivery, 29 studies (65.9%) reported descriptive statistics, 11 (25%) reported descriptive and inferential statistics, and four (9.1%) did not report how they analysed the data. For engagement, 37 studies (80.4%) reported descriptive statistics and nine (19.6%) reported descriptive and inferential statistics.

Across all 66 studies, 13 (19.7%) reported using a fidelity framework.

Reporting of psychometric and implementation qualities

Studies

Of all included studies, 51 (77%) reported at least one psychometric or implementation quality of their measures (38 fidelity of delivery; 86.4%, 23 engagement; 50%).

Forty-nine studies (74.2%) reported at least one psychometric quality, and 17 studies (25.8%) reported at least one implementation quality (see Table 2 for details).

Table 2. Number of studies reporting psychometric and implementation qualities, across all studies (N = 66) and by studies reporting fidelity of delivery (N = 44) and engagement (N = 46)

	Psychometric qualities			Implementation qualities			
	Reported at least one quality	Validity	Reliability	Reported at least one quality	Practicality	Acceptability	Cost
All studies; *N* (%)	49 (74.2)	41 (62)	34 (52)	17 (25.8)	14 (21)	6 (9)	2 (3)
Fidelity of delivery; *N* (%)	37 (84.1)	31 (70.5)	29 (65.9)	12 (27.3)	11 (25)	5 (11.4)	0 (0)
Engagement; *N* (%)	21 (45.7)	16 (34.8)	10 (21.7)	9 (19.6)	6 (13.4)	2 (4.3)	2 (4.3)

Table 3. Number of times qualities were reported in total, and for fidelity of delivery and engagement

Quality	Total number of times (%)	Category	Total number of times	Fidelity of delivery	Engagement
Psychometric quality	215 (82.4)	Validity	129	100	33
		Reliability	85	75	14
		Reliability and validity	1	1	0
Implementation quality	41 (15.7)	Practicality	30	25	6
		Acceptability	8	7	1
		Cost	2	0	2
		Acceptability and practicality	1	1	0
Psychometric and Implementation quality	5 (1.9)	Reliability and practicality	1	1	0
		Validity and practicality	3	2	1
		Validity and acceptability	1	1	1
Total	261 (100)				

Note. The fidelity of delivery and engagement columns do not add up to 261 because 10 qualities were reported for both fidelity of delivery and engagement.

Psychometric and implementation qualities

In total, 261 (100%) reported qualities were identified (see Table 3 for details). Of these, 215 (82.4%) psychometric qualities were reported, 41 (15.7%) implementation qualities, and five (1.9%) both psychometric and implementation qualities; 213 qualities were reported in relation to fidelity of delivery measures and 58 qualities for engagement measures.

The most frequently reported psychometric qualities concerned the use of multiple researchers (n = 21: 3 data collection, 2 data analysis, 1 data entry, 3 develop measures, 11 coding, 1 validate coding frame), the validity of measures (n = 17: 9 valid, 8 not valid), the use of independent researchers (n = 16: 14 used independent researchers, 2 did not use independent researchers), reliability of measures (n = 11: 5 reliable, 6 not reliable), the random selection of data (n = 11: 9 randomly selected data, 2 did not randomly select data), and inter-rater agreement (n = 9: 3 high inter-rater agreement, 2 did not report inter-rater agreement, 2 poor to fair, 1 fair to excellent, 1 no coder drift). Please see Table 4 for a detailed list of all psychometric qualities.

The most frequently reported implementation qualities concerned resource challenges (n = 10: 1 sharing Dictaphones, 4 time restrictions, 2 financial restrictions, and 3 technical difficulties) and providers' attitudes (n = 7: 1 dislike paperwork, 1 fear of discouraging participants, 1 nerves, 1 report participants behaving differently, 1 positive attitudes, 1 additional work) (see Table 4 for a list of all qualities).

Discussion

Key findings

Fewer than half of the reviewed studies measured both fidelity of delivery of and engagement with complex, face-to-face health behaviour interventions. Measures covered observation, self-report, and intervention records. Whilst 73% reported at least one psychometric quality, only 26% reported at least one implementation quality.

Table 4. Qualities, category, and number of studies qualities were reported in

Group of quality	Quality	Category	Number of studies reported in	Fidelity studies	Engagement studies
Psychometric qualities					
Use of multiple researchers	Coding	R	11	20,26,27,29,33,34,45,51,58,64	47
	Data collection		3	6,29,31	
	Develop measures		3	14,26,60	
	Data analysis		2	10,42	
	Data entry		1	26	
	Validate coding frame		1	26	
Validity of measures	Validated	V	9	21,22,34,48,51	4,17,25,51
	Not validated		8	2,10,34,35,41,42,50	13
Use of independent researchers	Used – coding	R	12	20,22,26,27,29,34,38,45,51,55,63,64	
	Not used – coding		1	58	
	Used – develop measures		1	14	
	Used – analysis		1	42	
	Not used	V	1	20	
Measurement of conditions	All conditions (result output)	V	8	7,50	4,13,17,18,51,53
	All conditions (reported)		5	2,48,51	2,3,35
	Intervention only		3	2,24	24,25
Reliability of measures	Reliable	R	6	21,22,48	4,17,51
	Not reliable		5	2,14,23,34,50	2,23
Random selection of data	Randomly selected	V	9	31,40,51,55,57,58,63,64	52 (data entry)
	Not randomly selected		2	45,48	
Reporting of inter-rater agreement	Reported – high	R	3	26,59	17
	Not reported		2	29,33	
	Reported – poor to fair		2	27,58	
	Reported – fair to excellent		1	58	
	Reported – no coder drift		1	26	

Continued

Table 4. (*Continued*)

Group of quality	Quality	Category	Number of studies reported in	Fidelity studies	Engagement studies
Coding of sessions	A percentage	V	7	33,45,51,55,57,58,63	
	All		1	27	
Calculated inter-rater agreement		R	8	20,26,27,29,33,58,59	17
Use of experts	Coding	V	5	10,21,22,36,38	
	Develop measures		1	27	
	Not used – coding		1	27	
	Checked % of data input	R	1	10	
Blinding	Coders	V	3	7,26,48	
	Not blinded		2	2	52
	Researchers		1		15
	Participants		1	2	
Measurement of content of intervention	Some aspects of intervention	V	3	20,38	36,38
	All aspects of intervention		2	33,63	
Problems with scoring criteria	Scoring criteria not sensitive	V	2	20,26	
	No success cut-off point		1	14	
	Dichotomized responses reduce variability		1		25
	Measures may capture different aspects of fidelity		1	26	
Standardization of procedure	Script	V	2	34,66	
	Data entry		1		52
	Coding guidelines		1	64	
	Not used standardized procedure		1	33	
	Not used standardized measure		1		52
Self-report bias		V	4	10,26,26,30	
		R	2	5	4

Continued

Table 4. (*Continued*)

Group of quality	Quality	Category	Number of studies reported in	Fidelity studies	Engagement studies
Sampling	Across all providers	V	2	27,45	
	Across all sites		1	10	
	Across all sites (purposively)		1	33	
	Across all participants		1	27	
	Balanced facilitator and gender (purposively)		1	26	
Audit	Data collection	R	1	6	
	Data analysis		1		6
	Coding		1	20	20
	Data entry	V	1	23	
	Recordings		1	40	
Missing responses	Missing responses	V	1		15
Trained researchers	Trained coders	V	3	7,27,58	
	Trained researcher (data collection)		1		52
Observation effects		V	4	22,26,27,34	
Use of one researcher	Coding	R	1	38	
	Trained observers		1	34	
Revised coding guidelines		R	3	20,26,48	
		V	1	33	
Team meetings		R	4	1,6,23,36	23
Recording of sessions	All sessions	V	2	40,55	
	% of sessions		1	35	
Triangulation	Method	V	2	34,42	
	Researcher		1	42	
Problems with analysis plan	Did not control for provider	V	1	36	
	Missing responses excluded		1	10	

Continued

Table 4. (*Continued*)

Group of quality	Quality	Category	Number of studies reported in	Fidelity studies	Engagement studies
Social desirability		V	3	22	13,52
Objective verification		V	2		15,43
		R	1		12
Used coding guidelines		R	2	20,27	
Analysis consideration – coded missing responses as no adherence		V	1		15
Independently validated coding frame		V	1	26	
Measurement differences – observation and self-report		V	1	26	
Measurement period – year after intervention		V	1		25
Piloted coding guidelines		V	1	26	
Practice period before recording		V	1	27	
Pre-specified dates for recordings		V	1	27	
Statistician involved in sampling (stratified)		V	1	10	
Training before recording may overestimate adherence		V	1	58	
Piloted measure		V	1	34	
Provided a reason for inter-rater agreement		R	1	27	
Supervision		R	1	58	
Measures were internally consistent indicating content validity		R+V	1	27	
Implementation qualities					
Resource challenges	Time restrictions	P	4	5,20,27,62	
	Technical difficulties	P	3	5,5,58	
	Financial restrictions	P	2	5,27	
	Sharing Dictaphones	P	1	45	
Providers' attitudes	Dislike paperwork	A	1	10	
	Fear of discouraging participants	A	1	27	
	Nerves	A	1	27	
	Report participants behaving differently	A	1	27	

Continued

Table 4. (*Continued*)

Group of quality	Quality	Category	Number of studies reported in	Fidelity studies	Engagement studies
	Positive attitudes	A	1	42	
	Additional work	A	1	62	
	Not enthusiastic	A	1	62	
Measurement of content of intervention	Telephone calls not assessed due to difficulty	P	1	38	
	Measure cannot capture non-verbal data	P	1	20	
Problems with documentation	No record of responses	P	2	10,58	
	Providers did not document everything		1	10	
	No record of refusals	A+P	1	27	
Missing responses	Missing responses	P	1	10,10 (different aspects)	
Problems with sampling	Low recruitment	P	1	60	
Problems with analysis plan	Analysis not feasible	P	1	10	
Incentives	Incentives used	P	2		15,52
	Incentives required	P	1	62	
Feedback to providers		P	2	21,27	
Feedback delay		P	1	38	
Forgetting to return data		P	1		15
Logbook showed that not all steps were applied		P	1	42	
Paper and digital version of measures given		P	1		5
Need simpler coding guidelines to achieve agreement		P	1	27	
Reviewed fidelity after trial		P	1	45	
Participants – dislike paperwork		A	1		15
Did not do a cost analysis		C	1		13
Cost of materials		C	1		37

Continued

Table 4. (*Continued*)

Group of quality	Quality	Category	Number of studies reported in	Fidelity studies	Engagement studies
Both psychometric and implementation qualities					
Problems with scoring criteria	Lack of clarity on items	V+P	1		25
Missing responses	Missing responses	V+P	1	58	
Use of one researcher	Data collection	R+P	2	5	52
Problems with sampling	Selection bias	V+A	1	2	2
	Not randomly selected	V+P	1	27	

Notes. This table is ordered by the number of studies that reported a quality that fits into the 'group of quality' column (e.g., 'use of multiple researchers'). Most frequent → Least frequent. The numbers in this table will not add up to the total number of studies included, as some studies included information on multiple qualities.

R = reliability; V = validity; A = acceptability; P = practicality; C = cost.

How findings relate to previous research

The measures used to measure fidelity of delivery of, and engagement with, complex, face-to-face health behaviour change interventions were consistent with previous recommendations of using observational or self-report measures to monitor fidelity of delivery, and self-report measures to monitor engagement (Bellg *et al.*, 2004; Borrelli, 2011; Burgio *et al.*, 2001; Carroll *et al.*, 2007; Schinckus *et al.*, 2014). A similar percentage of studies used observational and self-report measures to measure fidelity of delivery, despite observational measures being recommended as the gold-standard measure and the reported limitations of self-report measures (Bellg *et al.*, 2004; Borrelli, 2011; Breitenstein *et al.*, 2010; Lorencatto *et al.*, 2014; Schinckus *et al.*, 2014). Intervention records (e.g., attendance or homework) were also used to measure engagement. Intervention records can be considered an objective measure of receipt (Gearing *et al.*, 2011; Rixon *et al.*, 2016) and participation (Saunders, Evans, & Joshi, 2005). However, these measures are limited by their inability to monitor how much participants understand and use the intervention. Other recommended and potentially more objective measures, for example, asking participants to demonstrate skills (Burgio *et al.*, 2001), were not adopted by any study in this review. Perhaps these findings demonstrate that measures need to be easy to use and acceptable to respondents and researchers in order to be selected for use. This explanation is consistent with previous studies which suggest that observational measures are perceived to be more expensive, time-consuming and difficult to use (Breitenstein *et al.*, 2010; Schinckus *et al.*, 2014). Many studies used measures of fidelity of delivery and engagement specific to one intervention, and therefore, generalizability is limited (Breitenstein *et al.*, 2010).

This review found that three quarters of studies reported at least one quality of their measures. This finding demonstrates that the reporting of psychometric qualities in the complex, face-to-face health behaviour change interventions included in this review, may not be as infrequent as previously suggested in different populations (Baer *et al.*, 2007; Breitenstein *et al.*, 2010; Maynard *et al.*, 2013; Rixon *et al.*, 2016). However, not all studies reported psychometric qualities, and fewer reported implementation qualities, despite the importance of psychometric and implementation qualities (Gearing *et al.*, 2011; Glasgow *et al.*, 2005; Holmbeck & Devine, 2009; Lohr, 2002; Stufflebeam, 2000). The reporting of psychometric and implementation qualities provides information which allows the reader to determine whether the findings are trustworthy and representative. Given this, it is difficult to draw conclusions with high certainty about how well interventions have been delivered or engaged with. This, in turn, makes it difficult to draw conclusions about intervention effectiveness.

The psychometric qualities that were most frequently reported were those recommended by previous research; examples of these are the use of multiple, independent researchers to reliably rate a random percentage of sessions for fidelity of delivery (Bellg *et al.*, 2004; Borrelli, 2011; Lorencatto *et al.*, 2014). However, some qualities which are recommended by research were not frequently reported; an example of this is routine audio-recording (Gresham, Gansle, & Noell, 1993; Miller & Rollnick, 2014). The implementation qualities that were most frequently reported were those concerning resources (including time constraints, financial constraints, and technical difficulties) and providers' attitudes towards measures. These findings could explain why missing responses were reported in some of the studies included in this review (Arends *et al.*, 2014; Chesworth *et al.*, 2015; Dubbert, Cooper, Kirchner, Meydrech, & Bilbrew, 2002; Thyrian *et al.*, 2010) and health care research (Shrive *et al.*, 2006).

Providers may not return audio-recordings (Weissman, Rounsaville, & Chevron, 1982) or checklists, if they feel uncomfortable with audio-recording or if they are overwhelmed with paperwork.

Limitations

The aim of this review was to identify a range of studies that met the criteria and reported fidelity of delivery and/or engagement in enough depth to be able to draw conclusions about the reporting of fidelity of delivery and/or engagement measures. To identify as many studies as possible, a comprehensive search was conducted, which included contacting experts and authors to identify further relevant articles that may have been missed by the search strategy. However, we will not have identified articles that did not report monitoring fidelity of delivery or engagement in titles, abstracts, or keywords. A further reason why relevant articles may have been missed is that many terms are used interchangeably in fidelity research and we may not have captured all of these terms in the search strategy. We only included articles that reported a clear fidelity of delivery or engagement measure or outcome. As is the case with many systematic reviews, the search is inevitably limited to its date cut-off. However, future use of natural language processing, ontologies, and machine learning (Larsen *et al.*, 2016) will enable more ongoing updating when aggregating review evidence (see www.humanbehaviourchange.org).

The findings from this review consider the reporting of qualities and not the actual quality of measures. The review findings do not consider strengths or weaknesses of these qualities nor how much weighting should be given to each quality when designing fidelity of delivery and engagement measures. This is an area that could be investigated, building on the current review.

Implications

There are three main implications of these review findings for researchers and intervention developers:

1. The need to fully report details of fidelity of delivery and engagement measures. The findings from this review demonstrated that many studies did not specify details about the sampling or analysis method used in developing measures of fidelity of delivery and or engagement. If this information is not available, evaluation and replication are difficult to achieve.
2. The need to report both psychometric and implementation qualities for fidelity of delivery and engagement measures. The reporting of psychometric and implementation qualities would be helpful to researchers who are aiming to measure fidelity of delivery or engagement. This information would allow evaluations of what measures and procedures may be feasible.
3. The need to develop high-quality measures of fidelity of delivery and engagement that are acceptable and practical to use but also reliable and valid. Both psychometric and implementation qualities of measures are relevant when selecting, developing, and reporting measures.

If implemented, these steps could help to strengthen the quality of fidelity of delivery and engagement data and the interpretation of intervention effectiveness.

Future research

Further research is needed to evaluate the importance and weighting of each quality when designing fidelity of delivery and engagement measures. One way to do this could be to conduct a Delphi study with experts in intervention fidelity and engagement. This systematic method could be used for building a consensus (Hsu & Sandford, 2007) regarding which psychometric and implementation qualities are most important, and which qualities should be given the most weighting when developing and evaluating fidelity of delivery and engagement measures. This information could then to be used to inform the development of measures of fidelity of delivery and engagement that are reliable, valid, acceptable, and practical. Future systematic reviews could explore the qualities of fidelity and engagement measures reported in qualitative studies.

Conclusion

Fewer than half of the reviewed studies measured both fidelity of delivery of and engagement with complex, face-to-face health behaviour change interventions. Measures covered observation, self-report, and intervention records. Whilst 74% reported at least one psychometric quality, only 26% reported at least one implementation quality. Findings suggest that implementation qualities are reported less frequently than psychometric qualities. The findings from this review highlight the need for researchers to report measures of fidelity of delivery and engagement in detail, to report psychometric and implementation qualities, and to develop, use, and report high-quality measures. This would strengthen the quality of fidelity of delivery and engagement data and the interpretation of intervention effectiveness.

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Conflict of interest

The authors declare no conflict of interests.

Compliance with ethical standards

This research is a review and did not involve research with human participants or animals.

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Note: Included studies marked with *Study number.

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Supporting Information

The following supporting information may be found in the online edition of the article:

Appendix S1. Search strategy.
Appendix S2. Characteristics of included studies.
Appendix S3. The proportion of studies which measured fidelity of delivery, engagement, or both.
Appendix S4. Details extracted from the papers on fidelity of delivery, and engagement methods and results.

Appendix 3-1. PRIDE intervention framework

The PRIDE intervention aims to promote independence and facilitate the person’s access to opportunities which will help them live well with dementia. It also aims to enable the participants to maintain: an active lifestyle, a healthy lifestyle and maintain cognitive activities and social roles. Therefore, the components of the intervention which are most relevant to these objectives (key components) have been identified.

Framework	Key targets	Key components*	Session	Target behaviour	BCT’s	PRIDE objectives
Necessary information	1. Introduction to research	Purpose of PRIDE intervention was explained - What it is - What it involves - What the purpose is - How the manual works - Participant choice	1	N/A	N/A	N/A
	2. Information provision	a. Information and tips on how to find a balance	1	Carrying out activities, Participating in activities, Developing a routine	1.1 Goal setting behaviour 3.1 Social support unspecified 3.2 Practical social support 4.1 Instruction on how to perform the behaviour 7.1 Prompts/cues 8.1 Behavioural practice/rehearsal 8.3 Habit formation	Independence, Active lifestyle, Healthy lifestyle, Cognitive activities
		b. Information and tips on social connections	1	Connecting with others, Support for activities, Communicating with healthcare professionals	1.2 Problem solving 3.1 Social support unspecified 4.1 Instruction on how to perform the behaviour 5.3 Information about social and environmental consequences 6.1 Instruction on how to perform the behaviour	Social roles
		c. Information and tips on keeping going	1	Choosing activity, Planning activities, Being motivated	3.1 Social support unspecified 4.1 Instruction on how to perform the behaviour	Active lifestyle, Healthy lifestyle
	3 Provide tailored advice**	a. Keeping mentally active	1,2,3	Carrying out activities to keep mentally active	1.2 Problem solving 5.3 Information about social and environmental consequences 8.7 Graded tasks	Active lifestyle, Healthy lifestyle
		b. Keeping physically active		Carrying out activities to keep physically actives	1.1 Goal setting behaviour 1.2 Problem solving 3.1 Social support unspecified 4.1 Instruction on how to perform the	Active lifestyle, Healthy lifestyle

					behaviour 5.1 Information about health consequences 5.3 Information about social and environmental consequences 5.6 Information about emotional consequences 8.1 Behavioural practice/rehearsal 8.3 Habit formation 8.7 Graded tasks 9.1 Credible source 12.1 Restructuring the physical environment	
		c. Keeping socially active		Carrying out activities to keep socially active	1.2 Problem solving 3.2 Social support practical 5.1 Information about health consequences 7.3 Prompts/cues	Active lifestyle, Healthy lifestyle, Social roles
		d. Making decisions		Making decisions	1.2 Problem solving 3.1 Social support unspecified 3.2 Social support practical 5.3 Information about social and environmental consequences 6.1 Demonstration of behaviour 9.1 Pros and cons	Independence
		e. Getting your message across		Communicating	1.2 Problem solving 4.1 Instruction on how to perform a behaviour 5.6 Information about emotional consequences 9.1 Credible source	Independence
		f. Receiving a diagnosis of dementia		Adjusting to a dementia diagnosis (reducing worries etc)	1.2 Problem solving 3.1 Social support unspecified 4.1 Instruction on how to perform a behaviour 5.3 Information about social and environmental consequences 5.6 Information about emotional consequences 6.1 Demonstration of behaviour 9.1 Credible source	Healthy lifestyle
		g. Keeping healthy		Drinking water, Eating healthily, Stopping smoking, Reducing drinking	4.1 Instruction on how to perform a behaviour 5.1 Information about health consequences 9.1 Credible source	Healthy lifestyle
Assessment and Tailoring	4. Assessment	a. Assess ‘decision making’, using scenarios	1	Decision making	N/A	Independence, Maintain cognitive activities

		b. Assess ‘getting the message across’ using scenarios		Communicating	N/A	Independence, Social roles, Maintain cognitive activities
		c. Assess ‘social connections’ using scenarios		Connecting with others socially	N/A	Social roles
		d. Assess and map social connections	1	Support for activities	3.1 Social support unspecified	Social roles
		e. Assessed friends and family style	1	Connecting with others socially	N/A	Social roles
		f. Review satisfaction with progress	2, 3	N/A	N/A	All (depending on what participant chooses): Independence, Healthy lifestyle, Active lifestyle, Maintain cognitive activities, Social roles
	5. Provide tailored advice	Choose three topics to work on: a. Keeping mentally active b. Keeping physically active c. Keeping socially active d. Making decisions e. Getting your message across f. Receiving a diagnosis of dementia g. Keeping healthy	1	Behaviours which correspond with chosen topic	See information section (3*)	All (depending on what participant chooses): Independence, Healthy lifestyle, Active lifestyle, Maintain cognitive activities, Social roles
PRIDE activities	6. Plan	a. Set and record a goal	1, 2, 3	Behaviours which correspond with chosen topic	1.1 Goal setting behaviour+	All (depending on what participant chooses): Independence, Healthy lifestyle, Active lifestyle, Maintain cognitive activities, Social roles
		b. Set and record an action plan	1, 2, 3	Behaviours which correspond with chosen topic	1.4 Action planning	
		c. Identify facilitators and barriers, and possible solutions and record	1, 2,3	Behaviours which correspond with chosen topic	1.2 Problem solving	
	7. Do	Discussed how to record progress	1, 2, 3,	Behaviours which correspond with chosen topic	2.3 Self-monitoring of behaviour	All (depending on what participant chooses): Independence, Healthy lifestyle, Active lifestyle, Maintain cognitive activities, Social roles
	8. Review	a. Review progress	2, 3	Behaviours which	1.5 Review behavioural goal	All (depending on what participant

			correspond with chosen topic		chooses): Independence, Healthy lifestyle, Active lifestyle, Maintain cognitive activities, Social roles
	b. Facilitators and barriers and solutions and record	2, 3	Behaviours which correspond with chosen topic	1.2 Problem solving	
	c. Reviewed and changed plan if necessary and recorded	2,3	Behaviours which correspond with chosen topic	1.5 Review behavioural goal	
9. Feedback and support	a. Given positive feedback b. Given opportunity to ask questions c. Given contact details	1, 2, 3	Behaviours which correspond with chosen topic	2.2 Feedback on behaviour 3.1 Social support unspecified 10.4 Social reward?	All (depending on what participant chooses): Independence, Healthy lifestyle, Active lifestyle, Maintain cognitive activities, Social roles

Note:

*Key components will be referred to as appointment activities in checklists

** These were delivered according to participants' choice of topics

Appendix 3-2. PRIDE coding guidelines

PRIDE Coding guidelines

About the checklists

There are three checklists, one for each of the PRIDE intervention sessions:

- Session 1
- Session 2
- Session 3

These checklists detail the intervention activities that should have been delivered in each session. Some activities happen in every session, others are unique to one session only (these are clearly marked in the guideline).

For session 1 and 2 there is also an additional grid with tailored activities specific to topics. Participants were asked to choose one or more of the below topics to work on:

1. Keeping mentally active
2. Keeping physically active
3. Keeping socially active
4. Making decisions
5. Getting your message across
6. Receiving a diagnosis
7. Keeping healthy

For each of these topics, certain activities are recommended in the manual (the boxes with no shading on the checklists).

How do I fill out the checklists?

Please:

- Read the transcript once all the way through to familiarise yourself with it
- Read the coding guidelines all the way through to familiarise yourself with them
- Read the transcript again
- Record the set number provided on the transcript in the first row of the checklist.
- Record your initials next to coder ID and put the date that you are completing the checklist.
- Go through the checklist appointment activities one by one.
- Make a note on the transcript to demonstrate evidence for each appointment activity (this will be helpful when deciding to what extent it has been delivered and when discussing your decision with the other coder). Please do this using the comment function in word.
- Please add page numbers to the checklist for each appointment activity (this will help when discussing discrepancies with the other coder)
- For every item on the checklist, please tick whether it was:
    - Done
    - Done to some extent
    - Not done
- If there is an apparent reason (e.g. dementia advice worker mentions that they have ran out of time) why this may not have been delivered or delivered to some extent, please make a note in the notes column.
- For the activity: ‘chosen topic: discussed in relation to the participant’, please turn the page and tick the activities that were carried out **for the chosen topic only**.
- Note: Only tick the boxes if activities have been done. Blank box indicates not done response and shaded box with no tick indicates N/A response.

    E.g. If the participant chose to work on ‘Keeping mentally active: look for activities that should have been delivered for that topic (it is indicated by the boxes with no shading for the topic row in both grids). Make a note on the transcript for evidence of the provider delivering those activities and then select the activities that were delivered.
    For example, if ‘Keeping mentally active’ was chosen, you would look for evidence of:
    - *‘Provided information on the benefits associated with it’*
    - *‘Provided instructions on how to do it’*
    - *‘Provided example activities for the topic’*
    - *‘Provided examples of how others do it’*
    - *‘Provided tips to overcome challenges’*

    And select the activities that were delivered.

    If an activity was not relevant for the chosen topic, please select not applicable.

Note: Shading means that this component is not in the manual, however you should still look for evidence of these components when coding in case they have been delivered

Please code all evidence of tailored topic activities despite whether the topic is chosen (sometimes components are covered when DAWs are introducing the topics)

Evidence can be for more than one tailored topic at a time.

How do I decide which score to give?

- Please choose **'done'** if there is evidence in the transcript that all aspects of the activity have been delivered
- Please choose **'done to some extent',** if there is evidence that the activity has only been partially delivered or if the dementia advice worker could have done more.
- Please choose **'not done'** if there is no evidence in the transcript that this activity has been delivered.

Please see the table below for specific examples, definitions and rationale for scores per appointment activity.

Please note, some processes are repeated across sessions (plan, do and review), therefore it may only be suitable for the DAW to explain the process the first time. If this is the case, please code not done and write (N/A)

Acronyms

DAW = Dementia advice worker

PRIDE = Promoting Independence in Dementia

Session 1				
Framework Component	**Appointment Activity**	**Definition**	**Scores**	**Rationale for scores**
Initial PRIDE activities	1. Explained what the PRIDE programme is and what it will involve.	Explanation should include: - What PRIDE is, including what PRIDE stands for (Promoting Independence in Dementia) - What PRIDE will involve, including: ○ who it will involve (DAW) and supporter) ○ what the programme will involve (three sessions with DAW) ○ The purpose of the programme, ○ The manual	**Done**	DAW explained what the PRIDE programme is and what it will involve
			Done to some extent	DAW explained either what the PRIDE programme is or what it will involve Or The DAW explained what the PRIDE programme is and some information on what PRIDE will involve (e.g. who it will involve and the manual)
			Not done	DAW did not explain what the PRIDE programme is and what it will involve
	2. Helped the participant to complete the PRIDE profile.	PRIDE profile includes the person's name, age, living situation, name of supporter, name of PRIDE DAW, fitness, mobility, interests and hobbies and likes and dislikes Note: if done before session cannot code unless they say we've already filled in x, y and z (specific)	**Done**	DAW helped the participant to complete all of their PRIDE profile
			Done to some extent	DAW helped the participant to complete some of their PRIDE profile
			Not done	DAW did not help the participant to complete their PRIDE profile
	3a. Finding a balance: Provided information on how to find a balance with activities.	Provided information on how to find a balance that is outlined in the manual, including: - rest and relaxation (may include example activities for rest and relaxation e.g. yoga/meditation/taking a bath) - having a routine, (may include having a daily routine and to do list/planning week) - setting reminders (may include examples of ways to keep track of things – diaries/sticky notes/smart phones/calendars/asking someone, tips if forget something)	**Done**	DAW provided the information provided in the manual about how to find a balance with activities (all three: rest and relaxation, having a routine, setting reminders)
			Done to some extent	DAW provided information on some ways to find a balance with activities (1-2 of the bullet points met e.g. rest and relaxation only) or signposted to the information but not covered it
			Not done	DAW did not provide information on how to find a balance with activities (none of the bullet points met)
	3b. Finding a balance: Helped the participant to think about which activities they find enjoyable and important, using	Discussed the 'find a balance grid' – e.g. things that are enjoyable/important or not enjoyable/important For the find a balance grid, participants will put activities in the below grid in order of importance and enjoyment	**Done**	DAW helped the participant to think about which activities they find enjoyable and important (more/less) using the 'find a balance' grid

<table>
<tr><td>the ‘find a balance’ grid.</td><td><table><tr><td></td><td>Less important (!)</td><td>(!!)</td><td>More important (!!!)</td></tr><tr><td>Less enjoyable ☹</td><td></td><td></td><td></td></tr><tr><td>😐</td><td></td><td></td><td></td></tr><tr><td>More enjoyable ☺</td><td></td><td></td><td></td></tr></table></td><td>Done to some extent</td><td>DAW helped the participant to think about which activities they find enjoyable and important but did not use the ‘find a balance grid’
Or
DAW helped the participants to think about activities that were either more/less enjoyable or more/less important</td></tr>
<tr><td></td><td></td><td>Not done</td><td>DAW did not help the participant to think about which activities they find enjoyable and important using the ‘find a balance grid’</td></tr>
<tr><td>4a. How others can help: Provided information on how other people can help.</td><td>Provided information on how other people can help, as outlined in the manual. Including:
- what a support network is (explain that a support network is a group of people who can help you when you need it)
- why it is important to have a support network (explain that it is important as we get older – can help you keep independence and sense of self)
- how those in the support network can help (unsure of type of support – people may take over responsibility but need to do as much as you are able – finding the right balance with support – need to negotiate this)</td><td>Done</td><td>DAW provided information on all three of the criteria for how other people can help, as outlined in the manual</td></tr>
<tr><td></td><td></td><td>Done to some extent</td><td>DAW provided some information (one to two of the criteria) on how other people can help, as outlined in the manual (e.g. what a support network is but not why it is important/how others can help)</td></tr>
<tr><td></td><td></td><td>Not done</td><td>DAW did not provide information on how other people can help.</td></tr>
<tr><td>4b. How others can help: Encouraged the participant to describe their current social connections.</td><td>Asking the participant to complete the social connection exercises:
1) assessing which of the social connections are most like them (tick box exercise in manual)
2) Asking them to explore who is in their support network (network exercise in manual)
Tick box options for 1) are:
- My closest relationships are with family who live close by
- I have close relationships with family who live close by, friends and neighbours
- I have lots of contact with family who live far away. I have lots of friends and I am involved in the wider community</td><td>Done</td><td>DAW encouraged the participant to describe their current social connections by completing both the social connection activities</td></tr>
<tr><td></td><td></td><td>Done to some extent</td><td>DAW encouraged the participant to describe their current social connections by completing one of the social connection activities</td></tr>
</table>

	- I don’t have much contact with family. I have contact with neighbours but not a lot of involvement in things outside my home - I don’t have any close family or friends, and I don’t know my neighbours that well. I keep myself to myself. **Asking them to explore who is in their support network, including:** Immediate family, extended family, neighbours, lifelong friends, new friends, wider community voluntary organisations, service professionals, healthcare professionals	**Not done**	DAW did not encourage the participant to describe their current social connections
4c. How others can help: Provided examples of how other people help others.	Provided example case studies of how people can help. For example: the case study of ‘Jill and John’ and how other people have helped them Note: DAW may also provide examples from their own experience (e.g. ‘Other people’s support networks help them by xxx’)	**Done**	The DAW provided examples of how other people help others, and used a case study to provide an example.
		Done to some extent	The DAW provided examples of how other people help others, but did not provide a case study as an example Or The DAW signposted to the case study but did not provide examples of how other people help others.
		Not done	DAW did not provide examples of how other people help others
5a. Keeping going: Provided information on how to choose activities to keep going.	Provided information on how to choose activities to keep going, as outlined in the manual. This includes an explanation of: - The plan, do and review process - Making your plan - Planning an activity ○ Kind of activity? ○ What you would like to do (carry on, do more, try, do less) ○ How (where, when, how, who and what’ - Planning to build skills/try new ways of doing things Note: This component focuses on **explaining** the ‘plan, do, review’ process to the participant rather than making a plan	**Done**	DAW provided information on how to choose activities to keep going, as outlined in the manual
		Done to some extent	DAW provided some but not all information provided in the manual
		Not done	DAW did not provide information on how to choose activities to keep going
5b. Keeping going: Provided examples of how others keep going.	Provided examples of case studies of how other people have chosen activities to keep going using the plan, do and review steps. For example, Jill and John and their plan, do and review sheets.	**Done**	DAW provided examples of how other people keep going and used a case study to provide an example

		Note: DAW may also provide examples from their own experience (e.g. ‘Some people may keep going by xxx’	**Done to some extent**	DAW provided examples of how other people keep going but did not provide a case study as an example Or The DAW signposted to the case study but did not provide examples of how others keep going
			Not done	DAW did not provide examples of how other people keep going
	6. Asked the participant to choose three topics to work on.	Asked the participant to choose three topics out of the seven topics: 1) Keeping mentally active, 2) Keeping physically active, 3) Keeping socially active, 4) Making decisions, 5) Getting your message across, 6) Receiving a diagnosis, 7) Keeping healthy Note: Code DAW behaviour not participant response. E.g. If DAW asks participant to choose three but only one or two are chosen can code ‘done’	**Done**	DAW asked the participant to choose three topics to work on
			Done to some extent	DAW asked the participant to choose 1 or 2 topics to work on
			Not done	DAW did not ask the participant to choose topics to work on
Plan	7. Helped the participant to set an activity goal.	Helped the participant to set a goal of what they would like to work on for one of the topics *(*example from manual: The goal should specify the topic they want to work and the activity that they would like to do. For example: Topic: Making decisions Activity: Choosing what to have for dinner This is a more general goal than the plan made in component 9. Setting an activity goal is more a goal area e.g. reading/crosswords	**Done**	DAW helped the participant to set an activity goal
			Done to some extent	DAW helped the participant to choose a topic or an activity Or DAW helped the participant to choose an activity did not follow through to setting a goal
			Not done	DAW did not help the participant to set an activity goal
	8a. Chosen topic: Provided relevant resources for topic chosen from PRIDE manual and own sources.	Provided relevant resources refers to signposting to the relevant materials and going through them with the participant for the topic they have chosen to work on. This may also be supplemented with additional resources where necessary *(e.g. if chosen making decisions, identified the making decisions topic in the manual and given additional resources) – only code for the specific chosen topics* E.g. If the DAW signposts to the topic in the manual and explains relevant resources for the topic, can code done.	**Done**	DAW signposted to and went through the materials in the manual and own sources for the topic chosen
			Done to some extent	DAW signposted but did not go through the resources from the manual and own sources for the topic chosen Or DAW went through information relevant to the topic but did not signpost to the relevant materials in the manual and own sources
			Not done	DAW did not signpost to or go through the relevant resources for the topic chosen
	8b. Chosen topic: Discussed in relation to the participant *(Please turn the page and*	Discussed the information in the manual which is relevant for that topic and tailored it to the participant. ‘Resources’ refers to information from the manual and any additional resources referred to by the DAW	**Done**	DAW covered tailored activities in relation to the participant for the chosen topic

	provide details).	*Note: It may help to first decide which tailored activities have been delivered before making a judgement on this question.* If some tailored activities have been covered, this is an indicator that this component has been done. If DAW has covered tailored activities for various topics but not the specific chosen topic can code done to some extent	**Done to some extent**	DAW covered tailored activities in relation to the participant for other topics but not the chosen topic
			Not done	DAW did not cover tailored activities for other topics.
	9. Made at least one plan with the participant (including where, when and how they will do the plan and who will help).	The plan should outline how they will go about the plan, including: - where, - when, - how - with whom, Evidence for different aspects of the plan may be found in different parts of the transcript. All four criteria should be in relation the same plan and discussed at the time of the session (deciding at a later date is not enough)	**Done**	DAW made at least one plan with the participant, which meets all four criteria
			Done to some extent	DAW made at least one plan with the participant, which meets 1-3 of the criteria
			Not done	DAW did not make any plans with the participant
	10. Encouraged the participant to think about what might help and what might get in the way of doing their plan(s).	Discussed with the participant what might help them to do their activity and what might get in the way Please note: some aspects may overlap between the plan and things that help. Note: As long as participants have chosen an activity, barriers and facilitators can be identified.	**Done**	DAW encouraged the participant to think about what might help **and** what might get in the way of doing the plan
			Done to some extent	DAW encouraged the participant to think about what might help **or** what might get in the way of doing the plan
			Not done	DAW did not encourage the participant to think about what might help and what might get in the way of doing the plans
	11. Encouraged the participant to think of ways to overcome problems.	If problems are identified, encouraged the participant to identify ways of overcoming the problems and coming to an agreed solution with the participant. If it is unclear whether a solution has been agreed, code done to some extent. For example: It is okay if DAW suggests solution if discussed with the participant and they come to an agreed solution. If not this would be done to some extent. Only applicable if asked about barriers. If not asked about barriers: not done,. If asked and no barriers are identified (Appt activity 10.), please choose not done and write (N/A)	**Done**	DAW encouraged the participant to think of ways to overcome problems
			Done to some extent	DAW encouraged the participant to think of some possible ways to overcome problems but did not follow through to an agreed conclusion
			Not done	DAW did not encourage the participant to think of ways to overcome problems
	12. Recorded plan(s) on the plan sheet.	*Note: Please look for evidence of this behaviour in transcript to code.* It must be clear that they are talking about the plan sheet– if not clear code not done. The plan sheet must be completed for plans selected in this session only	**Done**	DAW recorded the plan(s) on the plan sheet
			Done to some extent	DAW recorded some but not all of the plan(s) on the plan sheet
			Not done	DAW did not record the plan on the plan(s) sheet
Do	13. Showed the participant how to record progress between sessions.	Showed the participant the 'do' calendar and explains how they can use this calendar to record their progress between sessions *(e.g. recording their activities)*	**Done**	DAW showed the participant how to record progress between sessions, using the 'do' calendar

		Note: Please look for evidence of this behaviour in transcript to code. It must be clear that they are talking about the do calendar, e.g. by referring to do calendar, activity calendar or recording activities on days of the week – if not clear code not done	**Done to some extent**	DAW showed the participants how to record progress between sessions, but suggested a different method
			Not done	DAW did not show the participants how to record progress between sessions
Support	14. Gave positive feedback.	Gave participants positive feedback to the participants. Positive feedback should be specific to the participants' efforts. For example: 'Great', 'Brilliant', 'You have done really well'. Judge based on depth of feedback and number of times	**Done**	DAW gave positive feedback to the participant 3 or more times
			Done to some extent	DAW gave positive feedback 1-2 times
			Not done	DAW did not give positive feedback to the participant
	15. Gave the opportunity to ask any questions or clarify any issues.	'Gave the opportunity' refers to prompting the participants to ask questions or clarify issues. This could be in relation to the plans or any other aspects of the intervention. Multiple instances of asking participants if they have any questions/whether they'd like to clarify issues can be coded as done, one example can be coded done to some extent Example questions: 'Is there anything you would like me to go over again?' 'Do you have any questions?'	**Done**	DAW gave the opportunity to ask questions **and** clarify issues more than once
			Done to some extent	DAW gave the opportunity to ask questions and/**or** clarify issues once
			Not done	DAW did not give the opportunity to ask questions or clarify issues
	16. Provided contact details and explained methods of support.	Provided contact details and explained methods of support. Methods of support may refer to contacting the DAW/ or the DAW contacting the participant between sessions via telephone Note: If there is an indication of them giving contact details, can code	**Done**	DAW provided contact details **and** explained methods of support
			Done to some extent	DAW provided contact details **or** explained methods of support
			Not done	DAW did not provide contact details or explain methods of support
Next step	17. Set a time and date for next session.	Set a time and date for the next session. Note: If there is an indication of setting time/date in this session can code as done, if to be arranged on the phone not done	**Done**	DAW set a time **and** date for next session
			Done to some extent	DAW set a time **or** date for next session
			Not done	DAW did not set a time or date for next session

Session 2				
Framework Component	**Appointment Activity**	**Definition**	**Scores**	**Rationale for scores**
Review	1. Asked participant about his/her progress since the last session.	Asked the participant about their progress since the last session *(e.g. how it went when they tried to carry out their activities)*	**Done**	DAW asked the participant about their progress in relation to their activities since last session
			Done to some extent	DAW asked the person about their progress but since last session but not specifically in relation to their activities
			Not done	DAW did not ask participants about their progress since last session
	2. Discussed what helped and what got in the way of participant's progress.	Discussed with the participant what helped them to carry out the activity and what got in the way of carrying out the activity	**Done**	DAW discussed with the participant what helped **and** what got in the way of progress
		Barriers and facilitators can be specific or more general	**Done to some extent**	DAW discussed with the participant what helped **or** what got in the way of progress
			Not done	DAW did not discuss with the participant what helped or what got in the way of progress
	3. If problems were identified, discussed ways to overcome them.	If problems are identified, encouraged the participant to identify ways of overcoming the problems and coming to an agreed solution with the participant.	**Done**	DAW discussed with the participant ways to overcome problems
		If it is unclear whether a solution has been agreed, code done to some extent. For example: It is okay if DAW suggests solution if discussed with the participant and they come to an agreed solution. If not this would be done to some extent.	**Done to some extent**	DAW discussed with the participant some possible ways to overcome problems but did not follow through to an agreed conclusion
		Only applicable if barriers are identified (Appt activity 2). If not, please choose not done and write (N/A)	**Not done**	DAW did not discuss with the participant ways to overcome problems
	4. Discussed and changed plan if needed.	Discussed the plan with the participant and asked if they would like to change or carry on with it, and changed it as necessary	**Done**	DAW discussed and changed the plan, with the participant, if needed, or decided to keep the plan the same

			Done to some extent	DAW discussed wanting to change the plan with the participant, but did not change it Or DAW changed the plan but did not discuss this with the participant
			Not done	DAW did not discuss or change the plan with the participant, if needed
	5. Recorded review using the review sheet.	*Note: Please look for evidence of this behaviour in transcript to code.* It must be clear that they are talking about the review sheet– if not clear code not done.	**Done**	DAW recorded the review on the review sheet
			Done to some extent	DAW recorded some of the review on the review sheet
			Not done	DAW did not record the review on the review sheet
	6. Assessed participant's satisfaction with their plan(s).	Assessed how satisfied the participant was with their plan. The DAW should specifically ask how happy they are with their plan/progress E.g. • 'How happy are you with your plan?' • 'How happy are you with the progress you have made?'	**Done**	DAW assessed the participant's satisfaction with the plan(s)
			Done to some extent	DAW assessed satisfaction with a specific aspect of the plan, but not the plan in general
			Not done	DAW did not assess satisfaction with the plan(s)
Plan	7. Helped the participant to set an activity goal.	Helped the participant to set a goal of what they would like to work on for one of the topics (example from manual: The goal should specify the topic they want to work and the activity that they would like to do. For example: Topic: Making decisions Activity: Choosing what to have for dinner This is a more general goal than the plan made in component 9. Setting an activity goal is more a goal area e.g. reading/crosswords	**Done**	DAW helped the participant to set an activity goal
			Done to some extent	DAW helped the participant to choose a topic or an activity Or DAW helped the participant to choose an activity did not follow through to setting a goal
			Not done	DAW did not help the participant to set an activity goal
	8a. Chosen topic: Provided relevant resources for topic chosen from PRIDE manual and own sources.	Provided relevant resources refers to signposting to the relevant materials and going through them with the participant for the topic they have chosen to work on. This may also be supplemented with additional resources where necessary *(e.g. if chosen making decisions, identified the making decisions topic in the manual and given additional resources) – only*	**Done**	DAW signposted to and went through the materials in the manual and own sources for the topic chosen

	code for the specific chosen topics E.g. If the DAW signposts to the topic in the manual and explains relevant resources for the topic, can code done.	**Done to some extent**	DAW signposted but did not go through the resources from the manual and own sources for the topic chosen Or DAW went through information relevant to the topic but did not signpost to the relevant materials in the manual and own sources
		Not done	DAW did not signpost to or go through the relevant resources for the topic chosen
8b. Chosen topic: Discussed in relation to the participant *(Please turn the page and provide details).*	Discussed the information in the manual which is relevant for that topic and tailored it to the participant. 'Resources' refers to information from the manual and any additional resources referred to by the DAW *Note: It may help to first decide which tailored activities have been delivered before making a judgement on this question.* If some tailored activities have been covered, this is an indicator that this component has been done. If DAW has covered tailored activities for various topics but not the specific chosen topic can code done to some extent	**Done**	DAW covered tailored activities in relation to the participant for the chosen topic
		Done to some extent	DAW covered tailored activities in relation to the participant for other topics but not the chosen topic
		Not done	DAW did not cover tailored activities for other topics.
9. Made at least one plan with the participant (including where, when and how they will do the plan and who will help).	The plan should outline how they will go about the plan, including: - where, - when, - how - with whom, Evidence for different aspects of the plan may be found in different parts of the transcript. All four criteria should be in relation the same plan and discussed at the time of the session (deciding at a later date is not enough)	**Done**	DAW made at least one plan with the participant, which meets all four criteria
		Done to some extent	DAW made at least one plan with the participant, which meets 1-3 of the criteria
		Not done	DAW did not make any plan with the participant
10. Encouraged the participant to think about what might help and what might get in the way of doing their plan(s).	Discussed with the participant what might help them to do their activity and what might get in the way Please note: some aspects may overlap between the plan and things that help. Note: As long as participants have chosen an activity, barriers and facilitators can be identified.	**Done**	DAW encouraged the participant to think about what might help **and** what might get in the way of doing the plan
		Done to some extent	DAW encouraged the participant to think about what might help **or** what might get in the way of doing the plan
		Not done	DAW did not encourage the participant to think about what might help and what might get in the way of doing the plans

	11. Encouraged the participant to think of ways to overcome problems.	If problems are identified, encouraged the participant to identify ways of overcoming the problems and coming to an agreed solution with the participant. If it is unclear whether a solution has been agreed, code done to some extent. For example: It is okay if DAW suggests solution if discussed with the participant and they come to an agreed solution. If not this would be done to some extent. Only applicable if asked about barriers. If not asked about barriers: not done. If asked and no barriers are identified (Appt activity 10.), please choose not done and write (N/A)	**Done**	DAW encouraged the participant to think of ways to overcome problems
			Done to some extent	DAW encouraged the participant to think of some possible ways to overcome problems but did not follow through to an agreed conclusion
			Not done	DAW did not encourage the participant to think of ways to overcome problems
	12. Recorded plan(s) on the plan sheet.	*Note: Please look for evidence of this behaviour in transcript to code.* It must be clear that they are talking about the plan sheet– if not clear code not done. The plan sheet must be completed for plans selected in this session only	**Done**	DAW recorded the plan(s) on the plan sheet
			Done to some extent	DAW recorded some but not all of the plan(s) on the plan sheet
			Not done	DAW did not record the plan on the plan(s) sheet
Do	13. Showed the participant how to record progress between sessions.	Showed the participant the 'do' calendar and explains how they can use this calendar to record their progress between sessions *(e.g. recording their activities)* *Note: Please look for evidence of this behaviour in transcript to code.* It must be clear that they are talking about the do calendar, e.g. by referring to do calendar, activity calendar or recording activities on days of the week – if not clear code not done	**Done**	DAW showed the participant how to record progress between sessions, using the 'do' calendar
			Done to some extent	DAW showed the participants how to record progress between sessions, but suggested a different method
			Not done	DAW did not show the participants how to record progress between sessions
Support	14. Gave positive feedback.	Gave participants positive feedback to the participants. Positive feedback should be specific to the participants' efforts. For example: 'Great', 'Brilliant', 'You have done really well'. Judge based on depth of feedback and number of times	**Done**	DAW gave positive feedback to the participant 3 or more times
			Done to some extent	DAW gave positive feedback 1-2 times
			Not done	DAW did not give positive feedback to the participant
	15. Gave the opportunity to ask any questions or clarify any issues.	'Gave the opportunity' refers to prompting the participants to ask questions or clarify issues. This could be in relation to the plans or any other aspects of the intervention. Multiple instances of asking participants if they have any questions/whether they'd like to clarify issues can be coded as done, one example can be coded done to some extent Example questions: 'Is there anything you would like me to go over again?' 'Do you have any questions?'	**Done**	DAW gave the opportunity to ask questions **and** clarify issues more than once
			Done to some extent	DAW gave the opportunity to ask questions and/**or** clarify issues once
			Not done	DAW did not give the opportunity to ask questions or clarify issues

	16.	Provided contact details and explained methods of support.	Provided contact details and explained methods of support.	**Done**	DAW provided contact details **and** explained methods of support
			Note: If there is an indication of them giving contact details, can code	**Done to some extent**	DAW provided contact details **or** explained methods of support
				Not done	DAW did not provide contact details or explain methods of support
Next steps	17.	Set a time and date for next session.	Set a time and date for the next session.	**Done**	DAW set a time **and** date for next session
			Note: If there is an indication of setting time/date in this session can code as done, if to be arranged on the phone not done	**Done to some extent**	DAW set a time **or** date for next session
				Not done	DAW did not set a time or date for next session

Session 3				
Framework Component	**Appointment Activity**	**Definition**	**Scores**	**Rationale for scores**
Review	1. Asked the participant about his/her progress since the last session.	Asked the participant about their progress since the last session *(e.g. how it went when they tried to carry out their activities)*	**Done**	DAW asked the participant about their progress in relation to their activities since last session
			Done to some extent	DAW asked the person about their progress but since last session but not specifically in relation to their activities
			Not done	DAW did not ask participants about their progress since last session
	2. Discussed what helped and what got in the way of the participant's progress.	Discussed with the participant what helped them to carry out the activity and what got in the way of carrying out the activity Barriers and facilitators can be specific or more general	**Done**	DAW discussed with the participant what helped **and** what got in the way of progress
			Done to some extent	DAW discussed with the participant what helped **or** what got in the way of progress
			Not done	DAW did not discuss with the participant what helped or what got in the way of progress
	3. If problems were identified, discussed ways to overcome them.	If problems are identified, encouraged the participant to identify ways of overcoming the problems and coming to an agreed solution with the participant. If it is unclear whether a solution has been agreed, code done to some extent. For example: It is okay if DAW suggests solution if discussed with the participant and they come to an agreed solution. If not this would be done to some extent. Only applicable if barriers are identified (Appt activity 2). If not, please choose not done and write (N/A)	**Done**	DAW discussed with the participant ways to overcome problems
			Done to some extent	DAW discussed with the participant some possible ways to overcome problems but did not follow through to an agreed conclusion
			Not done	DAW did not discuss with the participant ways to overcome problems
	4. Discussed and changed plan(s) if needed.	Discussed the plan with the participant and asked if they would like to change or carry on with it, and changed it as necessary	**Done**	DAW discussed and changed the plan, with the participant, if needed, or decided to keep the plan the same
			Done to some extent	DAW discussed wanting to change the plan with the participant, but did not change it Or DAW changed the plan but did not discuss this with the participant
			Not done	DAW did not discuss or change the plan with the participant, if needed

	5.	Recorded review using the review sheet.	*Note: Please look for evidence of this behaviour in transcript to code.* It must be clear that they are talking about the review sheet– if not clear code not done.	**Done**	DAW recorded the review on the review sheet
				Done to some extent	DAW recorded some of the review on the review sheet
				Not done	DAW did not record the review on the review sheet
	6.	Assessed participant's satisfaction with their plan(s).	Assessed how satisfied the participant was with their plan. The DAW should specifically ask how happy they are with their plan/progress. E.g. • 'How happy are you with your plan?' • 'How happy are you with the progress you have made?'	**Done**	DAW assessed the participant's satisfaction with the plan(s)
				Done to some extent	DAW assessed satisfaction with a specific aspect of the plan, but not the plan in general
				Not done	DAW did not assess satisfaction with the plan(s)
Plan: going forward	7.	Helped the participant to set an activity goal to work on after the programme.	Helped the participant to set a new goal which specifies what they want to work on in the long term after the programme. This plan may be more general than plans made in previous sessions	**Done**	DAW helped the participant to set an activity goal to work on after the programme
				Done to some extent	DAW helped the participants to think about an activity they might like to work on after the programme, but did not follow through to an agreed conclusion
				Not done	DAW did not help the participant to set an activity goal to work on after the programme
	8.	Encouraged the participant to think about what might help and what might get in the way of doing their plan(s).	Encouraged the participant to think about things that might help and get in the way of these long-term plans. Barriers and facilitators can be specific or more general	**Done**	DAW encouraged the participant to think about what might help **and** what might get in the way of doing the plan
				Done to some extent	DAW encouraged the participant to think about what might help **or** what might get in the way of doing the plan
				Not done	DAW did not encourage the participant to think about what might help and what might get in the way of doing the plans
	9.	Encouraged the participant to think of ways to overcome problems.	If problems are identified, encouraged the participant to identify ways of overcoming the problems and coming to an agreed solution with the participant. If it is unclear whether a solution has been agreed, code	**Done**	DAW encouraged the participant to think of ways to overcome problems
				Done to some extent	DAW encouraged the participant to think of some possible ways to overcome problems but did not follow through to an agreed conclusion

		done to some extent. For example: It is okay if DAW suggests solution if discussed with the participant and they come to an agreed solution. If not this would be done to some extent. Only applicable if asked about barriers. If not asked about barriers: not done. If asked and no barriers are identified (Appt activity 10.), please choose not done and write (N/A)	**Not done**	DAW did not encourage the participant to think of ways to overcome problems
	10. Recorded plan(s) going forward on the ‘things to take forward’ sheet.	*Note: Please look for evidence of this behaviour in transcript to code.* It must be clear that they are talking about the things to take forward sheet– if not clear code not done.	**Done**	DAW recorded the plan(s) on the ‘things to take forward’ sheet
			Done to some extent	DAW recorded some but not all of the plan(s) on the ‘things to take forward’ sheet
			Not done	DAW did not record the plan on the ‘things to take forward’ sheet
Support	11. Gave positive feedback.	Gave participants positive feedback to the participants. Positive feedback should be specific to the participants’ efforts. For example: ‘Great’, ‘Brilliant’, ‘You have done really well’. Judge based on depth of feedback and number of times	**Done**	DAW gave positive feedback to the participant 3 or more times
			Done to some extent	DAW gave positive feedback 1-2 times
			Not done	DAW did not give positive feedback to the participant
	12. Gave the opportunity to ask any questions or clarify any issues.	‘Gave the opportunity’ refers to prompting the participants to ask questions or clarify issues. This could be in relation to the plans or any other aspects of the intervention. Multiple instances of asking participants if they have any questions/whether they’d like to clarify issues can be coded as done, one example can be coded done to some extent Example questions: ‘Is there anything you would like me to go over again?’ ‘Do you have any questions?’	**Done**	DAW gave the opportunity to ask questions **and** clarify issues more than once
			Done to some extent	DAW gave the opportunity to ask questions and/**or** clarify issues once
			Not done	DAW did not give the opportunity to ask questions or clarify issues

Session 1 & 2: Tailored grid

Framework	Appointment activity	Definition	Scores	Rationale for scores
Tailored grid:	Provided information on the benefits associated with it *Note: ‘It’ refers to the chosen topic/activity*	Provides information on the benefits of working on the chosen topic/activity. Specific benefits should be given for each topic. Benefits can include: cognitive functioning, physical, social and mental wellbeing. **Relevant for all seven topics**. Some benefits listed in the manual for each topic that may be covered. 1) **Keeping mentally active:** Cognitive functioning 2) **Keeping physically active:** Physical, mental and social health. 3) **Keeping socially active:** Physical and mental health and cognitive functioning 4) **Making decisions:** independence 5) **Getting your message across:** Well-being 6) **Receiving a diagnosis:** Clarity on next steps/planning/support 7) **Keeping healthy:** Physical health and cognitive functioning Other benefits may also be discussed and should be taken into consideration when coding. If greyed out but evident in transcript, still tick	Done	Provided information on the benefits associated with the participant’s choice of topic.
			Not done	Did not provide Information on the benefits associated with the participant’s choice of topic
			Not applicable	This activity was not relevant for the topic chosen.
	Provided information on how dementia can affect it *Note: ‘It’ refers to the chosen topic/activity*	Provided information on how dementia can affect the chosen topic/activity. Specific examples for how dementia can affect it must be given, e.g. ‘([topic] can be affected by dementia in many ways) is not sufficient. Relevant for: 4) Making decisions 5) Getting your message across Some information that may be covered for each topic, from the manual: **4) Making decisions:** Information about dementia not stopping the person from having a say, types of decisions that the person makes changing, and information about decisions that the person may never have been involved in **5) Getting your message across:** Information about the person expressing themselves and understanding information, e.g. trouble thinking of words/objects/people, repetition, difficulty tracking conversations. If greyed out but evident in transcript, still tick	Done	Provided information on how dementia can affect the topic chosen by the participant
			Not done	Did not provide Information on how dementia can affect the topic chosen by the participant
			Not applicable	This activity was not relevant for the topic chosen.
	Assessed participant’s current style (decision making/communication)	Assessed the participant’s current decision making or communication style. Relevant for: 4) Making decisions, 5) Getting your message across In both of these topics, the dementia advice worker will assess the person’s style using the	Done	Assessed the participant’s current style
			Not done	Did not assess the participant’s current style

	flow diagrams in the manual. If greyed out but evident in transcript, still tick	Not applicable	This activity was not relevant for the topic chosen.
Identified potential challenges	Identified potential challenges for working on that topic/chosen activity. Specific challenges must be identified e.g. (there are many challenges associated with [topic]) is not sufficient.	Done	Identified potential challenges for the participant’s chosen topic
	Relevant for: 4) Making decisions, 5) Getting your message across, 6) Receiving a diagnosis	Not done	Did not identify potential challenges for the participant’s chosen topic
	Some challenges that may be identified for each topic: **4) Making decisions:** May include risky activities, feeling left out of decisions, being limited by other people’s decisions, lack of confidence making decisions and trouble making decisions **5) Getting your message across:** May include keeping involved, confidence, talking to people about feelings, talking to people about having dementia and health issues **6) Receiving a diagnosis:** May include worries about receiving a diagnosis and sharing a diagnosis If greyed out but evident in transcript, still tick	Not applicable	This activity was not relevant for the topic chosen.
Provided information on resources	Provided information and resources for the participant to find further information Relevant for: 7) Keeping healthy	Done	Provided information on resources for the participant’s chosen topic
	Relevant resources may include: general health resources, heart health resources, diabetes resources, lifestyle resources (eating and drinking, managing weight, sleep, managing worries, taking care of teeth), smoking and drinking	Not done	Did not provide information on resources for the participant’s chosen topic
	If greyed out but evident in transcript, still tick	Not applicable	This activity was not relevant for the topic chosen.
Provided instructions on how to do it	Provided instructions on how the participant could achieve their chosen activity/make progress with that topic	Done	Provided instructions on how to do the chosen topic
Note: ‘It’ refers to the chosen	Relevant for: 1) Keeping mentally active, 2) Keeping physically active, 3) Keeping socially	Not done	Did not provide instructions on how to do the chosen topic

topic/activity	active For these topics, instructions which explain how the person can participate in mental, physical or social activities should be provided. This could include the difficulty of the activity, equipment and safety If greyed out but evident in transcript, still tick	Not applicable	This activity was not relevant for the topic chosen.
Provided example activities for this topic	Provided examples of activities for the chosen topic.	Done	Provided example activities for the chosen topic
	Relevant for: 1) Keeping mentally active, 2) Keeping physically active, 3) Keeping socially active	Not done	Did not provide example activities for the chosen topic
	For these topics, example activities may be provided, for example: puzzles/reading/computer use/CST (mentally active), walking, swimming, chair exercises (physically activity), and volunteering, singing groups, courses, cinema (Socially active)	Not applicable	This activity was not relevant for the topic chosen.
	If greyed out but evident in transcript, still tick		
Provided examples of how others do it	Provided examples or case studies of how others do the chosen activity	Done	Provided examples of how others do the chosen topic
Note: 'It' refers to the chosen	Relevant for: 1) Keeping mentally active, 2) Keeping physically active, 3) Keeping socially active, 4) Making decisions, 5) Getting your message across and 6) Receiving a diagnosis	Not done	Did not provide examples of how others do the chosen topic

topic/activity	**1)Keeping mentally active:** Explored case studies for how others keep mentally active, for example (Simon, Alan and Anna) **2)Keeping physically active:** Explored case studies for how others keep physically active, for example: Kate and James, Aki and Haya, Lana **3) Keeping socially active:** Explored case studies for how others keep socially active, for example: Andrew, Mary, Rachel. **4) Making decisions:** Explored the case studies provided in the manual for the relevant challenge to see how others make decisions (e.g. David & Elsie, Sandra, Curtis, & Roberts' stories **5) Getting the message across:** Explored the case studies provided in the manual for examples of how others get the message across (e.g. Violet, Gladys, Harry, Irene, Phillip and June) **6) Receiving a diagnosis:** Explored the case studies provided in the manual for examples of how others received their diagnosis (e.g. Terry, Josephine, Claudia) If greyed out but evident in transcript, still tick	Not applicable	This activity was not relevant for the topic chosen.
Provided tips on how others provide support	Provided tips (guidance) on how other people can support the participant to achieve their chosen activity/topic. Note: It must be clear which topic(s) they are talking about	Done	Provided tips on how others can provide support for the chosen topic
	Relevant for: 1) Keeping mentally active, 2) Keeping physically active, 3) Keeping socially active, 4) Making decisions, 5) Getting your message across, 6) Receiving a diagnosis	Not done	Did not provide tips on how others can provide support for the chosen topic
	Providing tips on how others can help you with these activities, for example asking family members/friends to support or join in with an activity	Not applicable	This activity was not relevant for the topic chosen.
	1, 2 and 3) Keeping mentally active, physically active and socially active: Provided tips to explain how others can support in this, for example asking family members or friends to support/ go with them to an activity **4) Making decisions: Tips** on how others can provide a little support, backup, enable rather than limit, offer choices, help with part of a task, consider options together and know which decisions are important **5) Getting your message across:** Tips on how you can use support from healthcare professionals, family and friends to get your message across. **6) Receiving a diagnosis:** Tips on how support groups and healthcare professionals, family and friends can support your with receiving a diagnosis. If greyed out but evident in transcript, still tick		

	Provided examples of how others overcome challenges	Provided examples or case studies of how other people have overcome difficulties to achieve the chosen activity/topic Relevant for: 4) Making decisions, 5) Getting your message across, 6) Receiving a diagnosis **4) Making decisions:** Explored the case studies provided in the manual for the relevant challenge to see how others have overcome challenges (e.g. David & Elsie, Sandra, Curtis, & Roberts’ stories **5) Getting the message across:** Explored the case studies provided in the manual for relevant challenges to see how overs may have overcome challenge (e.g. Ian) **6) Receiving a diagnosis:** Explored the case studies provided in the manual to see how others have overcome these challenges (e.g. Rosa, Ben & Sade, Zach, Ali, Jay and Gita) If greyed out but evident in transcript, still tick	Done	Provided examples of how others overcome challenges relating to the chosen topic
			Not done	Did not provide examples of how others overcome challenges relating to the chosen topic
			Not applicable	This activity was not relevant for the topic chosen.
	Provided tips to overcome challenges	Provided tips (guidance) to the participant on how they can overcome problems. Relevant for: 1) Keeping mentally active, 2) Keeping physically active, 3) Keeping socially active, 4) Making decisions, 5) Getting your message across, 6) Receiving a diagnosis 1) **Keeping mentally active:** Covered tips of how to overcome challenges for keeping mentally active, including doing activities at home instead of outside, using technological aids, making notes, 2) **Keeping physically active:** Covered tips of how to overcome challenges for keeping physically active, for example: setting goals, using technology and other equipment **3) Keeping socially active:** Covered tips of how to overcome challenges, for example: prompts, making list, using equipment, e.g. timers. **4) Making decisions:** Covered tips of how to identify the challenges related to decision making e.g. changing routine, talking to other people to negotiate roles/activities, **5) Getting your message across:** Covered tips which may include talking to people to show you want to be in the conversation, looking at communication resources, talking to a health professional, having patience, using reminders, **6) Receiving a diagnosis:** Covered tips including getting support, finding out about dementia, speaking openly to others, raising awareness, humour, looking at situation from all points of view) If greyed out but evident in transcript, still tick	Done	Provided tips to overcome challenges relating to the chosen topic
			Not done	Did not provide tips to overcome challenges relating to the chosen topic

	Not applicable	This activity was not relevant for the topic chosen.

Appendix 3-3. PRIDE dementia advice worker/researcher checklists, Sessions 1-3

DEMENTIA ADVICE WORKER CHECKLIST: SESSION 1

Site ID: DAW ID: Participant ID: Date:

Appointment activities					**Please tick**			**If not done or done to some extent, please give a brief reason for not delivering** (e.g. ran out of time, forgot)
					Done	**To some extent**	**Not done**	
INITIAL PRIDE ACTIVITIES	1.	Explained what the PRIDE programme is and what it will involve.		1.				
	2.	Helped the participant to complete the PRIDE profile.		2				
	3.	Finding a balance:	a. Provided information on how to find a balance with activities.	3a.				
			b. Helped the participant to think about which activities they find enjoyable and important, using the 'find a balance' grid.	3b.				
	4.	How others can help	a. Provided information on how other people can help.	4a.				
			b. Encouraged the participant to describe their current social connections.	4b.				
			c. Provided examples of how other people help others.	4c.				
	5.	Keeping going:	a. Provided information on how to choose activities to keep going.	5a.				
			b. Provided examples of how others keep going.	5b.				
	6.	Asked the participant to choose three topics to work on.		6.				
PLAN	7.	Helped the participant to set an activity goal.		7.				
	8.	Chosen topic:	a. Provided relevant resources for topic chosen from PRIDE manual and own sources.	8a.				
			b. Discussed in relation to the participant *(Please turn over and provide details).*	8b.				
	9.	Made at least one plan with the participant (including where, when and how they will do the plan and who will help).		9.				
	10.	Encouraged the participant to think about what might help and what might get in the way of doing their plan(s).		10.				
	11.	Encouraged the participant to think of ways to overcome problems.		11.				
	12.	Recorded plan(s) on the plan sheet.		12.				
DO	13.	Showed the participant how to record progress between sessions.		13.				
SUPPORT	14.	Gave positive feedback.		14.				
	15.	Gave the opportunity to ask any questions or clarify any issues.		15.				
	16.	Provided contact details and explained methods of support.		16.				
NEXT STEP	17.	Set a time and date for next session.		17.				

Session 1: Please complete for appointment activity 8 only.

For the topic that your participant chose to work on, please tick what was done.

If anything else was done, please provide details in the space below.

Provided information, assessed situation and identified challenges

Topic	Provided information on the benefits associated with it	Provided information on how dementia can affect it	Assessed participant's current style (decision making/ communication)	Identified potential challenges	Provided information on resources
1. Keeping mentally active		▨	▨	▨	▨
2. Keeping physically active		▨	▨	▨	▨
3. Keeping socially active		▨	▨	▨	▨
4. Making decisions					▨
5. Getting your message across					▨
6. Receiving a diagnosis		▨	▨		▨
7. Keeping healthy		▨	▨	▨	

Provided examples and tips

Topic	Provided instructions on how to do it	Provided example activities for this topic	Provided examples of how others do it	Provided tips on how others can provide support	Provided example of how others overcome challenges	Provided tips to overcome challenges
1. Keeping mentally active					▨	
2. Keeping physically active					▨	
3. Keeping socially active					▨	
4. Making decisions	▨	▨				
5. Getting your message across	▨	▨				
6. Receiving a diagnosis	▨	▨				
7. Keeping healthy	▨	▨	▨	▨	▨	▨

DEMENTIA ADVICE WORKER CHECKLIST: SESSION 2

Site ID: DAW ID: Participant ID: Date:

Appointment activity				**Please tick:** Done	To some extent	Not done	**If not done or done to some extent, please give a brief reason** (e.g. ran out of time/ forgot)
REVIEW	1.	Asked participant about his/her progress since the last session.	1.				
	2.	Discussed what helped and what got in the way of participant's progress.	2.				
	3.	If problems were identified, discussed ways to overcome them.	3.				
	4.	Discussed and changed plan if needed.	4.				
	5.	Recorded review using the review sheet.	5.				
	6.	Assessed participant's satisfaction with their plan(s).	6.				
PLAN	7.	Helped the participant to set an activity goal.	7.				
	8.	Chosen topic: 8a. Provided relevant resources for topic chosen from PRIDE manual and own sources.	8a.				
		8b. Discussed in relation to the participant *(Please turn over and provide details).*	8b.				
	9.	Made at least one plan with the participant (including where, when and how they will do the plan and who will help).	9.				
	10.	Encouraged the participant to think about what might help and what might get in the way of doing their plan(s).	10.				
	11.	Encouraged the participant to think of ways to overcome problems.	11.				
	12.	Recorded plan(s) on the plan sheet.	12.				
DO	13.	Showed the participant how to record progress between sessions.	13.				
SUPPORT	14.	Gave positive feedback.	14.				
	15.	Gave the opportunity to ask any questions or clarify any issues.	15.				
	16.	Provided contact details and explained methods of support.	16.				
NEXT STEP	17.	Set a time and date for next session.	17.				

Session 2: Please complete for appointment activity 8 only.

For the topic that your participant chose to work on, please tick what was done.

If anything else was done, please provide details in the space below.

Provided information, assessed situation and identified challenges

Topic	Provided information on the benefits associated with it	Provided information on how dementia can affect it	Assessed participant's current style (decision making/ communication)	Identified potential challenges	Provided information on resources
1. Keeping mentally active		▨	▨	▨	▨
2. Keeping physically active		▨	▨	▨	▨
3. Keeping socially active		▨	▨	▨	▨
4. Making decisions					▨
5. Getting your message across					▨
6. Receiving a diagnosis		▨	▨		▨
7. Keeping healthy		▨	▨	▨	

Provided examples and tips

Topic	Provided instructions on how to do it	Provided example activities for this topic	Provided examples of how others do it	Provided tips on how others can provide support	Provided example of how others overcome challenges	Provided tips to overcome challenges
1. Keeping mentally active					▨	
2. Keeping physically active					▨	
3. Keeping socially active					▨	
4. Making decisions	▨	▨				
5. Getting your message across	▨	▨				
6. Receiving a diagnosis	▨	▨				
7. Keeping healthy	▨	▨	▨	▨	▨	▨

DEMENTIA ADVICE WORKER CHECKLIST: SESSION 3

Site ID:
DAW ID:
Participant ID:
Date:

Appointment activity				**Please tick:**			**If not done or done to some extent, please give a brief reason** (e.g. ran out of time/ forgot)
				Done	**To some extent**	**Not done**	
REVIEW	1.	Asked the participant about his/her progress since the last session.	1.				
	2.	Discussed what helped and what got in the way of the participant's progress.	2.				
	3.	If problems were identified, discussed ways to overcome them.	3.				
	4.	Discussed and changed plan(s) if needed.	4.				
	5.	Recorded review using the review sheet.	5.				
	6.	Assessed participant's satisfaction with their plan(s).	6.				
PLAN: GOING FORWARD	7.	Helped the participant to set an activity goal to work on after the programme.	7.				
	8.	Encouraged the participant to think about what might help and what might get in the way of doing their plan(s).	8.				
	9.	Encouraged the participant to think of ways to overcome problems.	9.				
	10.	Recorded plan(s) going forward on the 'things to take forward' sheet.	10.				
SUPPORT	11.	Gave positive feedback.	11.				
	12.	Gave the opportunity to ask any questions or clarify any issues.	12.				

Appendix 3-4. PRIDE participant ‘your experience’ checklists, Sessions 1-3

Promoting Independence in Dementia (PRIDE): Your experiences. First session							
Site ID:	DAW ID:	Participant ID:	Date:				
Session activities					**Please tick**		
					Definitely happened	**Possibly happened**	**Didn’t happen**
INITIAL PRIDE ACTIVITIES	1.	The dementia advice worker explained what the PRIDE programme is and what it will involve.		1.			
	2.	We completed my PRIDE profile.		2.			
	3.	Finding a balance with activities	a. The dementia advice worker gave me information on how to find a balance with activities.	3a.			
			b. I described which activities I find important and enjoyable using the ‘find a balance’ grid.	3b.			
	4.	How other people can help	a. The dementia advice worker gave me information on how other people could help me.	4a.			
			b. I described my current relationships.	4b.			
			c. We talked about examples of how other people’s support network helps them.	4c.			
	5.	Keeping going with activities	a. The dementia advice worker gave me information on how to choose activities to keep going.	5a.			
			b. We talked about examples of how others keep going.	5b.			
	6.	I chose three topics to work on.		6.			
PLAN	7.	I set an activity goal.		7.			

First session activities continued					**Please tick**		
					Definitely happened	**Possibly happened**	**Didn’t happen**
PLAN	8.	Chosen topic	7a. The dementia advice worker gave me information for my chosen topic.	8a.			
			7b. We talked about my chosen topic in relation to me.	8b.			
	9.	We talked about and made at least one plan (including where, when, and how I will do the plan and who will help me).		9.			
	10.	We talked about things that will help and things that might get in the way of my plan(s).		10.			
	11.	If we identified problems, we talked about ways to solve them.		11.			
	12.	We wrote my plan(s) on the plan sheet.		12.			
DO	13.	The dementia advice worker showed me how to log how I am getting on with my plan(s) between sessions, using the ‘do’ calendar.		13.			
SUPPORT	14.	The dementia advice worker gave me positive feedback.		14.			
	15.	The dementia advice worker gave me the opportunity to ask questions and clarify issues.		15.			
	16.	The dementia advice worker gave me their contact details and ways to seek support.		16.			
NEXT STEP	17.	We set a time and date for the next session.		17.			
After the session					**Please tick**		
					Yes	**To some extent**	**No**
	18.	The information given to me in the session was clear and easy to understand.		18.			
	19.	I understand how to put my plans into action.		19.			

Promoting Independence in Dementia (PRIDE): Your experiences. Second session.

Site ID: DAW ID: Participant ID: Date:

Activities since the last session				**Please tick**		
				Yes	**To some extent**	**No**
	1.	Since the last session, I have written my activities on the 'do' calendar.	1.			
	2.	Since the last session, I have practiced and used the information and skills I learnt.	2.			
Session activities				**Please tick**		
				Definitely happened	**Possibly happened**	**Didn't happen**
REVIEW	3.	We talked about how I have got on with my plan(s) since last session.	3.			
	4.	We talked about things that helped and got in the way of me making progress.	4.			
	5.	If we identified problems, we talked about ways to solve them.	5.			
	6.	We talked about my plan(s) and made changes if needed.	6.			
	7.	We reviewed my plan(s) using the review sheet.	7.			
	8.	We talked about if I was satisfied with my plan(s).	8.			
PLAN	9.	I set an activity goal.	9.			
	10.	Chosen topic: a. The dementia advice worker gave me information for my chosen topic.	10a.			

Second session activities continued				**Please tick**		
				Definitely happened	**Possibly happened**	**Didn't happen**
PLAN	10.	Chosen topic: b. We talked about my chosen topic in relation to me.	10b.			
	11.	We talked about and made at least one plan (including where, when, and how I will do the plan and who will help me).	11.			
	12.	We talked about things that will help and things that might get in the way of my plan(s).	12.			
	13.	If we identified problems, we talked about ways to solve them.	13.			
	14.	We wrote my plan(s) on the plan sheet.	14.			
DO	15.	The dementia advice worker showed me how to log how I am getting on with my plan(s) between sessions, using the 'do' calendar.	15.			
SUPPORT	16.	The dementia advice worker gave me positive feedback.	16.			
	17.	The dementia advice worker gave me the opportunity to ask questions and clarify issues.	17.			
	18.	The dementia advice worker gave me their contact details and ways to seek support.	18.			
NEXT STEP	19.	We set a time and date for the next session.	19.			
After the session				**Please tick**		
				Yes	**To some extent**	**No**
	20.	The information given to me in the session was clear and easy to understand.	20.			
	21.	I understand how to put my plan(s) into action.	21.			

Promoting Independence in Dementia (PRIDE): Your experiences. Final session.					
Site ID:	DAW ID:	Participant ID:	Date:		
Activities since the last session			**Please tick**		
			Yes	**To some extent**	**No**
	1. Since the last session, I have written my activities on the 'do' calendar.	1.			
	2. Since the last session, I have practiced and used the information and skills I learnt.	2.			
Session activities			**Please tick**		
			Definitely happened	**Possibly happened**	**Didn't happen**
REVIEW	3. We talked about how I have got on with my plan(s) since last session.	3.			
	4. We talked about things that helped and got in the way of me making progress.	4.			
	5. If we identified problems, we talked about ways to solve them.	5.			
	6. We talked about my plan(s) and made changes if needed.	6.			
	7. We reviewed my plan(s) using the review sheet.	7.			
	8. We talked about if I was satisfied with my plan(s).	8.			

Third session activities continued			**Please tick**		
			Definitely Happened	**Possibly Happened**	**Didn't happen**
PLAN: GOING FORWARD	9. We set a goal that I would like to continue working on.	9.			
	10. We talked about things that will help me and things that might get in the way of my plan(s).	10.			
	11. If we identified problems, we talked about ways to solve them.	11.			
	12. We wrote my plan(s) for going forward on the 'things to take forward' sheet.	12.			
SUPPORT	13. The dementia advice worker gave me positive feedback.	13.			
	14. The dementia advice worker gave me the opportunity to ask questions and clarify issues.	14.			
After the session			**Please tick**		
			Yes	**To some extent**	**No**
	15. The information given to me in the session was clear and easy to understand.	15.			
	16. I understand how to put my plan(s) into action.	16.			

Appendix 3-5. COTiD-UK intervention framework

COTiD-UK is an occupation based intervention that aims to promote independence, meaningful activity and quality of life for people with dementia (PwD) and their family carer (FC).

Framework	**Key targets**	**Key components***	**Skill / session**	**Target audience**		N/A
				PwD	FC (FS)	
Key information	Introductions	OT introduces themselves	Introduction	√	√	
		OT asks person with dementia how they want to be addressed	Introduction	√	√	
		OT asks family carer how they want to be addressed	Introduction	√	√	
	Explain what intervention involves	OT checks that the dyad has received the COTiD-UK home visits leaflet	Introduction	√	√	
		OT gives dyad a copy if not received - May be not applicable	Introduction	√	√	
		OT explains the home visits using the leaflet if applicable	Introduction	√	√	
		OT explains that the intervention will take place over 10 hours in 10 x one hour sessions	Introduction	√	√	
	Explain aim of sessions	Explain aim of current session	Summaries and goal-setting, Consultation and advice, Evaluation	√	√	
		Explain aim of future/next sessions	OPHI, Ethnographic interview, Summaries and goal-setting, Consultation and advice, Evaluation	OPHI √	Ethnographic √	
	Explain role boundaries	OT explains that they can support the partnership between them and family carer but cannot solve	Introduction, Summaries and goal-setting, Consultation and advice, Evaluation		√	
	Provision of information	OT provides information about the condition	Consultation and advice		√	
		OT provides information about behavioural features	Consultation and advice		√	
		OT provides information about potential support available	Consultation and advice		√	
Assessment and tailoring	Environment assessment	OT assesses home environment (Checklist) (NB cannot measure with recordings) - May be not applicable	Introduction and/or OPHI and Ethnographic	√		
	Activity assessment	OT completes Activity assessment (Checklist) (NB cannot measure with recordings) - May be not applicable	Introduction	√	√	
Analysis	Activity analysis	OT identifies the skills required to achieve the activity	Summaries and goal-setting	√	√	
	Environmental analysis	OT provides information about the causes of problems	Summaries and goal-setting	√	√	
		OT gives explanations for behaviour	Summaries and goal-setting	√	√	
		OT gives ideas for modifications	Summaries and goal-setting	√	√	
Communication	Questions	OT uses open questions when appropriate	OPHI, Ethnographic interview	√	√	

techniques		OT prompts the person to provide more details about their responses (can you explain a bit more, can you give me an example?)	OPHI, Ethnographic interview, Consultation and advice	√	√
		OT doesn't ask any questions that raises the person's anxiety (reverse coded in checklist – distress)	OPHI, Ethnographic interview	√	√
	Language	OT uses jargon/technical language (repeating words used, making use of metaphors)	OPHI, Ethnographic interview, Consultation and advice, Evaluation	√	√
	Search for meaning	OT asks about the feeling and meaning of situations and activities	OPHI, Ethnographic interview	√	√
	Summarise and seek confirmation	OT summarises the information provided by the person	OPHI, Ethnographic interview, Summaries and goal-setting	√	√
		OT checked they understood the information provided by the person	OPHI, Ethnographic interview, Summaries and goal-setting	√	√
	Balance in conversation	The family carer is able to express his/her reactions and feelings	Consultation and advice		√
	Interpretation	OT interprets the person's story (*?)	OPHI, Ethnographic interview, Summaries and goal-setting	√	√
	Reflect on own experiences	OT does not tell their own story (reverse coded – spoke about themselves)	OPHI, Ethnographic interview	√	√
	Offer solutions	OT does not offer any solutions (reverse coded – told the person what to do)	OPHI, Ethnographic interview	√	√
	Use objects	OT uses objects if appropriate	OPHI, Ethnographic interview	√	√
Intervention activities.	Support	OT gives the person with dementia the opportunity to speak (ask questions/give views)	Introduction; all	√	√
		OT gives the family carer the opportunity to speak (ask questions/give views)	Introduction; all	√	√
	Feedback	OT summarises the person with dementia's story (from OPHI)	Summaries and goal-setting	√	√
		OT summarises the family carer's story (What came out of the ethnographic interview)	Summaries and goal-setting	√	√
		OT summarises the occupational therapist's story (from activity and environment observations)	Summaries and goal-setting	√	√
	Goal setting	A SMART (specific, measureable, achievable, realistic, time) goal is created with the person with dementia	Summaries and goal-setting	√	
		A SMART (specific, measureable, achievable, realistic, time) goal is created with the carer	Summaries and goal-setting		√
		A joint SMART (specific, measureable, achievable, realistic, time) goal is created with the dyad	Summaries and goal-setting	√	√
		OT summarises the final list of goals agreed	Summaries and goal-setting	√	√
		OT explains that participants should start working on the goal	Summaries and goal-setting	√	√

		OT supports the family carer to formulate a goal using the How can you achieve that? formula	Consultation and advice		√
	Using activity	OT uses prepared cards with some important activities and possible goals identified through the OPHI and ethnographic interviews (Analysing potential activities)	Summaries and goal-setting	√	√
		OT uses blank cards to include new activities and goals that arise during the discussion (Analysing potential activities)	Summaries and goal-setting	√	√
		OT selects the best activity to engage the client (selecting appropriate activities)	Summaries and goal-setting	√	√
		OT produces a new activity to achieve the outcome (synthesising new activities)	Summaries and goal-setting	√	√
		OT changes the demands of an activity (e.g. changes tools equipment, material) (adapting chosen activities)	Summaries and goal-setting	√	√
		OT grades the activity (adapting chosen activities)- manipulates factors so that the activity becomes more difficult or easy – social, emotional, cognitive, perceptual or physical demands)	Summaries and goal-setting	√	√
		OT sequences the activity (adapting chosen activities) – The OT designs a sequence of different but related activities (to increase or decrease demand on participants) to suit the participants needs.	Summaries and goal-setting	√	√
	Environmental adaptation	OT recommends changes to the clients' environments (physical, cultural, institutional, and social) to influence motivation and help performance.	Summaries and goal-setting	√	√
	Operationalising goals	OT supports the family carer to think about potential actions	Consultation and advice		√
		OT supports the family carer to select an action	Consultation and advice		√
	Problem analysis	OT creates a problem analysis together with the family carer	Consultation and advice		√
	Summarise	OT summarises the activities	Consultation and advice		√
	Review goals	OT reviews behaviour goal(s) using COTiD-UK goal setting form	Evaluation	√	√
		OT uses the COTiD-UK goal setting form to record the goals	Evaluation	√	√
	Planning ahead.	OT helps the dyad to identify goals for addressing future needs	Evaluation	√	√
		OT supports the dyad in how to continue making progress without the OT	Evaluation	√	√
Administration	Future plans	OT checks dyad availability and books next visit(s)	Introduction/all sessions	√	√
		OT explained what will happen next	Evaluation	√	√
		OT reminds dyad of 12 week follow up and not to tell researcher that they received the COTiD-UK intervention	Evaluation	√	√

Appendix 3-6. COTiD-UK coding guidelines

COTiD-UK Intervention: Fidelity checklist coding guidelines

About the checklists

The checklists represent the 7 key skill sessions delivered in the VALID Intervention:

1) Introduction
2) OPHI Interview
3) Ethnographic interview
4 & 5) Summaries and Goal setting (2 sessions, combined, as many occupational therapists deliver these in the same session)
6) Consultancy and advice
7) Evaluation

These checklists detail what appointment activities the occupational therapists should have delivered in each session.

Each checklist has a series of appointment activities. Some activities happen in every session, whereas others are unique to one session only.

Abbreviations

OT= Occupational therapist

OPHI interview = Occupational performance history interview

COTiD-UK = Community occupational therapy in dementia UK

SMART goal = Specific, measurable, achievable, realistic and timed goal

Transcription codes

T = Occupational therapist

P = Participant

C = Family carer

How do I fill out the checklists?

Please:

- Read through the coding guidelines
- Read through the table guidelines for the session that you are working on to familiarise yourself with the session outline
- Read the transcript once all the way through to familiarise yourself with it
- Read the transcript again
- Record the set number, date that you are completing the checklist and your initials on the top of the checklist
- Go through the checklist appointment activities one by one
- Use track changes and comments function to add a code (intervention activity) to the transcript (word document) to demonstrate evidence for each appointment activity.
- The same evidence can be used to support more than one appointment activity.
- Please also add comments about the strength of the evidence (this will be helpful when deciding to what extent it has been delivered and for discussions between coders).
- For each skill and for every item on the checklist, please tick whether it was:
    - **Done**
    - **Done to some extent**
    - **Not done**

Delivered in a different session

- After coding all skill sessions, please go back through the components that were **'not done'** and check if these have been delivered in any other session. If so, please tick 'delivered in a different session' and write the number of the skill session that it was delivered in.
    - Note: This is only applicable if a component is specific to one session only. If skills are more general and should be delivered in more than one skill session (e.g. explaining the aim/communication skills) this should not be coded.
    - Please do not code if 'done to some extent' in a different session

More than one skill delivered in one session

- If more than one skill has been delivered in one session, please split the transcript into the two skills and code the corresponding checklists accordingly. For example: if Introduction and OPHI skills are combined, please code the introduction checklist up to the beginning of the OPHI session.
- In these cases, if components apply to both sessions (e.g. setting the date of the next session) please code done for both.

How do I decide which score to give?

- Please choose **'done'** if all aspects of the activity have clearly been delivered
- Please choose **'done to some extent'** if the activity has been partially delivered, or if you think that the OT needed to do more.

  For example:

  "Explained that they can offer support but cannot solve problems", if the OT has explained that they are there to offer support, but have not told the dyad that they cannot solve the problems for them then this would be 'done to some extent'.

  "Helped the person with dementia to create a SMART goal". If the OT helped the person to create a goal, but it only met some of the SMART criteria, e.g. that it was specific and measurable, but not achievable, realistic or timed, choose 'done to some extent'

- Please choose **'not done'** if there is no evidence throughout the transcript that this has been delivered to the dyad or if this was not necessary.

  For example:

  "Prompted the family carer to identify solutions for these problems". If there is no evidence throughout the transcript that the family carer was helped to identify solutions for problems which they identified, choose 'not done'.

- If you think that any component is **not applicable**, please choose 'not done' and write 'N/A' in the box.

What are the criteria for scoring intervention components?

Please see the below tables (one per session) for a list of appointment activities, along with their definitions, scoring instructions, and rationale for choosing 'done', 'done to some extent' and 'not done' for each session.

Please ensure that you are looking at the correct session coding guidelines.

Saving the coded transcripts and checklists

Please save the files with _ [your initials] and date at the end. For example: Setx checklists _HW 01092016 and Set x – Skill x_ HW 01092016

Please return the saved transcripts and checklists to me before we meet to discuss discrepancies.

Coding guidelines for Session 1: Introduction				
Framework component	**Appointment activity**	**Definition (if needed)**	**Scores**	**Rationale for scores**
Introduction	1. Introduced themselves. Note: OT may have already have introduced their name before recording.	Introduction should include their name, professional role (occupational therapist) and role as part of the VALID research programme	**Done**	OT gave their name, professional role and role as part of the VALID research programme
			Done to some extent	OT gave 1 or 2 of the three introduction criteria (name, professional role or role as part of VALID programme)
			Not done	OT did not give their name, professional role or role as part of the VALID programme
	2. Asked the person with dementia how they want to be addressed.	(Appointment activity self-explanatory)	**Done**	OT asked the person with dementia how they would like to be addressed
			Not done	OT did not ask the person with dementia how they would like to be addressed
	3. Asked the family carer how they want to be addressed.	(Appointment activity self-explanatory)	**Done**	OT asked the family carer how they would like to be addressed
			Not done	OT did not ask the family carer how they would like to be addressed
Key information	4. Checked that the dyad had received the COTiD-UK home visits leaflet.	(Appointment activity self-explanatory)	**Done**	OT checked whether the leaflet has been received
			Not done	OT did not check
	4a. If not received, gave the dyad a copy.	Conditional on previous activity – provided copy of leaflet if do not have. **Note:** If already received, score not done and write not applicable.	**Done**	OT gave dyad a copy
			Not done	OT did not give dyad a copy, Or Dyad already had a copy and it was not necessary to give one (can also make a note that Not applicable)
	5. Explained the home visits using the leaflet. Note: Cannot tell if using leaflet, therefore code content, **using leaflet**	Explaining the home visits includes giving information about: - What is occupational therapy? - What do occupational therapists do? - What are the home visits? - What happens next? (Note: Assume that this happens before the session – assume done)	**Done**	OT gave information about all four topics.
			Done to some extent	OT gave information about 2 or 3 of the topics.
			Not done	OT gave information about 0 or 1 of the topics.
	6. Explained that the intervention will take place in 10 x one hour sessions.	Explained the number and duration of sessions (e.g. 10 one hour sessions)	**Done**	OT explained the number and duration (10 one hour sessions)
			Done to some extent	OT explained the number of sessions Or OT explained the duration of sessions
			Not done	OT did not explain the number or duration of sessions

	7. Described what will happen in future sessions.	Future sessions include: Interview with person with dementia (OPHI interview), interview with family carer (ethnographic interview), summaries and goal-setting, consultation and advice and evaluation) • **Interview with person with dementia (OPHI):** This involves a chat with the person with dementia to gain information about their life story. • **Interview with family carer (Ethnographic)**: This session involves a chat with the family carer to gain information about their life story • **Summaries and goal setting:** This session involves the OT summarising the information gathered in the OPHI and ethnographic interviews and also their own observations from assessments and then using this information to help the dyad set goals to work on throughout the programme • **Consultation and advice**: This session involves a chat with the family carer to work out what is working well and what is not working and to support the family carer to think about how to achieve those goals. • **Evaluation:** This session consists of reviewing the behavioural goals and helping the dyad to identify ways to continue making progress after the programme. (For example: The OT talks about seeing them both individually to find out about their stories, observing a task, observing the environment, coming back together to draw on goals and work on those that have been developed).	**Done**	OT described what will happen in all future sessions
			Done to some extent	OT described what will happen in some future sessions
			Not done	OT did not describe what will happen in any future sessions
	8. Explained that they can offer support to the dyad but cannot solve their problems for them.	Explained that they are able to offer support (or help the dyad) but cannot solve the dyad's problems for them. Note: If the OT makes it clear in the session that they are supporting/helping the dyad and not telling them what to do, can code	**Done**	OT explained that they can support the partnership between the dyad but cannot solve problems
			Done to some extent	OT explained that they can support but did not explain they cannot solve problems Or OT explained they cannot solve problems but did not explain that they can support the partnership,
			Not done	OT did not explain they can support but cannot solve problems
Assessment	9. Assessed the home environment and	Assessing the home environment is when the OT looks around the home environment and assesses it. Talking/Asking about the environment is	**Done**	OT assessed the home environment and recorded this on the COTiD-UK checklist

	recorded this on the checklist. Note: Cannot tell if recording on checklists therefore code content	not sufficient. But, if there is evidence that the OT goes to do a home assessment this can be coded (for example: ‘I will just have a look around your home’) **Measured using OT checklist (+ JB advice)**	**Done to some extent**	OT assessed some but not all of the home environment Or OT assessed home environment but did not record it on the checklist
			Not done	OT did not conduct a home assessment
	10. Completed the activity assessment and recorded this on the checklist. Note: Cannot tell if recording on checklists therefore code content	An activity assessment is when the OT observes and assesses the person doing an activity) with the person. **Measured using OT checklist**	**Done**	OT completed an activity assessment and recorded this on the COTiD-UK checklist
			Done to some extent	OT completed the activity assessment but did not record it on the checklist
			Not done	OT did not complete an activity assessment
Support	11. Prompted the person with dementia to speak	Prompted the person with dementia to speak, for example: ask questions or give views. **Note:** If person with dementia speaks a lot without prompting, choose ‘not done and write N/A’ Note: This is different from ‘prompting for more information’. This component refers more to whether the participant has asked the participant if they have any questions (e.g. at the end of the session), or for more information on their views on decisions E.g. ‘Do you have any questions?’/’What’s your views on that?’ Note: If one example of stopping speaking (to move the session on), can still code ‘done’, code ‘done to some extent’ if multiple examples of stopping speaking.	**Done**	OT prompted person with dementia to speak on **most appropriate occasions**
			Done to some extent	OT prompted person with dementia to speak on some but not all appropriate occasions
			Not done	OT did not prompt person with dementia to speak
	12. Prompted the family carer to speak	Prompted the family carer to speak, for example: ask questions or give views. **Note:** If family carer speaks a lot without prompting, choose ‘not done and write N/A’ Note: This is different from ‘prompting for more information’. This component refers more to whether the participant has asked the participant if they have any questions (e.g. at the end of the session), or for more information on their views on decisions E.g. ‘Do you have any questions?’/’What’s your views on that?’ Note: If one example of stopping speaking (to move the session on), can still code ‘done’, code ‘done to some extent’ if multiple examples of stopping speaking.	**Done**	OT prompted family carer to speak on **most appropriate occasions**
			Done to some extent	OT prompted family carer to speak on some but not all appropriate occasions
			Not done	OT did not prompt family carer to speak
Next step	13. Described what will	The OT described what will happen in the next session (OPHI interview,	**Done**	OT described what will happen in the next session

happen in the next session.	or home environment observation or activity observation) - **OPHI interview**: This involves a chat with the person with dementia to gain information about their life story. If skills 1 and 2 are delivered in the same session, choose not done (N/A) and code for skill 2 only	**Done to some extent**	OT gave a session label but does not describe what will happen in the next session
		Not done	OT did not describe what will happen in the next session
14. Checked the dyad's availability and booked next visit(s). Note: If any indication that this has happened, can code.	The OT checked when the dyad would be available for the next visit and arranged the next visit. If skills 1 and 2 are delivered in the same session, choose not done (N/A) and code for skill 2 only	**Done**	OT checked when the dyad would be available for the next visit and arranged the next visit
		Done to some extent	OT checked when the dyad would be available but did not arrange the next visit Or OT arranged the next visit but did not check the dyad were available
		Not done	OT did not check when the dyad would be available or arrange the next visit

Coding guidelines for Session 2: OPHI interview

Framework component	Appointment activity	Definition	Scores	Rationale for scores
Key information	1. Described what will happen in the current session.	Described what will happen in the current session (OPHI interview, or home observation or activity observation, or ethnographic interview) • **OPHI interview:** This involves a chat with the person with dementia to gain information about their life story.	**Done**	OT described what will happen in the current session
			Done to some extent	OT gave a session label but does not describe what will happen in the current session
			Not done	OT did not describe what will happen in the current session
Assessment	2. Assessed the home environment and recorded this on the checklist. Note: Cannot tell if recording on checklists therefore code content	Assessing the home environment is when the OT looks around the home environment and assesses it. Talking/Asking about the environment is not sufficient. But, if there is evidence that the OT goes to do a home assessment this can be coded (for example: ‘I will just have a look around your home’). **Measured using OT checklist (+ JB advice)** **If you have coded ‘done’ for this component in first session, choose not done (N/A)**	**Done**	OT assessed the home environment and recorded this on the COTiD-UK checklist
			Done to some extent	OT assessed some but not all of the home environment. Or OT assessed home environment but did not record it on the checklist
			Not done	OT did not conduct a home assessment
Communication techniques	3. Used open ended questions. *Note: Use OPHI cards for scoring this	OT used open questions to ask about the person with dementia’s: - Daily routine - Role - Environment - Leisure - Activity/occupational choices - Critical life events Note: questions must be open questions An open question is a question that cannot have a ‘yes/no answer’. For example. ‘Did you enjoy x?’ would be a closed question, but ‘How did you find doing x?’ would be an open question.	**Done**	OT used open questions to ask about at least 5 topics
			Done to some extent	OT used open questions to ask about 2-4 topics
			Not done	OT used open questions to ask about none or one topic.
	4. Prompted the person with dementia to provide more details about their responses.	When participants have provided an answer to a question, the OT has asked a further question to prompt the participant to go into more details about their answer. For example: ‘Can you explain a bit more?’ ‘Could you give me an example?’ Note these prompts can be subtle, for example: if the OT asks questions to prompt more information from a certain topic.	**Done**	OT asked for more details when appropriate most of the time
			Done to some extent	OT asked for more details **sometimes but not always**,
			Not done	OT **did not ask for** more details
	5. Asked questions which caused distress (*)	Questions which cause distress refer to those topics or issues that may cause undue distress to either the person, family carer or OT. Could include the continued questioning of sensitive topics, for	**Done**	OT asked questions which caused distress and continued questioning the person with dementia or family carer about sensitive topics.

		example bereavement.	**Not done**	OT did not ask distressing questions
6.	Used jargon or technical language (*)	Jargon or technical language is unexplained terminology which may not be understandable to members of the general public. This includes OT terminology. For example: ‘graded’/’environmental assessment’, ‘SMART goal’, ‘OPHI’, ‘problem analysis’ ‘action planning’, ‘activity synthesis’ or condition specific terms/terminology	**Done**	OT **used** jargon or technical language 4 or more times
			Done to some extent	OT **used** jargon or technical language 2-3 times
			Not done	OT **did not use** jargon or technical language.
7.	Asked the person with dementia to explain what the meaning of situations and activities were.	OT asks the person to explain what it means to them to do a certain activity or be in a certain situation (e.g. can you tell me what doing x means to you?’). Example: The OT asks ‘How does it make you feel when you do some gardening?’ Can be either general or specific activities	**Done**	OT asked questions on the meaning of most activities or situations
			Done to some extent	OT asked questions on the meaning of some activities or situations
			Not done	OT did not ask questions on the meaning of activities or situations
8.	Summarised the information provided by the person with dementia.	Throughout the session, the OT summarised the information provided by the person with dementia by putting the information into their own words Example: ‘So you have told me that you garden two times a week and that you enjoy it’	**Done**	OT summarised the information provided by the person with dementia 4 or more times
			Done to some extent	OT summarised the information provided by the person with dementia 1-3 times
			Not done	OT did not summarise the information provided by the person with dementia
9.	Interpreted the information provided by the person with dementia (*)	The OT interpreted (made an inference or assumption) the information based on what they think that the person with dementia is saying e.g. ‘what I think you mean is…’ Example: (After the person says they like gardening), the OT says: ‘I’m guessing that you are an outdoor person’	**Done**	OT interpreted the information provided by the person with dementia more than 4 times
			Done to some extent	OT interpreted the information provided by the person with dementia 3 or 4 times
			Not done	OT did not interpret the information or interpreted the information less than two times
10.	Checked that they understood the information provided by the person with dementia.	The OT asks the person with dementia if they understood the information correctly e.g. ‘Is that right?’ ‘Did I understand that correctly?’ Example: (After the person says they like gardening), the OT says: ‘Am I right in thinking that you enjoy gardening?’	**Done**	OT checked that they understood the information provided by the person with dementia 4 or more times
			Done to some extent	OT checked they understood the information provided by the person with dementia 2-3 times
			Not done	OT did not check they understood the information provided by the person with dementia or checked the information provided by the person with dementia once
11.	Spoke about	The OT told the person with dementia about their own life. (e.g. ‘I	**Done**	OT spoke about themselves in detail more than 4 times

		themselves. (*)	always quite enjoyed doing x, until…’). This must be more than just a natural response to a remark, e.g. (P: I like chocolate, OT: Me too!).	**Done to some extent**	OT spoke about themselves in detail 3 to 4 times
				Not done	OT did not speak about themselves or spoke about themselves less than two times
	12.	Told the person with dementia what to do. (*)	The OT told the participants what to do rather than helping them to decide what to do for themselves e.g. ‘you should do this…’	**Done**	OT told the person with dementia what to do
				Not done	OT did not tell the person what to do
	13.	Used visual objects found in the person with dementia’s home to gather information (E.g. photos, garden, sewing, cakes, and paintings).	Visual objects could include photos, gardens, sewing, cakes, and paintings. The OT prompted/led the use of the person with dementia’s objects or used objects to gather information if the opportunity comes up (e.g. participant shows object to OT).	**Done**	OT prompted the use of objects in conversation to gather information
				Done to some extent	OT initiates but does not facilitate the use of objects Or OT facilitates but does not initiate the use of objects
				Not done	OT did not use objects
Support	14.	Prompted the person with dementia to speak.	Prompted the person with dementia to speak, for example: ask questions or give views. Note: If person with dementia speaks a lot without prompting, choose ‘not done and write N/A’ Note: This is different from ‘prompting for more information’. This component refers more to whether the participant has asked the participant if they have any questions (e.g. at the end of the session), or for more information on their views on decisions E.g. ‘Do you have any questions?’/’What’s your views on that?’ Note: If one example of stopping speaking (to move the session on), can still code ‘done’, code ‘done to some extent’ if multiple examples of stopping speaking.	**Done**	OT prompted person with dementia to speak on **most appropriate occasions**
				Done to some extent	OT prompted person with dementia to speak on some but not all appropriate occasions
				Not done	OT did not prompt person with dementia to speak
Next steps	15.	Described what will happen in the next session.	Described what will happen in the next session (E.g. Ethnographic interview, activity observation, environment observation) • **Ethnographic interview:** This session involves a chat with the family carer to gain information about their life story	**Done**	OT described what will happen in the next session
				Done to some extent	OT gave a session label but does not describe what will happen in the next session
				Not done	OT did not describe what will happen in the next session
	16.	Checked the dyad’s availability and	The OT checked when the dyad would be available for the next visit and arranged the next visit.	**Done**	OT checked when the dyad would be available for the next visit and arranged the next visit

booked next visit(s). Note: If any indication that this has happened, can code.		**Done to some extent**	OT checked when the dyad would be available but did not arrange the next visit Or OT arranged the next visit but did not check the dyad were available
		Not done	OT did not check when the dyad would be available or arrange the next visit

Coding guidelines for Session 3: Ethnographic interview

Framework component	Appointment activity	Definition	Scores	Rationale for scores
Key information	1. Described what will happen in the current session.	Described what will happen in the current session (Ethnographic interview, activity observation, environmental observation) • **Ethnographic interview:** This session involves a chat with the family carer to gain information about their life story	**Done**	OT described what will happen in the current session
			Done to some extent	OT gave a session label but does not describe what will happen in the current session
			Not done	OT did not describe what will happen in the current session
Assessment	2. Assessed the home environment and reported it on the checklist. Note: Cannot tell if recording on checklists therefore code content	Assessing the home environment is when the OT looks around the home environment and assesses it. Talking/Asking about the environment is not sufficient. But, if there is evidence that the OT goes to do a home assessment this can be coded (for example: 'I will just have a look around your home'). **Measured using OT checklist. (+ JB advice)** **If you have coded 'done' for this component in first session, choose not done (N/A)**	**Done**	OT assessed the home environment and recorded this on the COTiD-UK checklist
			Done to some extent	OT assessed some but not all of the home environment. Or OT assessed home environment but did not record it on the checklist
			Not done	OT did not conduct a home assessment
Communication techniques	3. Used open ended questions. *Note: Use ethnographic cards for scoring this	OT used open questions to ask about the family carer's: - Experiences - Current support and help - Experience of carrying out own activities - Experiences relating to daily schedule - Experiences relating to home environment - Dealing with the person with dementia's behaviour/coping strategies Note: questions must be open questions An open question is a question that cannot have a 'yes/no answer'. For example. 'Did you enjoy x?' would be a closed question, but 'How did you find doing x?' would be an open question.	**Done**	OT used open questions to ask about at least 5 topics
			Done to some extent	OT used open questions to ask about 2-4 topics
			Not done	OT used open questions to ask about none or one topic.
	4. Prompted the family carer to provide more details about their responses.	When the family carer provides an answer to a question, the OT has asked a further question to prompt the participant to go into more details about their answer. For example: 'Can you explain a bit more?' 'Could you give me an example?' **Note:** these prompts can be less subtle than this, for example if the OT	**Done**	OT asked for more details when appropriate most of the time
			Done to some extent	OT asked for more details **sometimes but not always**,

		asks questions to prompt more information from a certain topic.	**Not done**	OT **did not ask for** more details
5.	Asked questions which caused distress. (*)	Questions which cause distress refer to those topics or issues that may cause undue distress to either the person, family carer or OT. Could include the continued questioning of sensitive topics, for example bereavement.	**Done**	OT asked questions which caused distress and continued questioning the person with dementia or family carer about sensitive topics.
			Not done	OT did not ask distressing questions
6.	Used jargon or technical language. (*)	Jargon or technical language is unexplained terminology which may not be understandable to members of the general public. This includes OT terminology. For example: ‘graded’/’environmental assessment’, ‘SMART goal’, ‘OPHI’, ‘problem analysis’ ‘action planning’, ‘activity synthesis’ or condition specific terms/terminology	**Done**	OT **used** jargon or technical language 4 or more times
			Done to some extent	OT **used** jargon or technical language 2-3 times
			Not done	OT **did not use** jargon or technical language.
7.	Asked the family carer to explain what the meaning of situations and activities were.	OT asks the person to explain what it means to them to do a certain activity or be in a certain situation (e.g. can you tell me what doing x means to you?’). Example: The OT asks ‘How does it make you feel when you do some gardening?’ Can be either general or specific activities	**Done**	OT asked questions on the meaning of most activities or situations
			Done to some extent	OT asked questions on the meaning of some activities or situations
			Not done	OT did not ask questions on the meaning of activities or situations
8.	Summarised the information provided by the family carer.	Throughout the session, the OT summarised the information provided by the family carer by putting the information into their own words Example: ‘So you have told me that you garden two times a week and that you enjoy it’	**Done**	OT summarised the information provided by the family carer 4 or more times
			Done to some extent	OT summarised the information provided by the family carer 1-3 times
			Not done	OT did not summarise the information provided by the family carer
9.	Interpreted the information provided by the family carer (*)	The OT interpreted (made an inference or assumption) the information based on what they think that the family carer is saying e.g. ‘what I think you mean is…’ Example: (After the person says they like gardening), the OT says: ‘I’m guessing that you are an outdoor person’	**Done**	OT interpreted the information provided by the family carer more than 4 times
			Done to some extent	OT interpreted the information provided by the family carer 3 or 4 times
			Not done	OT did not interpret the information or interpreted the information less than two times
10.	Checked that they understood the information provided by the family carer.	The OT asks the family carer if they understood the information correctly e.g. ‘Is that right?’ ‘Did I understand that correctly?’ Example: (After the person says they like gardening), the OT says: ‘Am I right in thinking that you enjoy gardening?’	**Done**	OT checked that they understood the information provided by the family carer 4 or more times
			Done to some extent	OT checked they understood the information provided by the family carer 2-3 times

			Not done	OT did not check they understood the information provided by the family carer or checked the information provided by the family carer once
	11. Spoke about themselves. (*)	The OT told the family carers about their own life. (e.g. ‘I always quite enjoyed doing x, until…’). This must be more than just a natural response to a remark, e.g. (P: I like chocolate, OT: Me too!).	**Done**	OT spoke about themselves in detail more than 4 times
			Done to some extent	OT spoke about themselves in detail 3 to 4 times
			Not done	OT did not speak about themselves or spoke about themselves less than two times
	12. Told the family carer what to do. (*)	The OT told the family carer what to do rather than helping them to decide what to do for themselves e.g. ‘you should do this…’	**Done**	OT told the person what to do
			Not done	OT did not tell the person what to do
	13. Used visual objects found in the family carer’s home to gather information (E.g. photos, garden, sewing, cakes, paintings).	Visual objects could include photos, gardens, sewing, cakes, and paintings. The OT prompted/led the use of participants’ objects or used objects to gather information if the opportunity comes up (e.g. participant shows object to OT).	**Done**	OT prompted the use of objects in conversation to gather information
			Done to some extent	OT initiates but does not facilitate the use of objects Or OT facilitates but does not initiate the use of objects
			Not done	OT did not use objects
Support	14. Prompted the family carer to speak.	Prompted the family carer to speak, for example: ask questions or give views. **Note:** If family carer speaks a lot without prompting, choose ‘not done and write N/A’ Note: This is different from ‘prompting for more information’. This component refers more to whether the participant has asked the participant if they have any questions (e.g. at the end of the session), or for more information on their views on decisions E.g. ‘Do you have any questions?’/’What’s your views on that?’ Note: If one example of stopping speaking (to move the session on), can still code ‘done’, code ‘done to some extent’ if multiple examples of stopping speaking.	**Done**	OT prompted family carer to speak on **most appropriate occasions**
			Done to some extent	OT prompted family carer to speak on some but not all appropriate occasions
			Not done	OT did not prompt family carer to speak
Next steps	15. Described what will happen in the next session.	Described what will happen in the next session (Summaries and goal setting) • **Summaries and goal setting**: This session involves the OT	**Done**	OT described what will happen in the next session
			Done to some extent	OT gave a session label but does not describe what will happen in the next session

	summarising the information gathered in the OPHI and ethnographic interviews and also their own observations from assessments and then using this information to help the dyad set goals to work on throughout the programme	**Not done**	OT did not describe what will happen in the next session
16. Checked the dyad's availability and booked next visit(s). Note: If any indication that this has happened, can code.	The OT checked when the dyad would be available for the next visit and arranged the next visit.	**Done**	OT checked when the dyad would be available for the next visit and arranged the next visit
		Done to some extent	OT checked when the dyad would be available but did not arrange the next visit Or OT arranged the next visit but did not check the dyad were available
		Not done	OT did not check when the dyad would be available or arrange the next visit

Coding guidelines for Session 4/5: Summaries and goal setting				
Framework component	**Appointment activity**	**Definition**	**Scores**	**Rationale for scores**
Key information	1. Described what will happen in the current session.	Described what will happen in the current session - Summaries and goal setting: This session involves the OT summarising the information gathered in the OPHI and ethnographic interviews and also their own observations from assessments and then using this information to help the dyad set goals to work on throughout the programme	**Done**	OT described what will happen in the current session
			Done to some extent	OT gave a session label but does not describe what will happen in the current session
			Not done	OT did not describe what will happen in the current session
Feedback	2. Summarised the information provided in the interview with the person with dementia.	Throughout the session, the OT summarised the information from the interview with the person with dementia by putting the information into their own words Example: 'So you have told me that you garden two times a week and that you enjoy it'	**Done**	OT summarised the information provided by the person with dementia 4 or more times
			Done to some extent	OT summarised the information provided by the person with dementia 1-3 times
			Not done	OT did not summarise the information provided by the person with dementia
	3. Checked that they understood the information provided by the person with dementia.	OT checks throughout the session if they have understood the information summarised from the interview with the person with dementia correctly e.g. 'Is that right?' 'Did I understand that correctly?' Example: (After the person says they like gardening), the OT says: 'Am I right in thinking that you enjoy gardening?'	**Done**	OT checked that they understood the information provided by the person with dementia 4 or more times
			Done to some extent	OT checked they understood the information provided by the person with dementia 2-3 times
			Not done	OT did not check they understood the information provided by the person with dementia or checked the information provided by the person with dementia once
	4. Summarised the information provided in the interview with the family carer.	Throughout the session, the OT summarised the information from the interview with the family carer by putting the information into their own words Example: 'So you have told me that you garden two times a week and that you enjoy it'	**Done**	OT summarised the information provided by the family carer 4 or more times
			Done to some extent	OT summarised the information provided by the family carer 1-3 times
			Not done	OT did not summarise the information provided by the family carer.
	5. Checked that they understood the information provided by the family carer.	OT checks throughout the session if they have understood the information summarised from the interview with the family carer correctly e.g. 'Is that right?' 'Did I understand that correctly?' Example: (After the person says they like gardening), the OT says: 'Am I right in thinking that you enjoy gardening?'	**Done**	OT checked that they understood the information provided by the family carer 4 or more times
			Done to some extent	OT checked they understood the information provided by the family carer 2-3 times

			Not done	OT did not check they understood the information provided by the person with dementia or checked the information provided by the family carer once
	6. Summarised their own views from observations and assessments.	Summarised their own views from the observations and assessments (e.g. activity/home assessments) and **not information gathered in the interviews.** The OT should provide details about the home assessment/activity assessment and other relevant aspects e.g. challenges/achievements	**Done**	OT gave a detailed summary of their own views from the observations or assessments
			Done to some extent	OT gave a brief summary of their own views from the observations or assessments
			Not done	OT did not summarise their own view
Activity selection	7. Discussed potential activities using prepared cards which listed activities and possible goals. Note: Cannot tell if using cards, code if OT analyses potential activities	This refers to whether the OT has used activity cards to discuss potential types of activities that the dyad could engage in	**Done**	OT discussed potential activities with the dyad
			Not done	OT did not discuss potential activities with the dyad
Goal setting	8. Set at least one individual or joint goal for the person with dementia and family carer	Goals will specify an activity that they would like to work on. Goals can be aimed at the person with dementia, family carer or dyad. Setting a goal includes specifying on the form who the goal is set by and what the goal is Goals should be reported by the OT on the goal setting form. Code this component based on whether there is evidence of a goal been set on the goal setting form.	**Done**	Set at least one individual or joint goal for the person with dementia and family carer (including who the goal was set by and what the goal is)
			Done to some extent	Set a goal but did not specify either who the goal was set by or what the goal is
			Not done	Did not set a goal for the person with dementia and family carer
	9. Developed these goals into SMART goals	A SMART goal has the following criteria: - Specific (what, with, who, where, and when) - Measurable (specifies how progress is measured)	**Done**	Developed at least one goal that meets **all** 5 SMART criteria and at least 3 specific criteria.
			Done to some extent	OT and the participant developed a goal that meets **2-4** of the SMART criteria and at least 2 specific criteria

		- Achievable (explicit outcome is mentioned) - Realistic - Timed (by when) SMART can be discussed with family carer or created and reported on goal setting form by OT. ***Can be supported with information from goal setting form**	**Not done**	Did not develop a goal that included none or one of the SMART criteria.
Activity adaptation	10. Adapted the activities to suit participants' needs Note: Only code if goals have been set	To adapt an activity, OTs may have identified an easily achievable activity, broken down the activity to identify the skills required, graded the activity (made it easier or more difficult), adapted the activity (equipment or materials) or designed a sequence of activities.	**Done**	OT adapted the activity/activities to suit participants needs
			Done to some extent	OT adapted the activity/activities but it is not clear whether it is to suit participants needs
			Not done	OT and the participant did not adapt an activity
Environmental adaptation	11. Provided information about the environmental barriers for the dyad.	OT provides information about environmental barriers for the dyad that have been discussed in sessions/observed in assessments Environmental barriers can be barriers in the community or home.	**Done**	OT provided information about the environmental barriers for the dyad
			Done to some extent	OT provided information about the environmental barriers but barriers were not specific to the dyad
			Not done	OT did not provide information about the environmental barriers
	12. Recommended changes to the dyads' environment.	This refers to the OT making suggestions of ways that the dyad could change the physical, social, institutional environment. **Note**: If observational assessment has been carried out and no recommendations are made, can code not applicable. (Jane to look at checklist and let us know if observational assessment has been conducted)	**Done**	OT recommended changes to the dyads' environment
			Not done	OT did not recommend changes to the dyads' environment
Summary	13. Summarised the final list of agreed goals.	The OT summarised the goals that the dyad have set in this session. **Note:** If summarising areas of goals this can be coded.	**Done**	OT summarised all goals that have been set
			Done to some extent	OT summarised some but not all goals
			Not done	OT did not summarise the goals that were set.
	14. Told participants that they could start to carry out activities to meet the goals.	The OT told or encouraged participants to begin carrying out activities to meet the goals	**Done**	OT told dyad they can start to do the activities to meet the goals
			Not done	OT did not tell the dyad that they can start to work on the goals.

Support	15. Prompted the person with dementia and family carer to speak.	Prompted the person with dementia and family carer to speak, for example: ask questions or give views. **Note:** If person with dementia and family carer speak a lot without prompting, choose ‘not done and write N/A’ Note: This is different from ‘prompting for more information’. This component refers more to whether the participant has asked the participant if they have any questions (e.g. at the end of the session), or for more information on their views on decisions E.g. ‘Do you have any questions?’/’What’s your views on that?’ Note: If one example of stopping speaking (to move the session on), can still code ‘done’, code ‘done to some extent’ if multiple examples of stopping speaking.	**Done**	OT prompted person with dementia and family carer to speak on **most appropriate occasions**
			Done to some extent	OT prompted person with dementia and family carer to speak on some but not all appropriate occasions
			Not done	OT did not prompt person with dementia and family carer to speak
Next steps	16. Described what will happen in the next session.	Described what will happen in the next session (Consultation and advice), or whatever skill session the OT are providing next. • **Consultation and advice:** This session involves a chat with the family carer to work out what is working well and what is not working and to support the family carer to think about how to achieve those goals.	**Done**	OT described what will happen in the next session
			Done to some extent	OT gave a session label but does not describe what will happen in the next session
			Not done	OT did not describe what will happen in the next session
	17. Checked the dyad’s availability and booked next visit(s). Note: If any indication that this has happened, can code.	The OT checked when the dyad would be available for the next visit and arranged the next visit.	**Done**	OT checked when the dyad would be available for the next visit and arranged the next visit
			Done to some extent	OT checked when the dyad would be available but did not arrange the next visit Or OT arranged the next visit but did not check the dyad were available
			Not done	OT did not check when the dyad would be available or arrange the next visit

Coding guidelines for Session 6: Consultation and advice

Framework component	Appointment activity	Definition	Scores	Rationale for scores
Key information	1. Described what will happen in the current session.	Described what will happen in the current session (Consultation and advice) • **Consultation and advice:** This session involves a chat with the family carer to work out what is working well and what is not working and to support the family carer to think about how to achieve those goals.	**Done**	OT described what will happen in the current session
			Done to some extent	OT gave a session label but does not describe what will happen in the current session
			Not done	OT did not describe what will happen in the current session
	2. Explained that they can offer support to the dyad but cannot solve their problems for them.	Explained that they are able to offer support (or help the dyad) but cannot solve the dyad's problems for them. Note: If the OT makes it clear in the session that they are supporting/helping the dyad and not telling them what to do, can code	**Done**	OT explained that they can support the partnership between the dyad but cannot solve problems
			Done to some extent	OT explained that they can support but did not explain they cannot solve problems Or OT explained they cannot solve problems but did not explain that they can support the partnership,
			Not done	OT did not explain they can support but cannot solve problems
Operationalising goals	3. Prompted family carer to select an action to help them achieve their goals	Prompted the family carer to select an action to help them achieve their goals. This could include thinking about what they can do to achieve goals and choosing an action to work on	**Done**	OT prompted the family carer to think about what they can do to achieve their goals and choose an action
			Done to some extent	OT prompted the family carer to think about what they can do to achieve the goals but not to choose an action Or OT prompted the family carer to choose an action but did not discuss whether this would help them to achieve their goals
			Not done	OT did not prompt the family carer to think about what they can do to achieve the goals or choose an action
Problem analysis	4. Prompted the family carer to identify things that have helped the dyad to do their activity/activities.	Prompted the family carer to talk about things that have helped them to do the activity. Note: As long as things that helped are discussed (either initiated by OT or family carer), can be coded.	**Done**	OT prompted the family carer to identify things that helped them to do the activity/activities
			Not done	OT did not prompt the family carer to identify things that helped them to do the activity/activities
	5. Prompted the family carer to identify	Prompted the family carer to talk about barriers that prevented the dyad from doing their activity/activities	**Done**	OT prompted the family carer to identify barriers that prevented the dyad from doing the activity/activities

		barriers that prevented the dyad from doing their activity/activities	Note: As long as barriers are discussed (either initiated by OT or family carer), can be coded.	**Not done**	OT did not prompt the family carer to identify barriers that prevented the dyad from doing the activity/activities
	6.	Prompted the family carer to identify solutions for these problems.	Prompted the family carer to identify specific solutions for goals that haven't been achieved, or general solutions to general problems. Note: As long as solutions are discussed (either initiated by OT or family carer), can be coded.	**Done**	Prompted the family carer to identify solutions
				Not done	Did not prompt the family carer to identify solutions
Key information	7.	Provided information about dementia.	Provided the carer with information about dementia (can include behavioural features of dementia). When discussing behavioural features OT may provide and explain Alzheimer's fact sheet on topics including sleep, agitation, hallucinations in relation to the person's situation	**Done**	OT provided all information about dementia when needed/appropriate
				Done to some extent	OT provided some but not all information about dementia when needed/appropriate
				Not done	OT did not provide information about dementia when needed/appropriate
	8.	Provided information about support available to the dyad (e.g. community resources).	Support refers to specific support to the dyad and issues that they are facing, in relation to dementia. For example: signposting to community resources.	**Done**	OT provided information about support available to the dyad
				Done to some extent	OT provided some information about support Or OT provided information but did not make the information specific to the dyad
				Not done	OT did not provide information about support
Communication techniques	9.	Prompted the person to provide more details about their responses.	When participants have provided an answer to a question, the OT has asked a further question to prompt the participant to go into more details about their answer. For example: 'Can you explain a bit more?' 'Could you give me an example?' Note these prompts can be less subtle than this, for example if the OT asks questions to prompt more information from a certain topic.	**Done**	OT asked for more details when appropriate most of the time
				Done to some extent	OT asked for more details **sometimes but not always**,
				Not done	OT **did not ask for** more details
	10.	Used jargon or technical language. (*)	Jargon or technical language refers to unexplained language which may not be understandable to members of the general public. This includes OT terminology. For example: 'graded'/'environmental assessment', 'SMART goal', 'OPHI', 'problem analysis' 'action planning', 'activity synthesis' or condition specific terms/terminology	**Done**	OT **used** jargon or technical language 4 or more times
				Done to some extent	OT **used** jargon or technical language 2-3 times
				Not done	OT **did not use** jargon or technical language.
	11.	Prompted the family carer to express their feelings.	Prompted the family carer to tell the OT how they are feeling and what their reactions to situations are.	**Done**	OT sufficiently prompted the family carer to express their feelings and feelings were expressed
				Done to some extent	OT prompted the family carer to express their feelings but did not follow through appropriately
				Not done	OT did not prompt the family carer to express their feelings

Summarise	12. Provided a summary of the activities discussed.	The OT summarised the activities that were discussed in this session (session summary)	**Done**	OT summarised all activities that were discussed
			Done to some extent	OT summarised some but not all activities that were discussed
			Not done	OT did not summarise the activities that were discussed
Support	13. Prompted the family carer to speak.	Prompted the family carer to speak, for example: ask questions or give views. **Note:** If family carer speaks a lot without prompting, choose 'not done and write N/A' Note: This is different from 'prompting for more information'. This component refers more to whether the participant has asked the participant if they have any questions (e.g. at the end of the session), or for more information on their views on decisions E.g. 'Do you have any questions?'/'What's your views on that?' Note: If one example of stopping speaking (to move the session on), can still code 'done', code 'done to some extent' if multiple examples of stopping speaking.	**Done**	OT prompted family carer to speak on **most appropriate occasions**
			Done to some extent	OT prompted family carer to speak on some but not all appropriate occasions
			Not done	OT did not prompt and family carer to speak
Next steps	14. Described what will happen in the next session.	Described what will happen in the next session (Evaluation) • **Evaluation:** This session consists of reviewing the behavioural goals and helping the dyad to identify ways to continue making progress after the programme.	**Done**	OT described what will happen in the next session
			Done to some extent	OT gave a session label but does not describe what will happen in the next session
			Not done	OT did not describe what will happen in the next session
	15. Checked the dyad's availability and booked next visit(s). Note: If any indication that this has happened, can code.	The OT checked when the dyad would be available for the next visit and arranged the next visit.	**Done**	OT checked when the dyad would be available for the next visit and arranged the next visit
			Done to some extent	OT checked when the dyad would be available but did not arrange the next visit Or OT arranged the next visit but did not check the dyad were available
			Not done	OT did not check when the dyad would be available or arrange the next visit

Coding guidelines for Session 7: Evaluation

Framework component	Appointment activity	Definition	Scores	Rationale for scores
Key information	1. Described what will happen in the current session.	Described what will happen in the current session (evaluation) - Evaluation: This session consists of reviewing the behavioural goals and helping the dyad to identify ways to continue making progress after the programme.	**Done**	OT described what will happen in the current session
			Done to some extent	OT gave a session label but does not describe what will happen in the current session
			Not done	OT did not describe what will happen in the current session
Review goals	2. Reviewed the behavioural goal(s) using the COTiD-UK goal setting form.	Review behaviour goals involves asking about progress towards meeting the goals (doesn't require evidence of using the form as recording it on the form is the next apt activity)	**Done**	OT reviewed the behavioural goals with the participant
			Done to some extent	OT partly reviewed the behavioural goals
			Not done	OT did not review the behavioural goals
	3. Recorded the review of the goal using the COTiD-UK goal setting form.	The OT has recorded the review of the goal on the COTiD-UK goal setting form. **Note**: Use the goal setting form to answer this	**Done**	OT recorded the review on the COTiD-UK goal setting form
			Done to some extent	OT partly recorded the review on the COTiD-UK goal setting form
			Not done	OT did not record the review on the COTiD-UK goal setting form
Planning ahead	4. Prompted the dyad to identify long term goals for how to continue making progress.	The OT prompted the dyad to think about and choose long term goals for making progress after the intervention **Note:** Can be areas of goals as well as specific goals. This component focuses more on discussing **what** the dyad can work on after the programme	**Done**	OT helped the dyad to identify goals to help them to continue making progress and goals were agreed.
			Not done	OT did not help the dyad to identify goals to continue making progress
	5. Suggested ways in which the dyad can continue making progress.	The OT has given suggestions of ideas on how the dyad can begin to work on these goals. This component focuses more on discussing **how** the dyad can work on their goals – e.g. making suggestions.	**Done**	OT suggested ways for how the dyad can continue to make progress
			Done to some extent	OT partly suggested ways but did not develop these fully
			Not done	OT did not suggest ways they can continue making progress
Support	6. Prompted the person with dementia and family carer to speak.	Prompted the person with dementia and family carer to speak, for example ask questions or give views. **Note:** If person with dementia and family carer speak a lot without prompting, choose 'not done and write N/A' Note: This is different from 'prompting for more information'. This	**Done**	OT prompted person with dementia and family carer to speak on **most appropriate occasions**
			Done to some extent	OT prompted person with dementia and family carer to speak on some but not all appropriate occasions

		component refers more to whether the participant has asked the participant if they have any questions (e.g. at the end of the session), or for more information on their views on decisions Note: If one example of stopping speaking (to move the session on), can still code 'done', code 'done to some extent' if multiple examples of stopping speaking.	**Not done**	OT did not prompt person with dementia and family carer to speak
Next steps	7. Explained what will happen next.	The OT explained what would happen next (as they had just finished the last session). E.g. the researchers will come for another visit.	**Done**	OT explained what would happen next
			Done to some extent	OT partly explained what would happen next
			Not done	OT did not explain what would happen next
	8. Told the dyad not to tell the researcher that they received the COTiD-UK intervention.	The OT told the dyad not to tell the researcher who comes to the 12 week follow up that they received the COTiD-UK intervention (to keep the blinding)	**Done**	OT told the dyad not to tell the researcher that they received the intervention
			Not done	OT did not tell the dyad not to tell the researcher that they received the intervention

Appendix 3-7. COTiD-UK checklists

VALID COTiD-UK FIDELITY CHECKLIST: Introduction Session (1)

Set Number:

Date completed:

Coder's initials:

Appointment activities **The Occupational Therapist:**		Please choose:			
		Done	**Done to some extent**	**Not done**	**Delivered in a different session**
Introduction	1. Introduced themselves.				
	2. Asked the person with dementia how they want to be addressed.				
	3. Asked the family carer how they want to be addressed.				
Key information	4. Checked that the dyad had received the COTiD-UK home visits leaflet.				
	4a. If not received, gave the dyad a copy.				
	5. Explained the home visits using the leaflet.				
	6. Explained that the intervention will take place in 10 x one hour sessions.				
	7. Described what will happen in future sessions.				
	8. Explained that they can offer support to the dyad but cannot solve their problems for them.				
Assessment	9. Assessed the home environment and recorded this on the checklist.				
	10. Completed the activity assessment and recorded this on the checklist.				

Introduction session activities continued **The Occupational Therapist:**		**Please choose:**			
		Done	**Done to some extent**	**Not done**	**Delivered in a different session**
Support	11. Prompted the person with dementia to speak.				
	12. Prompted the family carer to speak.				
Next step	13. Described what will happen in the next session.				
	14. Checked the dyad's availability and booked next visit(s).				

VALID COTiD-UK FIDELITY CHECKLIST: OPHI Interview (2)

Set number: Date completed: Coder's initials:

Appointment activities The Occupational Therapist:		Please choose:			
		Done	Done to some extent	Not done	Delivered in a different session
Key Information	1. Described what will happen in the current session.				
Assessment	2. Assessed the home environment and recorded this on the checklist.				
Communication techniques	3. Used open ended questions.				
	4. Prompted the person with dementia to provide more details about their responses (E.g. Can you explain a bit more, can you give me an example?).				
	5. Asked questions which caused undue distress. (*)				
	6. Used jargon or technical language. (*)				
	7. Asked the person with dementia to explain what the meaning of situations and activities were.				
	8. Summarised the information provided by the person with dementia.				
	9. Interpreted the information provided by the person with dementia. (*?)				
	10. Checked that they understood the information provided by the person with dementia.				
	11. Spoke about themselves. (*)				
	12. Told the person with dementia what to do. (*)				
	13. Used visual objects found in the person with dementia's home to gather information (E.g. photos, garden, sewing, cakes, and paintings).				

OPHI Interview appointment activities continued The Occupational Therapist		Please choose:			
		Done	Done to some extent	Not done	Delivered in a different session
Support	14. Prompted the person with dementia to speak.				
Next steps	15. Described what will happen in the next session.				
	16. Checked the dyad's availability and booked next visit(s).				
(*) = Reverse Code					

VALID COTiD-UK FIDELITY CHECKLIST: Ethnographic Interview (3)

Set number: Date completed: Coder's initials:

Appointment activities		**Please choose:**			
The Occupational Therapist:		**Done**	**Done to some extent**	**Not done**	**Delivered in a different session**
Key Information	1. Described what will happen in the current session.				
Assessment	2. Assessed the home environment and reported it on the checklist.				
Communication techniques	3. Used open ended questions.				
	4. Prompted the family carer to provide more details about their responses.				
	5. Asked questions which caused undue distress. (*)				
	6. Used jargon or technical language. (*)				
	7. Asked the family carer to explain what the meaning of situations and activities were.				
	8. Summarised the information provided by the family carer.				
	9. Interpreted the information provided by the family carer. (*?)				
	10. Checked that they understood the information provided by the family carer.				
	11. Spoke about themselves. (*)				
	12. Told the family carer what to do. (*)				
	13. Used visual objects found in the person's home to gather information (E.g. photos, garden, sewing, cakes, paintings).				

Ethnographic interview appointment activities continued		**Please choose:**			
The Occupational Therapist:		**Done**	**Done to some extent**	**Not done**	**Delivered in a different session**
Support	14. Prompted the family carer to speak.				
Next steps	15. Described what will happen in the next session.				
	16. Checked the dyad's availability and booked next visit(s).				
(*) = Reverse Code					

VALID COTiD-UK FIDELITY CHECKLIST: Summaries and goal setting (4&5)

Set number: Date completed: Coder's initials:

Appointment activities		**Please choose:**			
The Occupational Therapist:		**Done**	**Done to some extent**	**Not done**	**Delivered in a different session**
Key information	1. Described what will happen in the current session.				
Feedback	2. Summarised the information provided in the interview with the person with dementia.				
	3. Checked that they understood the information provided by the person with dementia.				
	4. Summarised the information provided in the interview with the family carer.				
	5. Checked that they understood the information provided by the family carer.				
	6. Summarised their own views from observations and assessments.				
Activity selection	7. Discussed potential activities using prepared cards which listed activities and possible goals.				
Goal setting	8. Set at least one individual or joint goal for the person with dementia and family carer.				
	9. Developed these goals into SMART goals				
Activity adaptation	10. Adapted the activities to suit participants' needs				

Summaries and goal setting appointment activities continued		**Please choose:**			
The Occupational Therapist:		**Done**	**Done to some extent**	**Not done**	**Delivered in a different session**
Environmental adaptation	11. Provided information about the environmental barriers for the dyad.				
	12. Recommended changes to the dyads' environment.				

Summary	13. Summarised the final list of agreed goals.				
	14. Told participants that they could start to carry out activities to meet the goals.				
Support	15. Prompted the person with dementia and family carer to speak.				
Next steps	16. Described what will happen in the next session.				
	17. Checked the dyad's availability and booked next visit(s).				

VALID COTiD-UK FIDELITY CHECKLIST: Consultation and advice (6)

Set number:
Date completed:
Coder's initials:

Appointment activities **The Occupational Therapist:**		**Please choose:**			
		Done	**Done to some extent**	**Not done**	**Delivered in a different session**
Key information	1. Described what will happen in the current session.				
	2. Explained that they can offer support to the dyad but cannot solve their problems for them.				
Operationalising goals	3. Prompted family carer to select an action to help them achieve their goals				
Problem analysis	4. Prompted the family carer to identify things that have helped the dyad to do their activity/activities.				
	5. Prompted the family carer to identify barriers that prevented the dyad from doing their activity/activities.				
	6. Prompted the family carer to identify solutions for these problems.				
Key information	7. Provided information about dementia.				
	8. Provided information about support available to the dyad (e.g. community resources).				
Communication techniques	9. Prompted the family carer to provide more details about their responses.				
	10. Used jargon or technical language. (*)				
Consultation and advice appointment activities continued		**Please choose:**			
The Occupational Therapist:		**Done**	**Done to some extent**	**Not done**	**Delivered in a different session**
Communication techniques	11. Prompted the family carer to express their feelings.				
Summarise	12. Provided a summary of the activities discussed.				
Support	13. Prompted the family carer to speak.				
Next steps	14. Described what will happen in the next session.				
	15. Checked the dyad's availability and booked next visit(s).				

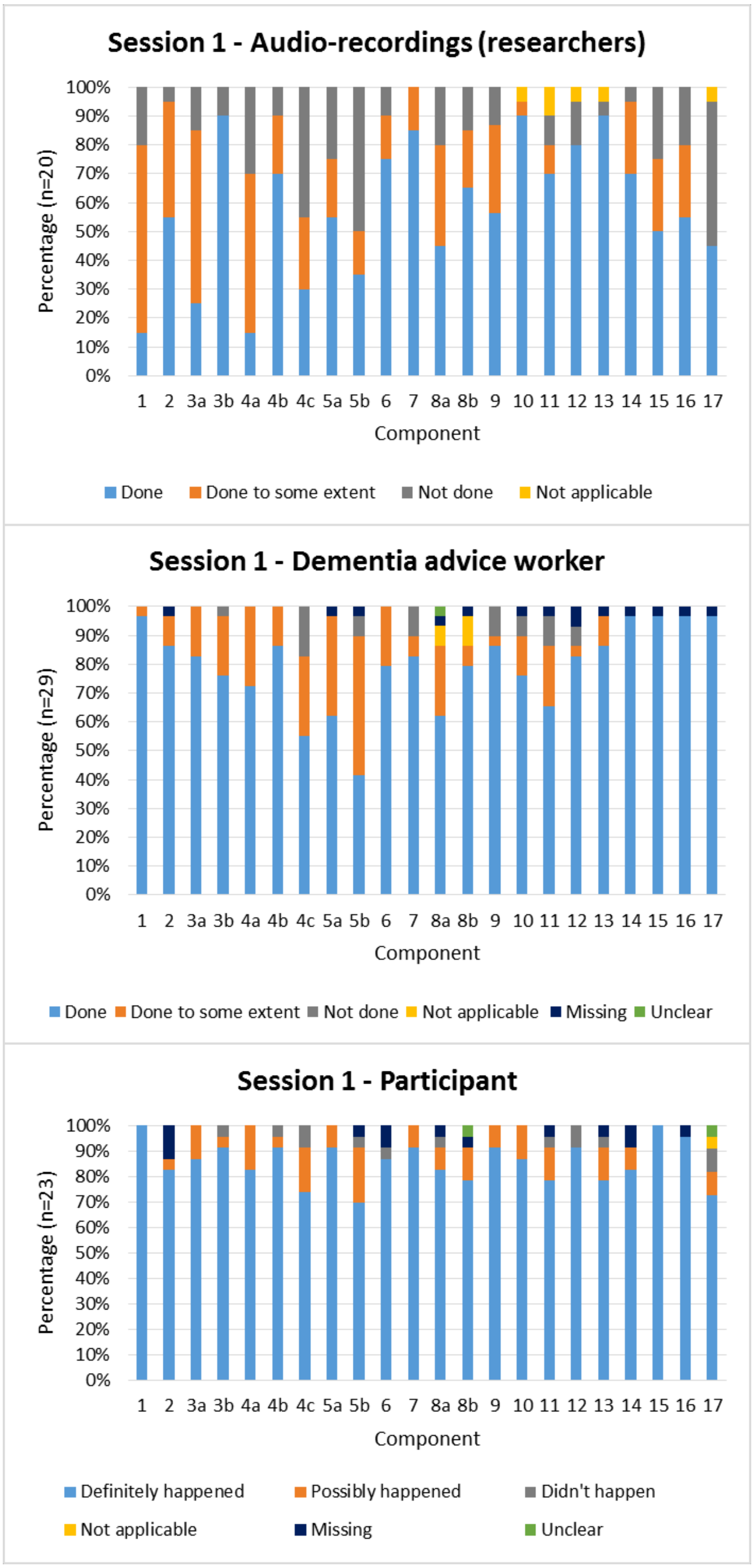
(*) = Reverse Code

VALID COTiD-UK FIDELITY CHECKLIST: Evaluation (7)

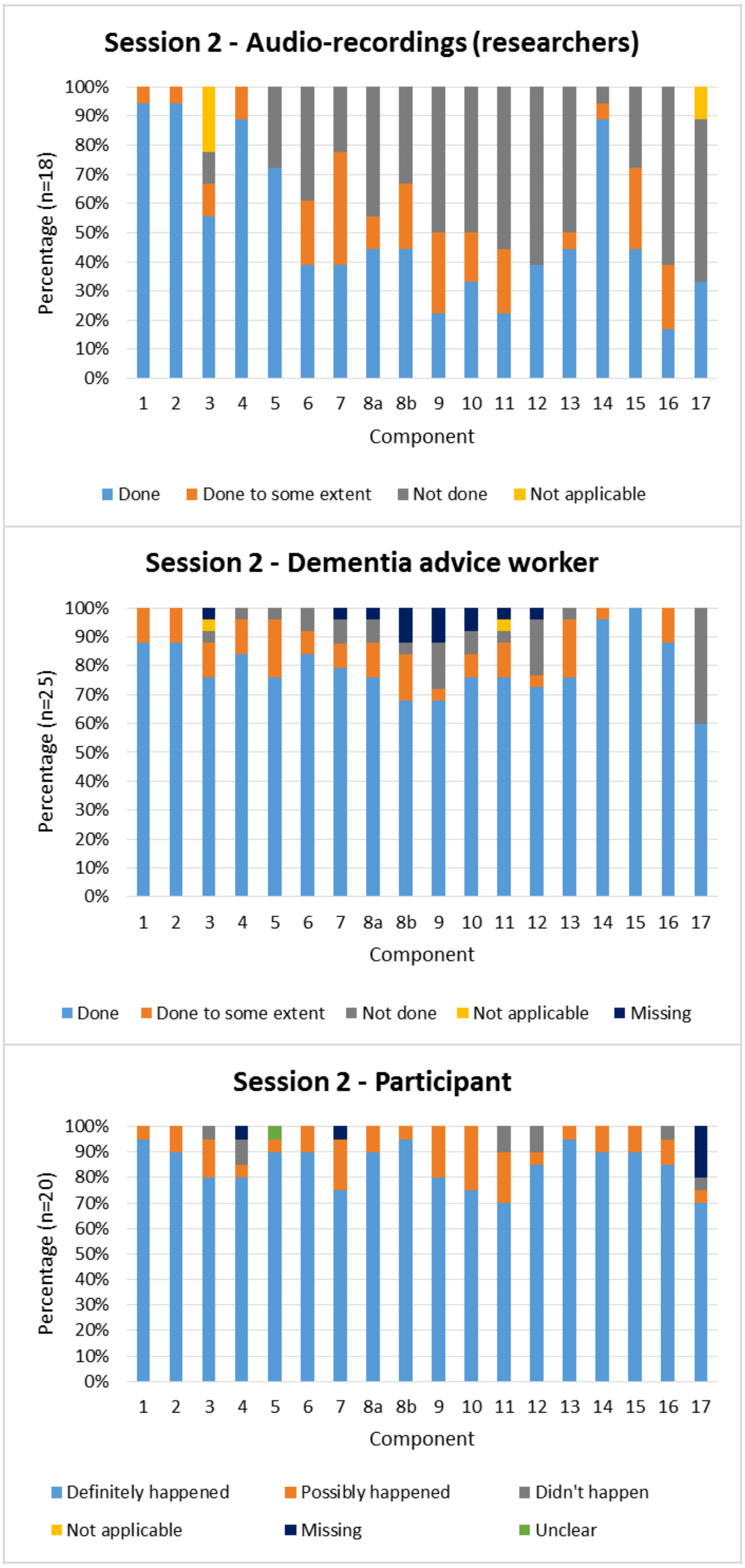
Set number:
Date completed:
Coder's initials:

Appointment activities **The Occupational Therapist:**		**Please choose:**			
		Done	**Done to some extent**	**Not done**	**Delivered in a different session**
Key information	1. Described what will happen in the current session.				
Review goals	2. Reviewed the behavioural goal(s) using the COTiD-UK goal setting form.				
	3. Recorded the review of the goal using the COTiD-UK goal setting form.				
Planning ahead	4. Prompted the dyad to identify long term goals for how to continue making progress.				
	5. Suggested ways in which the dyad can continue making progress.				
Support	6. Prompted the person with dementia and family carer to speak.				
Next steps	7. Explained what will happen next.				
	8. Told the dyad not to tell the researcher that they received the COTiD-UK intervention.				

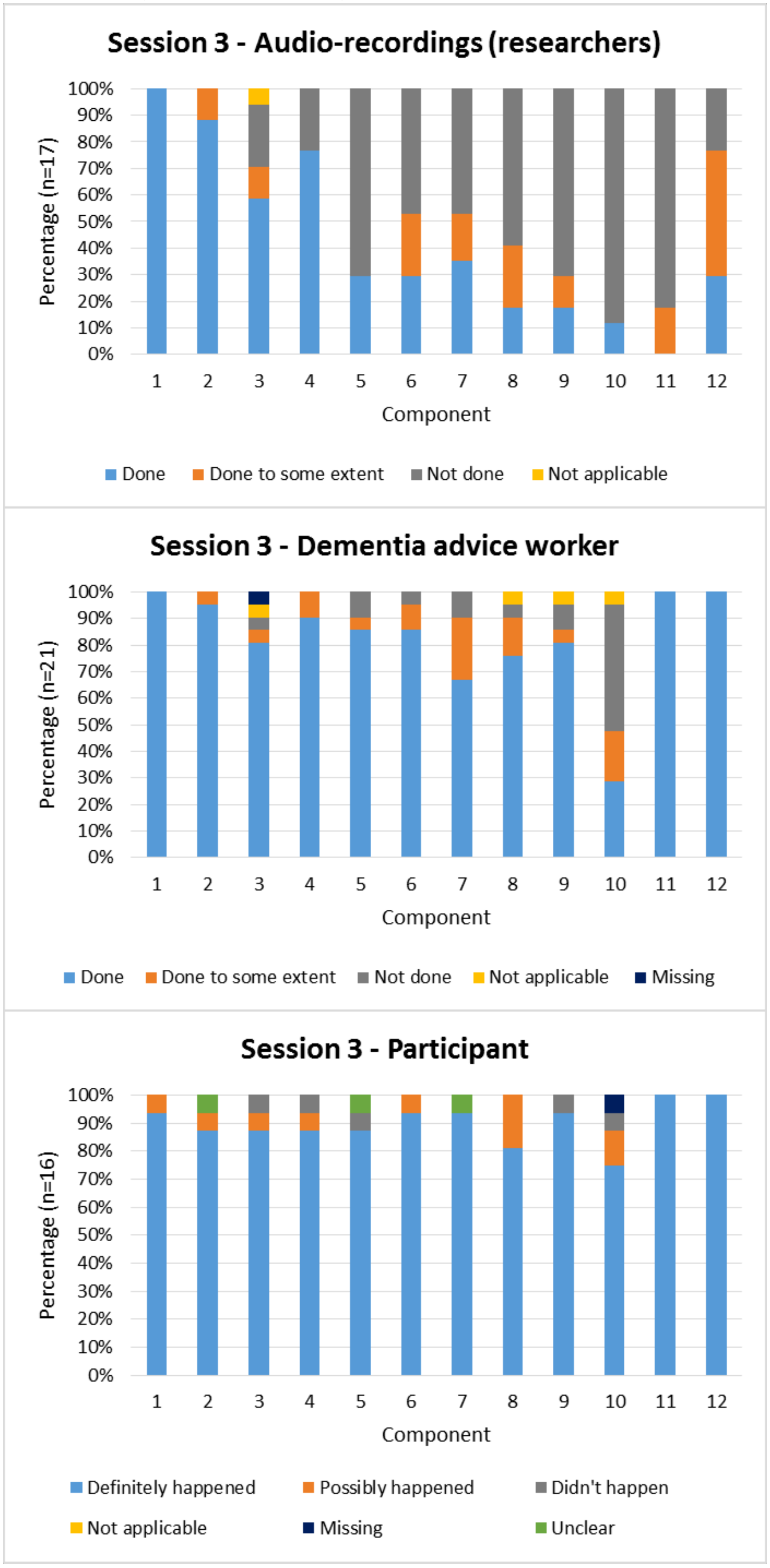
Appendix 4-1. Percentage of transcripts in which individual standardised components were delivered fully, to some extent or not at all, in PRIDE Session one, as reported by audio-recordings, DAW self-report and participant self-report



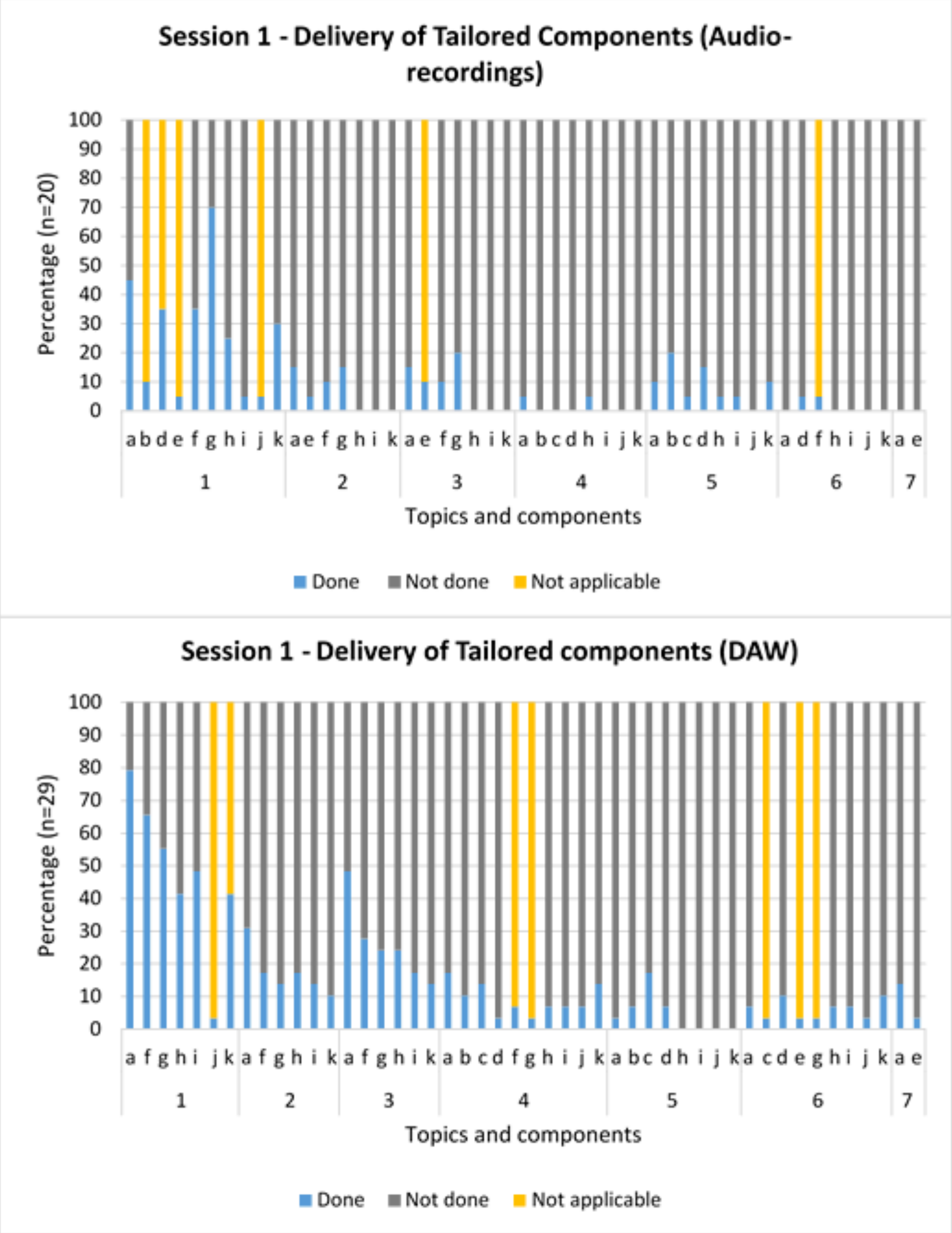
Appendix 4-2. Percentage of transcripts in which individual standardised components were delivered fully, to some extent or not at all, in PRIDE Session two, as reported by audio-recordings, DAW self-report and participant self-report



Appendix 4-3. Percentage of transcripts in which individual standardised components were delivered fully, to some extent or not at all, in PRIDE Session three, as reported by audio-recordings, DAW self-report and participant self-report



Appendix 4-4. Percentage of sessions in which tailored components were delivered or not delivered, in PRIDE Session one, as reported by audio-recordings and DAW self-report

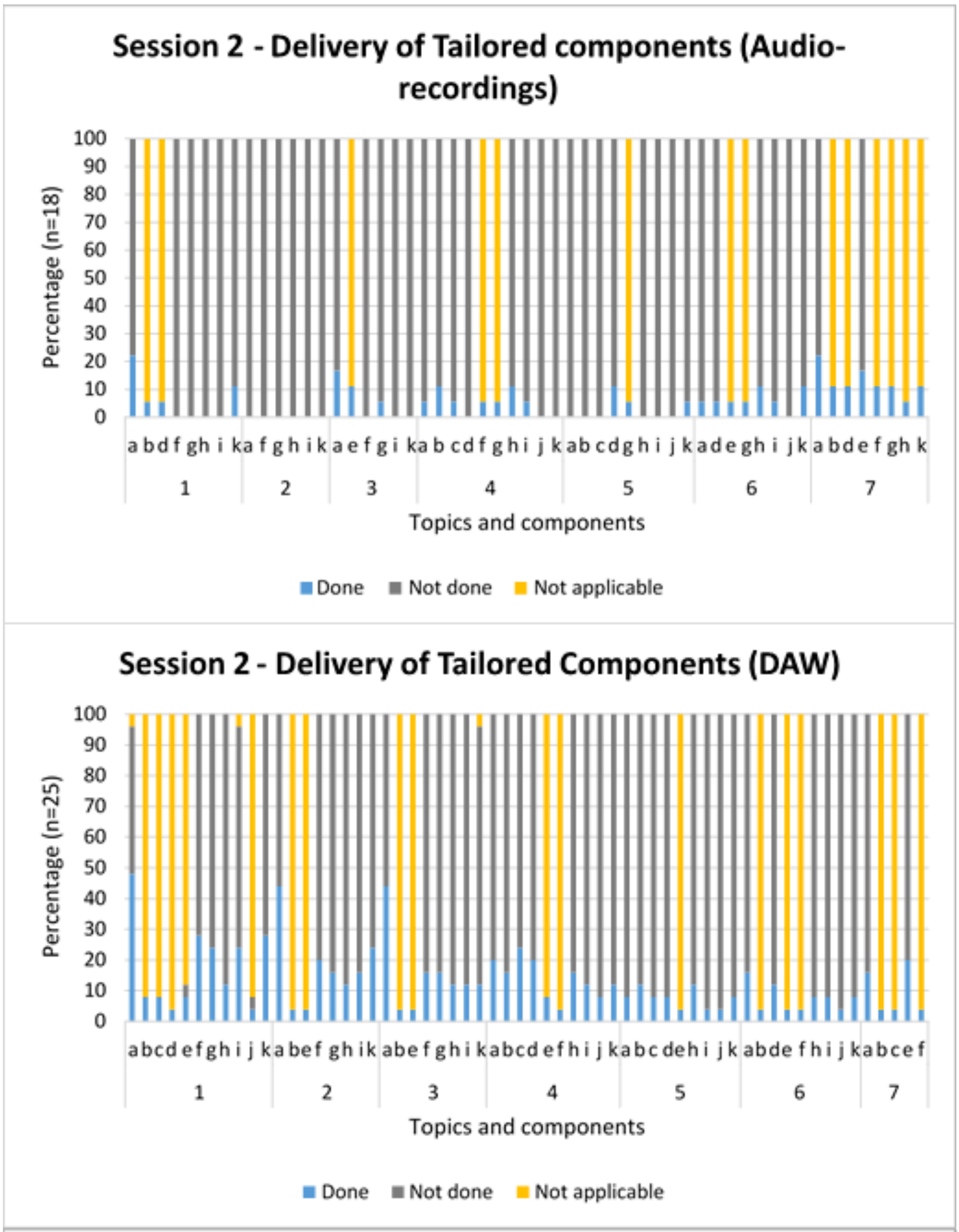


Topic: 1) Keeping mentally active, 2) Keeping physically active, 3) Keeping socially active, 4) Making decisions, 5) Getting your message across, 6) Receiving a diagnosis, 7) Keeping healthy

Components: a) Provided information on benefits, b) Provided information on how dementia can affect it, c) Assessed current style, d) Identified potential challenges, e) Provided information on resources, f) Provided instructions on how to do it, g) Provided example activities, h) Provided examples of how others do it, i) Provided tips on how others can provide support, j) Provided examples of how others overcome challenges, k) Provided tips to overcome challenges

Note: Components that were coded 'not applicable' and that were not delivered by any DAWs, have been removed from the graph

Appendix 4-5. Percentage of sessions in which tailored components were delivered or not delivered, in PRIDE Session two, as reported by audio-recordings and DAW self-report

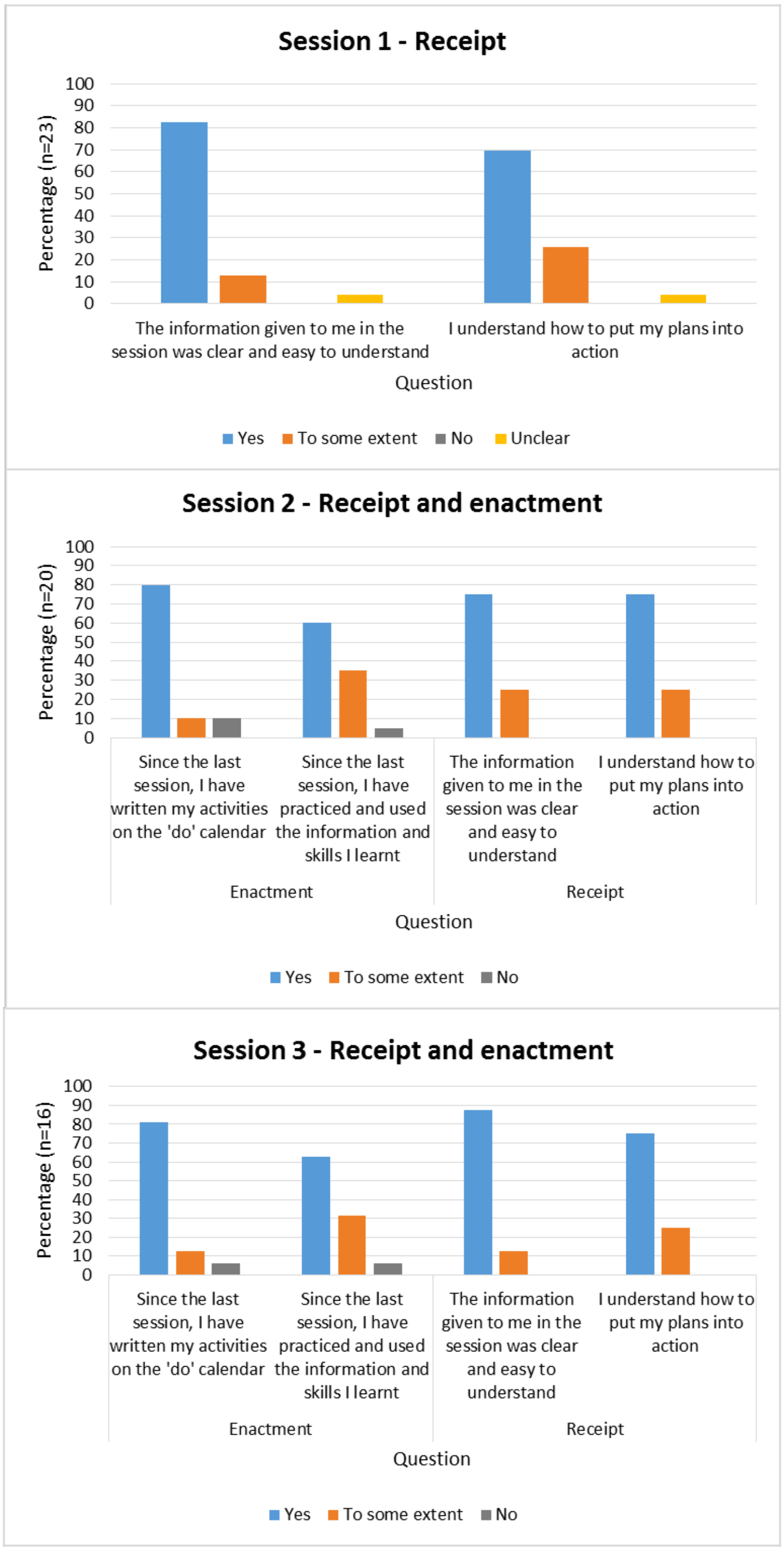


Topic: 1) Keeping mentally active, 2) Keeping physically active, 3) Keeping socially active, 4) Making decisions, 5) Getting your message across, 6) Receiving a diagnosis, 7) Keeping healthy

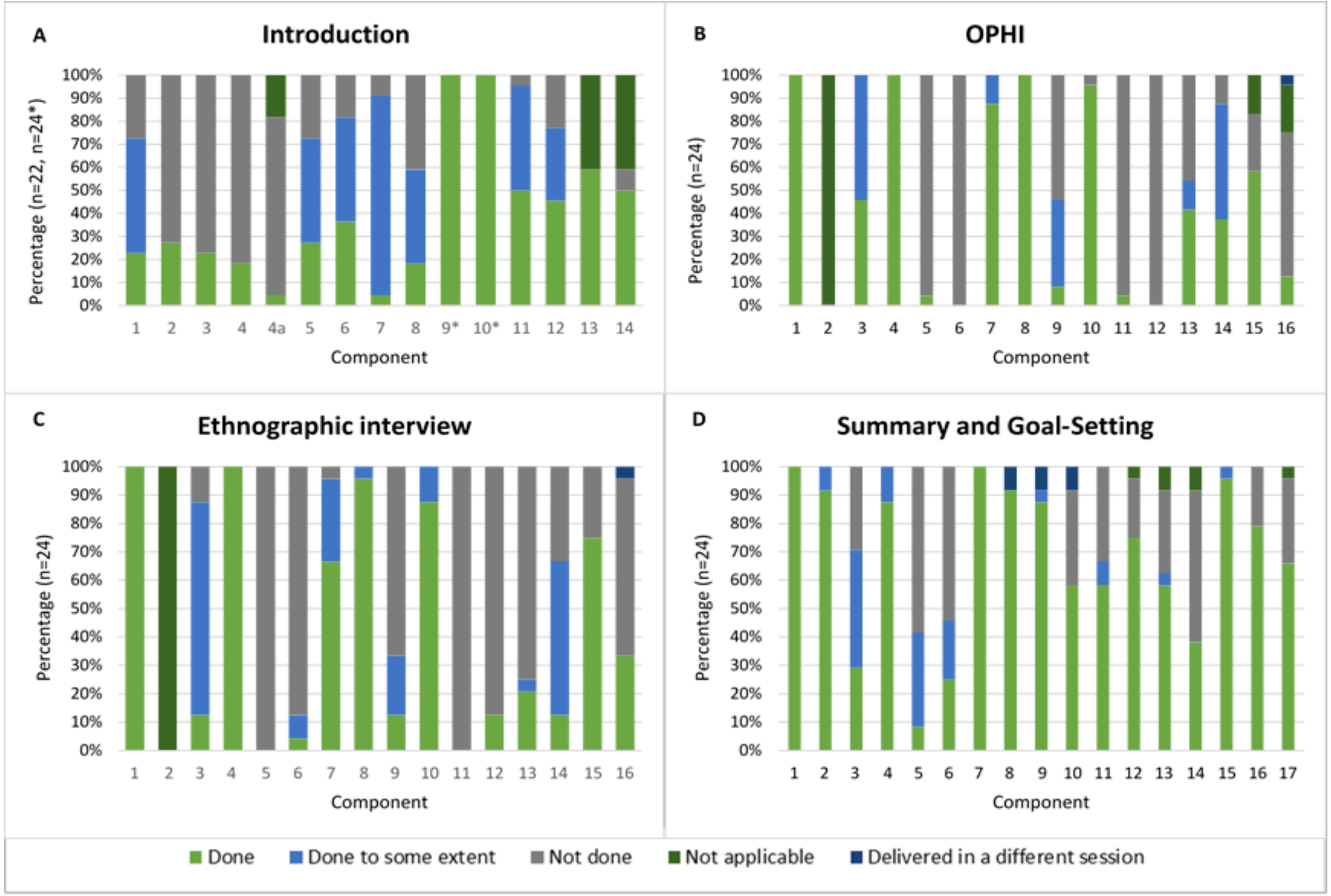
Components: a) Provided information on benefits, b) Provided information on how dementia can affect it, c) Assessed current style, d) Identified potential challenges, e) Provided information on resources, f) Provided instructions on how to do it, g) Provided example activities, h) Provided examples of how others do it, i) Provided tips on how others can provide support, j) Provided examples of how others overcome challenges, k) Provided tips to overcome challenges

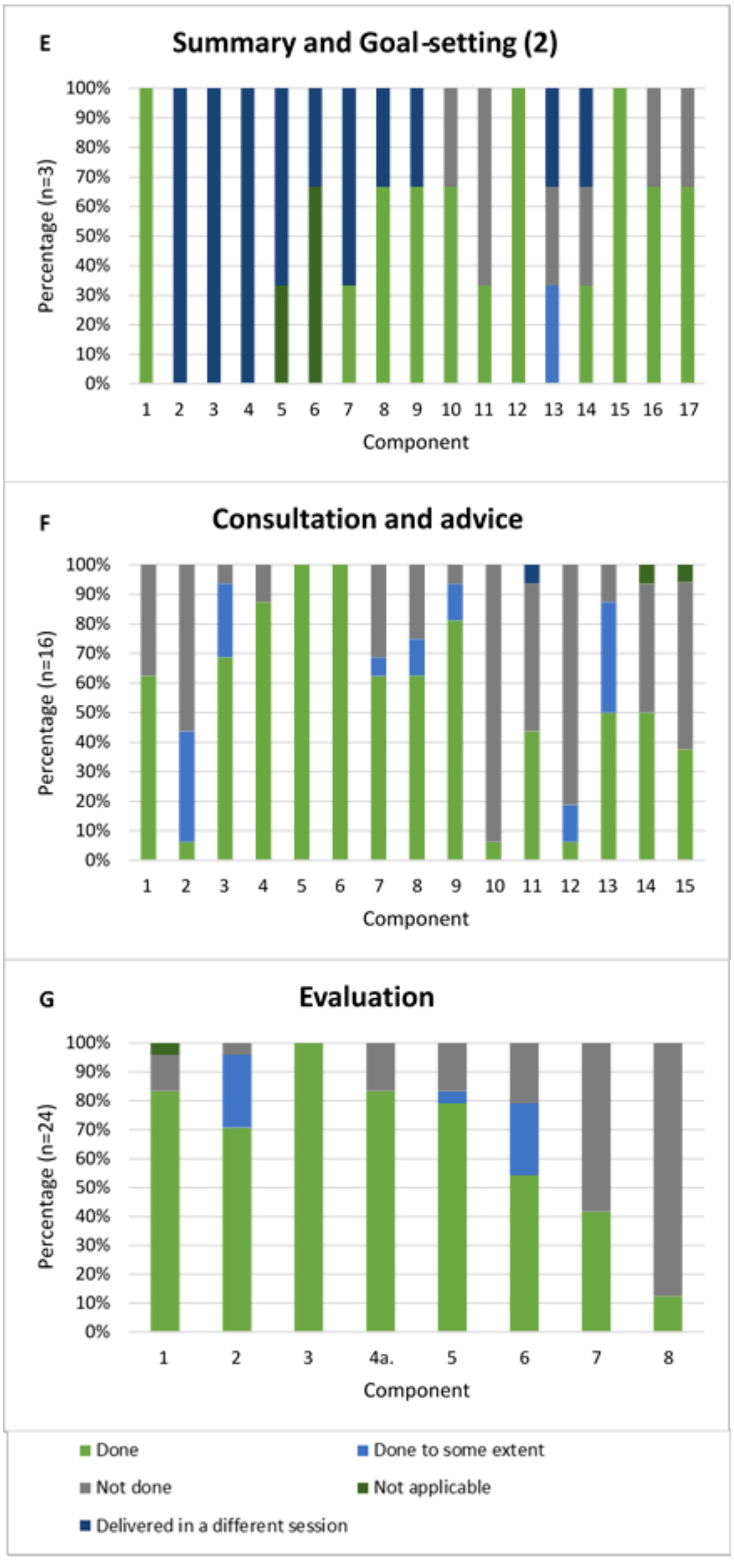
Note: Components that were coded 'not applicable' and that were not delivered by any DAWs, have been removed from the graph

Appendix 4-6. Percentage of participants who responded ‘yes’, ‘to some extent’, or ‘no’ for the engagement questions across the three PRIDE sessions



Appendix 4-7. Percentage of sessions in which individual components were delivered fully, to some extent or not all, per COTiD-UK sessions




E
Summary and Goal-setting (2)
Percentage (n=3)
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17
Component
F
Consultation and advice
Percentage (n=16)
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
Component
G
Evaluation
Percentage (n=24)
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
1 2 3 4a. 5 6 7 8
Component
Done
Done to some extent
Not done
Not applicable
Delivered in a different session

Appendix 5-1. Interview schedule for DAWs with relevant COM-B and TDF domains

Interview questions	**Prompts**	**COM-B domains**	**TDF domains**
1. Please tell me a bit about yourself and any thoughts you have about the PRIDE intervention.	- What things have you been engaged in with participants? - How has this changed over time – by participants		
2. How have you found the experience of delivering the PRIDE intervention?	- How difficult or easy is it to deliver the intervention? - Why?	Psychological capability	
3. Can you describe the PRIDE programme to me?	- What should be delivered in: Session 1 | Session 2 | Session 3	Psychological capability	
4. How feasible do you think it is to deliver the intervention as it is described in the manual?	- Is it achievable? - Why/why not? - What would make it more feasible to deliver as planned? - Time required – is it reasonable?	Reflective motivation;	Optimism
5. How do you think the PRIDE programme impacts on participants' lives?	- No impact - Positive impact - Negative impact - Why?	Reflective motivation	Beliefs about consequences
6. How do you feel about your ability to deliver the PRIDE programme as planned?	- What would help you feel more confident about your ability to deliver PRIDE as planned?	Reflective motivation	Beliefs about capability
7. How comfortable do you feel delivering the intervention as planned?	- In what way? - What makes you feel uncomfortable (if anything)? - How? - What would help you to overcome these feelings? - Would you want to continue delivering the programme?	Automatic motivation	Emotion
8. What strategies do you use to deliver the PRIDE intervention?	- Use of manual - Your own guide - Training in delivery of intervention - Support from PRIDE team - Sticking to it loosely/strictly - Why did you choose that method?	Physical capability; Psychological capability;	Skills Cognitive skills, memory, attention and decision making, knowledge
9. Thinking about the resources available to you, what has helped you deliver the PRIDE programme as planned?	- E.g. Training, your work environment, competing tasks or time constraints, support from PRIDE team - How?	Physical opportunity	Environmental context and resources
10. Thinking about the people around you, who has helped you to deliver the PRIDE programme as planned?	- E.g. Participants you work with, co-workers, trainers, line-managers, researchers - How? - Which have you found has been most useful in helping you to deliver PRIDE as planned?	Social opportunity	Social influences
11. Has anything got in the way of you delivering the PRIDE programme as planned?	- The resources available to you: e.g. not enough training, your work environment, competing tasks or time constraints (patient needs/session timing) - How? - Did you overcome any of these challenges? - If so, how?	Physical opportunity Social opportunity Automatic motivation	Environmental context and resources Social influences Reinforcement
12. What could be changed in future to help you deliver the PRIDE programme as planned?	- What would you change? - Why?		
13. How important is it for you to deliver the PRIDE programme as planned?	- Why is it important? - Professionally? - Personally?	Reflective motivation Automatic motivation	Goals, social professional, role and identity, intentions, Reinforcement
14. Are there any systems that are in place for monitoring whether you have delivered the intervention as planned?	- E.g. recording the sessions/filling out and returning checklists? - How did you find these systems? (easy/difficult/stressful) - What would make it easier?	Psychological capability	Behavioural regulation
15. Is there anything else that you would like to say about the issues we have talked about?			

Appendix 5-2. Interview schedule for people with dementia and supporters with relevant COM-B and TDF domains

Interview questions	Prompts	COM-B domains	TDF domains
1. Please tell me a bit about yourself			
2. Please tell me your experience of taking part in the PRIDE programme	- Overall experience - Three sessions - E.g. enjoyable/not enjoyable/interesting - Why? - What does taking part mean to you? - Has taking part in the programme impacted on your life? - If so, how?	Reflective motivation	Beliefs about consequences, social, professional role and identity
3. How many of the three sessions did you take part in?	**If all three** - What did you get out of the sessions? **If one or two** - What did you get out of the sessions? - Why did you only take part in one or two sessions? - Could anything be changed to make you want to take part more? **If none** - Why did you choose not to attend the sessions? - Could anything be changed to make you want to take part more?		
4. What do you think of the information you were given: (a) in the manual, and (b) by your dementia advisor in the sessions?	- How easy or difficult was it to understand? - What was it that made it easy/difficult to understand? - Was it relevant to you? - How did the information help/get in the way of you doing your activity? - What would make it easier/more relevant/helpful for you?	Psychological capability, physical capability; Reflective motivation;	Physical, cognitive skills and knowledge. Beliefs about capabilities
5. What activity did you choose to work on?	- Why did you choose that activity? **If participant did not choose to work on an activity** - Why did you decide not to choose an activity to work on? - Could anything be changed to make you want to choose an activity to work on?	Motivation (automatic/reflective)	
6. What strategies have you used to put your plan into practice?	- E.g. reminders, use of technology, - Why did you choose that strategy?	Psychological capability	Memory, attention and decision processes

7. How did it go when you tried to put your plan into practice?	- E.g. well, not very well
	- Why?
	- What helped?
	  o Knew how to do it, had the right resources, wanted to do it, incentives
	  o How did it help?
	- What got in the way?
	  o Didn't know how, time, didn't have the right resources
	- What would need to make it easier for you?
		Physical capability.
		Psychological capability.
		Physical opportunity
		Automatic motivation
		Reflective motivation
			Environmental context and resources
			Reinforcement, goals
			Beliefs about capabilities

8. What could be changed to help you to do more of the activities you planned?	- What would you change? - Why?		
9. What makes it worthwhile for you to do the activities that you enjoy?	- How? - What difference would it make to your life if you could do your activities?	Reflective/ automatic motivation	Beliefs about consequences
10. What did you like or not like about the activities you chose?	- Why?	Motivation (automatic/ reflective)	Emotions
11. Thinking about the people around you, who helped you to do the activities you planned?	- E.g. DAW, friends, family - How did they help? - How could your situation change to make it easier? - What kind of support would you need?	Social opportunity	Social influences
12. What was your relationship with your DAW like?	- E.g. get on well/had some issues - What was the reason for that? - How could it be improved?	Social opportunity	Social influences
13. How did you find filling in the forms for the programme?	- E.g. easy, difficult, stressful - PRIDE: your experience forms - Plan, do, review forms - What would make it easier?	Psychological capability	Behavioural regulation
14. Is there anything else that you'd like to say about what we have talked about?			

Appendix 5-3. Coding framework which was developed and applied to the dementia advice worker interviews

Research Question	Overarching theme	Theme	Sub theme	Definition
Experience of delivering PRIDE and barriers and facilitators to delivering PRIDE as planned (DAW interviews) (Code: D)	1. **Concept of PRIDE** *(Providers' opinions on PRIDE as a program)*	a. Beliefs in relation to PRIDE	i. Concept of PRIDE	Data relating to the providers' views on PRIDE (may include how they view the program overall, e.g. good concept, bad concept) and providers' belief in the intervention (e.g. belief in goals of PRIDE, want to see PRIDE applied to other situations, see the value of PRIDE)
			ii. Interest in delivering PRIDE	Data relating to the providers' interest in delivering PRIDE and whether they would want to continue delivering PRIDE
		b. PRIDE intervention materials	i. Views on materials	Data relating to providers' views (positive or negative) on intervention materials (e.g. manual, instruction sheets, do sheets, forms).
			ii. Recommendations to improve materials	Data relating to providers' recommendations to improve materials
		c. Providers' views of benefits and issues for participants	i. Benefits of PRIDE for participants	Data relating to the providers' views on the benefits of PRIDE (for participants/supporters/DAWs)
			ii. Participants' perceptions of PRIDE	Data relating to providers' views on how the intervention may have been received by participants (e.g. why participants may have chosen to work on activities)
		d. Documentation requirements	i. PRIDE paperwork	Data relating to paperwork for PRIDE (e.g. facilitators/barriers) – including the amount of paperwork
	2. **Delivery of PRIDE** (*How providers found delivering PRIDE)*	a. Knowledge of how to deliver PRIDE	i. Delivery	Data relating to providers' knowledge of how to deliver PRIDE (e.g. lack of knowledge (Barriers)/sufficient knowledge (Facilitators).
			ii. Use of manual	Data relating to providers' knowledge of how to use the PRIDE manual (e.g. lack of knowledge (Barriers)/sufficient knowledge (Facilitators).
			iii. Previous knowledge	Data relating to providers' previous knowledge (e.g. lack of knowledge (Barriers)/sufficient knowledge (Facilitators).
		b. Delivery and feasibility/achievability	i. Feasibility of delivering with fidelity	Data relating to providers' views on how achievable/realistic or feasible it is to deliver PRIDE as planned (with fidelity)
		c. Temporal characteristics	i. Difficulty	Data relating to how delivery of PRIDE changed over time in relation to the difficulty delivering PRIDE (e.g. more difficult/time consuming to start with then became easier over time/same difficulty)
			ii. Time taken	Data relating to how delivery of PRIDE changed over time in relation to the time taken to deliver PRIDE (e.g. more time consuming to start with then became easier over time/same amount of time taken)
		d. Using manual to guide delivery	i. Fidelity to manual	Data relating to the providers' use of manual (e.g. sticking to it strictly to deliver or using it loosely or not using it at all) for delivering PRIDE as planned
			ii. Views on using manuals	Data relating to providers' views on using a manual to deliver psychological interventions (e.g. restricting/helpful)

	e. Tailoring content	i. Tailored topics	Data related to how providers found the delivery of the tailored topics (Keeping mentally active/physically active/socially active/making decisions/getting the message across/keeping healthy/receiving a diagnosis)
		ii. Participant choice	Data related to and how providers found delivering PRIDE in relation to giving the participants choice
	f. Number of sessions	i. Appropriateness of number of sessions	Data relating to the number of sessions and whether this is enough/not enough to deliver PRIDE as planned
	g. Adopting personal strategies	i. Type of strategies	Data relating to the personal strategies DAWs may have used to deliver PRIDE as planned (e.g. writing notes/sticky tabs/using manual)
	h. Barriers and facilitators influencing engagement	i. Barriers and facilitators	Data relating to providers' views on what barriers/facilitators to participants' engagement with the intervention
	i. Time between sessions	i. Barriers and facilitators	Data relating to the time between sessions (barriers/facilitators)
	j. Completing audio-recording and checklists	i. Barriers and facilitators	Data relating to fidelity measures (audio recordings (Dictaphones) and checklist completion (provider/participant) as barriers/facilitators for delivery
	k. Having a digital intervention	i. Digital delivery	Data relating to the delivery of PRIDE using digital methods
3. **PRIDE and wider healthcare** *(How PRIDE fits into the wider healthcare context and whether this facilitates or gets in the way of delivery)*	a. Similarities and differences between PRIDE and current job	i. Similarities	Data relating to similarities between PRIDE and current job
		ii. Differences	Data relating to differences between PRIDE and current job
	b. Conflict between job and PRIDE	i. Difficulty separating job role from PRIDE delivery	Data relating to conflict between job role and PRIDE (e.g. difficulties separating work and PRIDE delivery, conflict related to working with previous clients, issues arising need to deal with, mixing together). Also can include data relating to no conflict.
		ii. Arranging time for visits	Data relating to conflict between job roles and PRIDE relating to arranging time for visits. Also can include data relating to no conflict arranging time for visits
		iii. Delivering PRIDE and work commitments	Data relating to conflict between job roles and PRIDE relating to work commitments. Also can include data relating to no conflict between work commitments and delivery
4. **Providers' characteristics** *(Providers' characteristics which may affect whether the intervention is delivered as planned)*	a. Personal preferences	i. Personal characteristics	Data relating to delivery of PRIDE in relation to providers' personal preferences and characteristics (e.g. personality, personal goals, professionalism)
	b. Providers' experience	i. Providers' previous work experience	Data relating to experience in job roles/skills relating to delivering PRIDE
		ii. Providers' previous and current experience delivering PRIDE	Data relating to providers' past or current experience delivering PRIDE
	c. Emotional reactions to delivering PRIDE as planned	i. Positive emotional reactions	Data relating to positive and negative emotional reactions to delivering PRIDE as planned (e.g. confidence)
		ii. Negative emotional reactions	Data relating to negative emotional reactions to delivering PRIDE as planned (e.g. nerves/anxiety/stress)

	d. Professional identity	i. Providers' views on participant expectations	Data relating to providers' reactions in relation to their professional identity and their views on participants' expectations.
		ii. Fear of judgement	Data relating to providers' reactions in relation to their professional identity and how they may come across to participants in delivery of the intervention
	e. Reflective motivations	i. For other people	Data relating to the providers' motivations for delivering PRIDE which are to do with other people – e.g. the person with dementia (e.g. desire to help people live well/maintain independence, see people do well)
		ii. For themselves	Data relating to the providers' motivation for delivering PRIDE which are to do with themselves (e.g. wanting to learn/ enjoying spending time with people with dementia)
5. Participants' characteristics *(Participants' characteristics which may affect whether the intervention is delivered as planned)*	a. Characteristics of dementia	i. Type of dementia	Data relating to delivery of PRIDE in relation to characteristics of dementia (i.e. different types of dementia/level of cognitive impairment/suitability/adaptation)
		ii. Level of cognitive impairment	Data relating to delivery of PRIDE in relation to perceived level of cognitive impairment and suitability for participating in PRIDE
		iii. PRIDE adaptations	Data relating to adapting PRIDE depending on participants' characteristics
	b. Health	i. Physical Health	Data relating to participants' physical health
	c. Individual differences	i. Participant characteristics	Data relating to the delivery of PRIDE and participants' personal characteristics
	d. Participant engagement	i. Engagement	Data relating to delivery of PRIDE and engagement from participants
		ii. Lack of engagement	Data relating to delivery of PRIDE and lack of engagement from participants
6. Training (*Views on the PRIDE training and delivery)*	a. Usefulness of training	i. Useful	Data relating to the usefulness of training for delivery of PRIDE (e.g. useful/meeting expectations
		ii. Not useful	Data relating to the lack of usefulness of training for delivery of PRIDE (e.g. confusion/not meeting expectations)
	b. Training characteristics	i. Length of training	Data relating to the length of training,
		ii. Time between training and delivery	Data relating to the time between training and delivery
		iii. Recommendations	Data relating to recommendations for training
7. Role of support for delivery *(Support for delivery as planned)*	a. Support from researchers	i. Barriers and facilitators	Data relating to support from researchers (barriers/facilitators)
	b. Support from other Dementia advice workers	i. Barriers and facilitators	Data relating to support from other DAWs (barriers/facilitators)
	c. Role of supporter in delivering PRIDE	i. Barriers and facilitators	Data relating to the necessity of supporters participating in PRIDE with participants (barriers/facilitators)

Appendix 5-4. Coding framework which was developed and applied to the person with dementia and supporter interviews

Research Question	Overarching theme	Theme	Sub theme	Definition
Experience of receiving the PRIDE intervention and barriers and facilitators to engaging with PRIDE (Participant and supporter interviews) (Code: E)	1. **Concept of PRIDE** *(Participants' views on the intervention)*	a. Beliefs about the benefits of PRIDE	i. Concept of PRIDE	Data relating to the participants' views on PRIDE as a concept (may include positive views, negative views)
			ii. Benefits of taking part in PRIDE	Data relating to participants' views on benefits of taking part in PRIDE (e.g. no impact, positive impact, negative impact)
		b. PRIDE intervention materials	i. Relevance	Data relating to participants' views on the intervention materials (e.g. manual – positive/negative), may include relevance of materials,
			ii. Accessibility of materials	Data relating to participants' use of materials and accessibility of materials (including future use of materials, and participants' understanding of materials and ability to complete materials for engagement
		c. PRIDE intervention characteristics	i. Number of sessions	Data relating to participants' views on the number of sessions available
			ii. Flexibility of delivery	Data relating to participants' views on the flexibility of PRIDE delivery
			iii. Intervention components	Data relating to participants' views on certain aspects of intervention (e.g. problem solving)
		d. PRIDE as a digital intervention	i. Digital delivery	Data relating to the possibility of using technology to deliver PRIDE
	2. **Engagement with PRIDE** (How participants engaged with PRIDE)	a. Implementing strategies	i. Positive responses	Data relating to participants' positive responses to putting their plan into action (e.g. it went well or was easy)
			ii. Negative responses	Data relating to participants' negative responses to putting their plan into action (e.g. it went bad or was difficult)
		b. Adopting personal strategies	i. Type of strategies	Data relating to how personal strategies, e.g. setting up reminders/using computer/breaking down activities may facilitate or get in the way of putting plans into practice
		c. Engagement with activities	i. Type of activities liked	Data relating to participants' engagement in activities including type of activities liked
			ii. Previous involvement in activities	Data relating to participants' engagement in activities including previous involvement in activities
			iii. Current involvement in activities	Data relating to participants' engagement in activities including current involvement in activities)
		d. Choosing tailored topics	i. Tailored topic	Data relating to the topics that participants chose to work on in sessions (Keeping mentally active, physically active, socially active, making decisions, getting the message across, receiving a diagnosis, keeping healthy)

3. Role of support for engagement (Support + engagement)	a. Role of supporter	i. Barriers and facilitators	Data relating to support from supporter/lack of support as a barrier/facilitator
	b. Relationship between participant and dementia advice worker	i. Barriers and facilitators	Data relating to the relationship between participant and DAW (positive/negative relationship) and support given by dementia advice worker as a barrier/facilitator for activity engagement/engagement with PRIDE
	c. Support from family	i. Barriers and facilitators	Data relating to support/lack of support from family for activity engagement/PRIDE engagement as a facilitator or barrier
	d. Organisational support	i. Barriers and facilitators	Data relating to organisational support/lack of organisational support as a facilitator or barrier for activity engagement/PRIDE engagement
	e. Support from others	i. Barriers and facilitators	Data relating to support/lack of support from other people e.g. neighbours/friends for activity engagement/PRIDE engagement as a facilitator or barrier
	f. Level of support	i. Enough support	Data relating to the level of support being enough for activity engagement
		ii. Not enough support	Data relating to the level of support not being enough for activity engagement
4. Participant characteristics *(Participants' characteristics which may affect whether the participant engaged with the intervention/chosen activities)*	a. Cognitive processes	i. Knowledge	Data relating to knowledge and how knowledge/ability may facilitate or get in the way of engagement with PRIDE/PRIDE activities
		ii. Memory	Data relating to memory and how memory may facilitate or get in the way of engagement with PRIDE/PRIDE activities
		iii. Communication	Data relating to communication and how communication may facilitate or get in the way of engagement with PRIDE/PRIDE activities
		iv. Understanding	Data relating to understanding and how understanding may facilitate or get in the way of engagement with PRIDE/PRIDE activities
	b. Emotional reactions	i. Positive emotional reactions	Data relating to positive emotional reactions which may facilitate or get in the way of engagement with PRIDE/PRIDE activities (e.g. confidence)
		ii. Negative emotional reactions	Data relating to negative emotional reactions which may facilitate or get in the way of engagement with PRIDE/PRIDE activities (e.g. worries)
	c. Motivations	i. Liking/disliking activities	Data relating to participants' likes and dislikes of activities which may facilitate or get in the way of engagement with PRIDE
		ii. Wanting/not wanting to do activities	Data relating to participants wanting or not wanting to engage in activities which may facilitate or get in the way of engagement with PRIDE/PRIDE activities
		iii. Activity fulfilment as own responsibility	Data relating to participants views that the fulfilment of their plans is their own responsibility
		iv. Motivations for taking part in PRIDE	Data relating to participants' motivations for taking part in PRIDE (e.g. helping others, helping participant, support, awareness, motivation, wanting to meet others, wanting to keep going, wanting ideas, wanting to improve confidence)

	d. Physical health	i. Facilitators and barriers	Data relating to how physical health may facilitate or get in the way of engagement with PRIDE/PRIDE activities
	e. Experience with activities	i. Facilitators and barriers	Data relating to how experience of carrying out activities previously may facilitate or get in the way of engagement with PRIDE/PRIDE activities, may include discussions surrounding new vs old activities
	f. Personal characteristics	i. Facilitators and barriers	Data relating to how participants' personal preferences and characteristics facilitate or get in the way of engagement with PRIDE/PRIDE activities (e.g. being different to others/having an open mind)
5. Environment *(Environmental characteristics which may affect whether the participant engaged with the intervention/chosen activities)*	a. Ease of access to PRIDE and chosen activities	i. Location of PRIDE and activities	Data relating to location factors which may facilitate or get in the way of engagement with PRIDE/PRIDE activities (e.g. relocating/location of activities/convenience)
		ii. Transport	Data relating to how ease of access to activities on transport may facilitate or get in the way of engagement with PRIDE/PRIDE activities (e.g. facilitators/barriers).
		iii. Resources/opportunity	Data relating to how ease of access in relation to resources/opportunities (e.g. cost/necessary tools) may facilitate or get in the way of engagement with PRIDE/PRIDE activities (e.g. facilitators/barriers).
	b. Weather	i. Facilitators and barriers	Data relating to how weather may facilitate or get in the way of engagement with PRIDE/PRIDE activities
6. Activity characteristics *(Activity characteristics which may affect whether the participant engaged with the intervention/chosen activities)*	a. Temporal characteristics	i. Length of time taken to do activity	Data relating to the length of time taken to do the activity and how it relates to engagement with PRIDE/PRIDE activities (e.g. helps/gets in the way)
		ii. Regularity of activity	Data relating to how often the activity occurs and how it relates to engagement with PRIDE/PRIDE activities (e.g. helps/gets in the way)
		iii. Completion of activity	Data relating to whether the activity can be completed/has an endpoint and how it relates to engagement with PRIDE/PRIDE activities (e.g. helps/gets in the way)
	b. Difficulty of activities	i. Facilitators and barriers	Data relating to how the difficulty of activities may facilitate or get in the way of engagement with PRIDE/PRIDE activities (Easy/difficult)

Appendix 5-5. COM-B and thematic analysis examples for fidelity of delivery

Theme	Subtheme	An example of barrier/ facilitator	Psychological Capability	Physical Capability	Physical opportunity	Social opportunity	Automatic motivation	Reflective motivation
I. Providers' knowledge	1) Prior knowledge	Barrier	E.g. Lack of knowledge on what to do from current role and about the participant	N/A	E.g. Lack of use of strategies used in role (e.g. note taking), not having time to meet participants prior to delivery	E.g. need to familiarise due to swapping between PRIDE and job role, not having met participant prior to delivery	E.g. Worries about knowing how to deliver/doing it right as it is a new part of role	E.g. evaluation that experience influences knowledge, belief to trust in prior knowledge to know how to deliver
		Facilitator	E.g. Prior knowledge of participant, working with people with dementia, and resources/ environment	N/A	E.g. manual as useful icebreaker with no prior knowledge of participant, prior work strategies helpful for delivery	E.g. participant engagement, met participant prior to delivery	E.g. Experience as increasing confidence	E.g. Evaluation that experience influences knowledge for delivery, belief to trust in own prior knowledge to know how to deliver
	2) Skills to deliver	Barrier	E.g. Lack of knowledge on how to deliver the intervention as specified in manual, Lack of memory of information from training	N/A	E.g. lack of time in training session to practice/learn everything, not knowing how to use manual or Dictaphones	E.g. Involvement of supporter, knowledge of participant, lack of guidance from PRIDE researchers, lack of knowledge on tailoring	E.g. Anxiety about manual/not knowing how to deliver and time since training/audio-recordings	E.g. Negative beliefs about delivering something for first time
		Facilitator	E.g. Increased experience and skills to fill in forms	N/A	E.g. Resources (e.g. instruction sheet/own prompts), opportunity to practice, training day	E.g. resources/support from researchers, participant engagement, Researchers giving sheet on how to deliver PRIDE, support from other DAWs	E.g. Delivering PRIDE enjoyable and comfortable once know what doing	E.g. Understanding about what PRIDE is and why it's important
II. Providers' attributes	3) Beliefs about PRIDE as part of job	Barrier	E.g. Not remembering how to deliver until thought of in relation to job, not knowing	N/A	E.g. not familiar with manual/not knowing how to use it, training as	E.g. work remit changing, needing to deal with other job related issues whilst	E.g. Delivery as daunting until realise it's something they already do, not as natural as	E.g. Belief that PRIDE not right for DAW

		how to deliver/difficult to deliver (outside of remit), difficult not to blur job role and PRIDE together		not providing skills in the same way as job, possibility of sessions being longer due to work related issues	delivering PRIDE, needing shared knowledge from other DAWs for delivery	delivering job role	
	Facilitator	E.g. thinking of it as more formal version of job helped to remember how to deliver, experience delivering PRIDE facilitating knowledge, knowledge of how to deal with difficulties from job as useful, relevant knowledge	N/A	E.g. Not having lots of paperwork unlike job, not familiar with manual/knowing how to use it, easier if delivered as part of job	E.g. Needing other people to help know how to delivery, easier to deliver if part of job, experience from job as helpful, maintaining separation (different DAW deals with participant outside of intervention)	E.g. Exciting to get involved in new evidence based interventions, enjoy seeing people with dementia and delivery	E.g. Belief that it's good to get involved in new things and that there is value in PRIDE above and beyond role
4) Personal characteristics	Barrier	E.g. Individual differences in knowledge, learning style and anxieties about doing it right	N/A	E.g. approach to using manual, views on manual and training, level of instruction	E.g. type of provider and participant influence use of manual, personal styles relating to delivery	E.g. Feelings towards delivering PRIDE as differing	E.g. Beliefs about the use of PRIDE, and delivery
	Facilitator	E.g. Differences in learning style for training and experience	N/A	E.g. Approach to delivery as influenced by checklist (because of personality), use of personal strategies	E.g. Personal styles to delivery in relation to tailoring the intervention to participants and to delivery	E.g. wanting to deliver everything, enjoying spending time with people with dementia	E.g. Beliefs about the use of PRIDE as useful for people living with dementia (personally and professionally)
5) Feelings about delivery	Barrier	E.g. Anxiety about not knowing how to deliver PRIDE/whether doing it right, using Dictaphones and	N/A	E.g. Negative feelings in relation to manual and audio-recorders, time since	E.g. feeling as though not coming across well to participants, worries about participant expectations, and tailoring, and delivering	E.g. anxiety about delivery, audio-recordings and delivering certain topics. Manual as off-putting	E.g. Belief about needing to deliver it as planned, evaluating delivering PRIDE as planned as restricted

				delivering the first session		training increasing nerves, tiring fitting, tiring trying to fit delivery in around full time job	when do not know participant		
			Facilitator	E.g. Delivery as going better than expected – manual becoming friend is easier to deliver, familiarity with delivery increased confidence	N/A	E.g. needing time to familiarise, experience, sticking to manual as comfortable / being more flexible over time with experience (increased confidence)	E.g. support from other DAWs reducing anxieties, encouragement from researchers helpful, worries relating to delivering without supporter	E.g. enjoying delivery and feeling more comfortable sticking to the manual	E.g. Belief that PRIDE is useful and plans to deliver as planned
III.	Adaptation of PRIDE in relation to participants' needs	6) Ease of adaptation with fidelity	Barrier	E.g. set structure and delivery of some topics and aspects of the manual as difficult, lack of knowledge	N/A	E.g. time needed to get used to manual which becomes easier to deliver, manual restricting	E.g. Changing approach to use of manual and content of intervention depending on participant	E.g. worries about how participants view providers, and upsetting participants	E.g. planning to deliver it however best for participants, evaluations that delivering with fidelity is unrealistic in dementia interventions
			Facilitator	E.g. set choices as helpful for knowledge, experience, ability, some topics easier to deliver	N/A	E.g. Resources (session guide/manual) useful for delivery	E.g. changing approach to delivery and content of intervention depending on participant engagement	E.g. more comfortable with less fidelity or sticking to delivering manual as outlined	E.g. Belief that delivery depends on type of dementia, evaluations on benefits of delivery, plan to deliver it however best for participant
		7) Participant engagement	Barrier	E.g. Some aspects of PRIDE as confusing to deliver, lack of participant engagement	E.g. Sick leave	E.g. manual as a resource to use in relation to participants, time needed (differs depending on	E.g. Participant engagement/wants as influencing delivery	E.g. Not wanting to upset participants with less awareness/engagement	E.g. Belief that lack of supporter meant that there was no clear definition, evaluation that delivering with fidelity meant sessions flowed

					engagement)			less/less engagement
		Facilitator	E.g. Participant engagement = easier to deliver, some topics easier to deliver than others	N/A	E.g. Not needing to cancel any sessions, manual facilitating choices/engagement, changing use of manual with different participants, time taken to deliver differed for participants	E.g. Participant engagement/wants as influencing delivery	E.g. feeling rewarded from delivery, happy that participants engaged	E.g. Evaluation that PRIDE can still work without awareness into dementia, beliefs about PRIDEs usefulness
IV. Logistical considerations	8) Organisational constraints	Barrier	E.g. too much information to deliver (1st session), uncertainty of delivering, difficult to remember PRIDE and jobs – too much time in between	N/A	E.g. difficulties making appointments due to busy calendars, too much time in between, participants need more sessions, difficult to find time to deliver PRIDE alongside full time job	E.g. Delivery as more within another service remit, needing to support both people – lots of other topics coming up (makes time longer), timing variability due to participant/DAW availability	E.g. Anxieties as making delivery longer, working full time and delivering PRIDE as draining	E.g. Belief that PRIDE needs to be more tightly structured
		Facilitator	E.g. Familiarity with PRIDE, strategies for delivery	N/A	E.g. arranging own calendars, fitting well around work commitments, nothing competing for time, more time to deliver when working part time	E.g. Facilitative work environment – able to manage own diaries	E.g. Time needed to feel familiar and confident, liking delivering PRIDE (conflict with time availability)	E.g. Belief that no paperwork is a good thing and that delivery would be smoother if PRIDE took on by organisations
	9) Social support for	Barrier	E.g. needing peer support, difficult to	N/A	E.g. Resource format not	E.g. needing more support with technical	E.g. delivery as unnatural, needing	E.g. Lack of supporter for delivery – belief that

delivery		deliver without others input,		suitable for providing support for delivery, not enough support with Dictaphones, training too long before actual delivery	processes, involvement of support, lack of participant engagement as barrier	reassurance, Dictaphones not working as upsetting	harder to deliver
	Facilitator	E.g. need specific guidance on how to deliver, difficult to support both people in the time allowance, peer support/researcher support as helpful for knowledge	N/A	E.g. resource provision by researchers, support from DAWs to go through paperwork	E.g. Researchers as helpful – provision of materials/support, DAW support– reducing anxieties, Participant/supporter engagement	E.g. enjoying seeing people with dementia, and delivering, surprised that it works	E.g. Belief that shared experience was helpful

Appendix 5-6. COM-B and thematic analysis examples for engagement

Theme	Subtheme	Barrier/ facilitator	Psychological Capability	Physical Capability	Physical opportunity	Social opportunity	Automatic motivation	Reflective motivation
I. Participants' attributes	1) Preferences for PRIDE activities	Barrier	E.g. difficulty and memory stopping doing activities liked	E.g. physical health stopping doing activities liked	E.g. lack of resources, appropriate location, time and money to do activities liked	E.g. unable to do activity without support, other people distracting from activity	E.g. feelings of embarrassment, lack of enjoyment or want to do activity. Not liking certain types of transport, or worrying about resources breaking	E.g. evaluations of intervention (supporter not knowing what's going on and cannot support) or activities (location not appropriate)
		Facilitator	E.g. ease of taking part in PRIDE and doing activities	E.g. having the physical ability to do liked activities	E.g. location appropriate to do liked activities, manual (resource) helping to locate activities, weather facilitating	E.g. Support to help organise activity, having people to do activity with	E.g. As enjoying/liking and wanting to do activities	E.g. being interested in activities, activities needing to have an end, beliefs about activities being good
	2) Beliefs about PRIDE	Barrier	E.g. little knowledge of what intervention is, confusion between PRIDE and other support services	E.g. Inability of participant to drive anymore putting pressure on supporter to drive to support daily activities	E.g. physical location as not appropriate, needing a summary document between sessions, PRIDE taking time away from other activities and PRIDE as not providing information	E.g. Supporter as not unable to take part as participant wanted to do it on own	E.g. Missing doing activities used to do (PRIDE gives new ideas)	E.g. belief that intervention not as helpful for supporter if not involved, belief that PRIDE may not be understandable to everyone, belief that PRIDE was not providing enough information
		Facilitator	E.g. Beliefs that manual is helpful as participant is only just becoming familiar with dementia diagnosis and belief that PRIDE is easy to	N/A	E.g. PRIDE resources helpful for finding activities and easy to follow, location easy, summary document would be helpful	E.g. Having someone to talk to as helpful, providing encouragement needed	E.g. Liking activities in manual and liking PRIDE	E.g. beliefs that PRIDE is relevant, interest in activities, evaluation of benefits of PRIDE

				understand.					
	3)	Feelings about PRIDE	Barrier	E.g. Worries relating to not remembering the intervention/demented diagnosis Worries about not remembering the intervention/dementia diagnosis. Not being able to do activities liked due to diagnosis and memory	E.g. physical health making it difficult to do activities that would like to do, health appointments preventing from doing activities	E.g. liking/wanting to do activities but having no way of getting there/not wanting to go too far, worries about driving, daunting PRIDE resources,	E.g. lack of support for getting to activities, not liking people at activity, frightened to do activity on own	E.g. feelings of negativity talking to people, anxiety to do activities, manual as exhausting	E.g. Prior evaluations of what the activity may have been like
			Facilitator	E.g. feeling pleased with activity as easy to do	E.g. liking to do activities that physically able to do	E.g. wanting to find an easily accessible bridge club, having an accessible place to do liked activity, activities feeling like a safe environment	E.g. DAW helping to overcome worries, supporter helping to do activities like to do	E.g. liking to do activities and liking PRIDE DAWs/researchers	E.g. evaluation of type of activities liked and positive evaluations of the PRIDE intervention
II. Participants' capability	4)	Physical health	Barrier	E.g. Dementia limiting ability to do physical activity, or other conditions as limiting concentration	E.g. physical health problems/appointments limiting ability to do activities	E.g. lack of time due to health appointments, activities taking longer	E.g. needing other people to help due to physical health	E.g. anxiety of doing activity on own, not liking driving, not wanting to have a walking aid	N/A
			Facilitator	E.g. able to do activity easily despite concentration (social support)	E.g. Physical health as enabling to do activities	E.g. weather, ease of use of resource	E.g. doing activities with someone else	E.g. Pleased with activity, like doing activities that keep going health wise	E.g. positive evaluation of activities, plans to do activities to keep physically healthy

	5) Cognitive factors	Barrier	E.g. Memory of PRIDE / DAW / diagnosis, reading ability, finding words to communicate, knowledge of how to do activity / use technology / diagnosis, difficulties understanding PRIDE	E.g. Unable to walk to activities and difficulties using public transport, difficulties doing activities alone due to physical health	E.g. time, location, complexity of resources, lack of summary document, other competing activities	E.g. having no one to do activities with, not liking people at activity, not knowing who is who (PRIDE vs other support)	E.g. lack of confidence in communication, not enjoying activities first time, embarrassment if unable to do activity. Manual as exhausting to read	E.g. Evaluation that denied diagnosis until PRIDE, as not planning but just doing, evaluation of not being able to do activities that are too difficult
		Facilitator	E.g. ability to understand manual, and knowing how to do activities, once done it once, activity is easy to do	E.g. Ability to do physical activities still know how to do	E.g. PRIDE resources helpful for memory, manual easy to understand	E.g. DAW provision of PRIDE resources to help memory, asking for help if not know how to do it, availability of other people to do activity with	E.g. liking to do activities/liking activities but not knowing what to do	E.g. Positive evaluations of PRIDE giving ideas, belief that doing activity will help memory
III. Opportunity to engage	6) Accessibility	Barrier	E.g. difficulties organising activities due to memory, lack of knowledge on how to use public transport, or to find places, needing a summary to know what activities chosen, forgetting to write down activities	E.g. Physical health as making it difficult to get anywhere to do activities	E.g. Weather, time, location/transport, and expense of activities as barriers to activities, lack of PRIDE summary, length of manual and paperwork is tedious	E.g. People not providing support to get somewhere and having no one to do activity with	E.g. anxieties of travelling, manual as exhausting	E.g. Evaluation that some available places aren’t appropriate/others aren’t accessible, belief that manual as difficult to understand for some people, evaluation that PRIDE paperwork is tedious, evaluation that PRIDE is more questions than information

	Facilitator	E.g. ability to understand information, get to places once been there before and activities and resources easy to do / use	E.g. Physical health as helping to get to activities	E.g. Accessible/appropriate location, prompts (reminders/diary/to do sheets) and weather conditions	E.g. DAW/supporter helping to organise activity and getting to activity, and having someone to do activity with	E.g. Liking to skim through manual, wanting to do activities but not knowing how to get there/having somewhere accessible, liking activity	E.g. Evaluation that PRIDE is relevant and useful
7) Support	Barrier	E.g. dementia requiring participants to move closer to family, not knowing what to do and needing help, not knowing who is PRIDE and who is other support, not knowing what participants need support with due to lack of involvement	E.g. Needing support to help people to get to places by transport	E.g. needing support to find places to do activity, needing support to find out about resources	E.g. not having anyone to do activity with, not being able to do activity on own	E.g. not wanting to talk to people who are not close friends in case of embarrassment, e.g. anxiety to do activity prior to support	E.g. evaluation that PRIDE was more helpful for participant but not enough support from DAW for supports not involved – need summary
	Facilitator	E.g. Support helping to know how to do activities	E.g. Support as helping to get to places / do activities	E.g. Support to organise activities and find places to do activities, manual for prompt to choosing activities (do not need support)	E.g. Support from DAW/supporter/neighbour/organisations as helpful to do activities (emotional/practical)	E.g. wanting some support on to do activities, looking forward to seeing DAW, looking forward to activity – good support network	E.g. Evaluation that speaking to DAW /family member was helpful
8) Activity characteristics	Barrier	E.g. Difficulty of activities, length of activities and difficulty filling in calendar every day	E.g. activities too difficult for health, take longer due to physical health	E.g. lack of accessibility of activity, frequency of activity, length of activity	E.g. Not having people to do activity with as barrier	E.g. not liking things which don't have an end	e.g. Evaluation that some activities with characteristics are harder to do

	Facilitator	E.g. ease of activities	E.g. physical health facilitates some activities done previously	E.g. Accessibility of activity, frequency of activity, length of activity	E.g. Having people to do activity with as facilitator, support helping simplify the activity	E.g. liking things which have an end/to win	E.g. evaluation of types of activities liked (with an end/can do)

Appendix 6-1. Links between COM-B domains, intervention functions and policy categories, as proposed by Michie et al (2014)

COM-B model domain	**Intervention functions**	**Policy categories**
Psychological capability	Education	Communication/marketing, Guidelines, Regulation, Legislation, Service provision
	Training	Guidelines, Fiscal measures, Regulation, Legislation, Service provision
	Enablement	Guidelines, Fiscal measures, Regulation, Legislation, Environmental/social planning, Service provision
Physical capability	Training	Guidelines, Fiscal measures, Regulation, Legislation, Service provision
Social opportunity	Restriction	Guidelines, Regulation, Legislation
	Environmental restructuring	Guidelines, Fiscal measures, Regulation, Legislation, Environmental/social planning
	Modelling	Communication/marketing, Service provision
	Enablement	Guidelines, Fiscal measures, Regulation, Legislation, Environmental/social planning, Service provision
Physical opportunity	Training	Guidelines, Fiscal measures, Regulation, Legislation, Service provision
	Restriction	Guidelines, Regulation, Legislation
	Environmental restructuring	Guidelines, Fiscal measures, Regulation, Legislation, Environmental/social planning
	Enablement	Guidelines, Fiscal measures, Regulation, Legislation, Environmental/social planning, Service provision
Reflective motivation	Education	Communication/marketing, Guidelines, Regulation, Legislation, Service provision
	Persuasion	Communication/marketing, Guidelines, Regulation, Legislation, Service provision
	Incentivisation	Communication/marketing, Guidelines, Fiscal measures, Regulation, Legislation, Service provision
	Coercion	Communication/marketing, Guidelines, Fiscal measures, Regulation, Legislation, Service provision
Automatic motivation	Training	Guidelines, Fiscal measures, Regulation, Legislation, Service provision
	Incentivisation	Communication/marketing, Guidelines, Fiscal measures, Regulation, Legislation, Service provision
	Coercion	Communication/marketing, Guidelines, Fiscal measures, Regulation, Legislation, Service provision
	Persuasion	Communication/marketing, Guidelines, Regulation, Legislation, Service provision
	Environmental restructuring	Guidelines, Fiscal measures, Regulation, Legislation, Environmental/social planning
	Modelling	Communication/marketing, Service provision
	Enablement	Guidelines, Fiscal measures, Regulation, Legislation, Environmental/social planning, Service provision