Designing for Empathy in Elderly Care

Exploration of Opportunities to Deliver Behaviour Change Interventions through mHealth Applications, to Promote Empathic Behaviour in Elderly Home Care Nursing Assistants

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Abstract

Background The Swedish population is ageing quickly and the system for elderly home care is under increasing pressure. Staff turnover is high, nursing assistants are reporting stress, and employers have to recruit staff lacking sufficient experience. These factors are barriers to empathic care, considered essential to patient health outcomes. Elderly care should rely on cognitive empathy, be other-oriented and improve the client's situation based on contextual understanding. There is a need for education and support for nursing assistants, so that they can provide empathic care.

Purpose The thesis explores empathy as a skill in elderly home care to identify opportunities of promoting empathy in the client-nursing assistant interaction, by means of behaviour change interventions delivered through an mHealth application that nursing assistants already use at work.

Method A group interview was conducted with six nursing assistants from four elderly home care organisations in a Swedish municipality, to learn about their experience of empathy at work, and factors affecting their ability to give empathic care. The respondents were using the same mHealth application to get and provide information about client visits. The Behaviour Change Wheel framework was used to analyze behavioural drivers of empathic care in elderly home care.

Results Influences on empathic behaviour was identified in all 14 domains in the Theoretical Domains Framework. 13 target behaviours, 7 Intervention Functions and 45 Behaviour Change Techniques were suggested as suitable candidates to investigate for intervention development.

Conclusion Empathy seems possible to promote through resource-efficient digital behaviour change interventions. Future studies may use this work as a starting point for development of interventions to promote empathic behaviour in elderly care.

Keywords: empathy, elderly care, nursing assistants, Behavior Change Wheel, Theoretical Domains Framework, COM-B, digital behavior change interventions.

Preface

Not all heroes wear capes. But if you look past the outfit of a nursing assistant in elderly care, a hero is what you might find. On a daily basis, they cope with death, injury, mental health disorders, disappearances, declining physical health and endless documentation, to take care of us when we no longer can take care of ourselves.

They will help us dress, try to make the morning coffee just the way we want it, chitchat by the table, keep our homes clean and help us if we fall out of bed at night, even sit by us when we close our eyes for the last time, if no one else will. To the best of their ability, they strive to let us maintain our dignity and our humanity under challenging circumstances. Their work requires empathy, skills and resources, to assess needs, build rapport and provide the right care for each individual.

We need to ask how we can help nursing assistants provide our elderly with care that is warm, empathic and professional, in a work environment that grows more challenging by the day. Apart from raising funding, hiring more highly qualified staff or dedicate resources to workplace training, what other options are available?

I am in the business of developing digital tools for nursing assistants in elderly care, and it seems to me that our industry has a great, seemingly untapped potential to support our customers through the digital tools already in place. We should identify opportunities to contribute to better structures, knowledge, and working environment in elderly care. We should use the knowledge we have about empathy to help nursing assistants stay empathic and healthy. This thesis is a small step in that direction, and hopefully more will follow.

Linköping, 2019

Malin Bergqvist

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Table of Contents

Terms and abbreviations

Elderly home care, home care
Care services provided to an elderly person in their home, by a nursing assistant from a care provider. The service typically includes assistance with e.g. personal hygiene, household services, training, socialization and can also involve more advanced medical assistance.

Care provider
Organization providing elderly home care.

Nursing assistant, care worker, home care staff
Staff providing personal care to clients in elderly home care. There are two subgroups of this profession (assistant nurses and nursing aides, separated by education) in Sweden, but they will be regarded as one group in this thesis, since they perform the same tasks.

Client
The elderly person receiving care.

eHealth
The use of information and communication technologies (ICT) for health (WHO, 2018).

mHealth
Medical and public health practice supported by mobile devices, such as mobile phones, patient monitoring devices, personal digital assistants (PDAs), and other wireless devices (WHO Global Observatory for eHealth, 2011).

BCW (Behaviour Change Wheel)
A framework for developing behaviour change interventions in a systematic manner, grounded in theory and based on the COM-B model of behaviour.

COM-B
A psychological model of behaviour, stating that Capability, Opportunity and Motivation are what drives our Behaviour.

TDF (Theoretical Domains Framework)
A theoretical framework dividing the COM-B components into 14 more specific domains.

BCT (Behaviour Change Techniques)
The smallest active components of behaviour interventions developed within the Behaviour Change Wheel framework.

APEASE
Stands for Affordability, Practicability, Effectiveness, Acceptability, Safety, Equity; Five criteria aiding pragmatic selection of intervention functions and behaviour change techniques.

Target behaviour
The behaviour an intervention is trying to change, in order to bring about a desired result.

Targeted helping
The kind of empathic behaviour desirable in care professionals, aiming to improve a given situation of the other party, based on an understanding of their problem and experience.

Introduction

This chapter provides a background framing the purpose and research questions of this thesis, and also states delimitations as well as conflicting interests. It concludes by outlining the remaining chapters.

Background

There is a growing demand of nursing assistants in the Swedish elderly care, because the population is ageing rapidly: the group of citizens older than 80 is expected to increase by 76 percent between 2015 and 2035, from 500 000 to 890 000 (Nilsson, 2016). At the same time, fewer people are pursuing work in elderly care. According to the same prognosis, the lack of nursing assistants will grow to 160 000 by 2035.

The changing nature of Swedish elderly care is only making matters worse. Organizations that used to provide services such as shopping, cleaning and a bit of personal care are now expected to provide more qualified care for clients with (often undiagnosed) mental or physical disorders. This requires special competence in the home care staff and makes recruitment even more difficult (Bergqvist, 2014). Statistics Sweden has suggested that training and education should be provided at the workplace, to improve the conditions of meeting these changing demands (2015).

The increasingly difficult task to provide care for an ageing population not only affects the clients, but also the staff. A survey study by the Swedish union *Kommunal* from 2012 showed that stress and psychological fatigue were experienced on a weekly basis by the vast majority of their participating members working in elderly care (Wondemeneh, 2013). Large shares of the respondents reported having a hard time taking breaks, and being understaffed.

Unmanageable workloads, burnout, inadequate staffing, skill mix and limited resources have previously been linked to lack of empathy towards patients (Aiken, Rafferty & Sermeus, 2014) and undermines quality in elderly care (Schell & Kayser-Jones, 2007). Empathy is widely acknowledged by the medical community as a vital aspect of good healthcare (e.g. Berhin, Theodoridis & Lundgren, 2014; Goodwin & Trocchio, 1987; Hofmeyer et. al., 2016; Holm, 2009; Åström et. al., 1991), improving both patient health outcomes and the experience of receiving care. Empathy can also increase job satisfaction in healthcare professionals and decrease the risk of burnout (Hojat, 2016; Åström et. al.,

1991). In other words, it is important for the frontline staff in elderly care to maintain their empathic ability, despite these organizational challenges.

Empathy training at work, as well as changing the workplace culture to be more supportive of empathy, has been suggested (Schell & Kayser-Jones, 2007). Larsson et. al. (2012) identified self-efficacy, along with some other potentially modifiable factors, to target with interventions for frontline staff in elderly care. One way of providing training might be through digital behaviour change interventions (DBCIs): digital tools that aim to promote certain behaviours. They can contribute to positive and cost-effective change in behaviour that lead to poor patient outcomes (Michie & West, 2016). DBCIs may be a way to adapt successful and cost-efficient strategies of improving the conditions for more empathic care, and make them accessible for more organizations, by integrating them into the daily work.

Worth noting with many DBCIs is that they fail because goals are vague, ambitious, and hard to start working on (Fogg, 2009). Furthermore, many interventions seem to be developed according to the ISLAGIATT principle: It Seemed Like A Good Idea At The Time (Michie West, Campbell et. al., 2014), and not according to a systematic approach. This is not to say these projects cannot succeed, but it can be difficult to know why a particular intervention worked or did not work.

To develop interventions that may successfully promote empathic interaction between nursing assistants and clients in elderly care, designers and developers of such interventions need an evidence-based starting point. Starting easy and small to test what works, then iterating and scaling successful interventions, is the safest way to design for behaviour change, according to Fogg (2009).

This work is meant to give designers and developers something substantial to lean on during those first small, explorative steps forward, whether they come from behaviour change research and do not know much about empathy or elderly care, or if they come from any of those areas and are beginning to learn about behaviour change.

Purpose and Research Questions

The purpose of this thesis is to find out if there is a way to behaviourally define the professional empathy that is desirable in elderly care, and how that empathy can be promoted evidence-based and systematically through behaviour change interventions.

The thesis attempts to answer the following questions:

1. What kind of empathic behaviour is desirable in care work and is there a way to define it?
2. Which are the factors affecting such empathic behaviour in nursing assistants working in elderly home care?
3. Can interventions to promote such empathic behaviour be developed in an evidence-based, systematic manner, with transparent links between theory and design choices?
4. Which opportunities to promote such empathic behaviour may be worth exploring, given that the intervention channel is an app for staff in elderly care?

Delimitations

The target group of this study was limited to nursing assistants in Swedish elderly home care, who use the mHealth application Phoniro App to access and register information about client visits in home care. The process of intervention development was limited to investigating the drivers of empathic care, and did not include design or evaluation of identified intervention opportunities.

Declaration of Interests

This thesis concludes my studies at the master's programme in cognitive science at Linköping University. The result of this research will also inform the continued user experience design work I do at the welfare technology company Phoniro AB. Phoniro creates technological solutions to help organizations in elderly care provide better service, both in Sweden and abroad. The type of application referred to in the research questions is developed by Phoniro and used by nursing assistants today.

Outline

The chapter on empathy in healthcare provides an explanation of *empathy*, how empathy is beneficial in healthcare, and how we might influence it. This section will propose a theory-based way to think about empathy when developing behaviour interventions to promote targeted helping in healthcare settings.

The chapter on behaviour change theory introduces some theories in *persuasive technology* and *behaviour change*, after which it dives deeper into the theoretical framework chosen for this study: *The Behaviour Change Wheel.*

The method chapter describes how data for this thesis was collected and analyzed based on the Behaviour Change Wheel framework for intervention development.

The results chapter presents an analysis of factors that affect empathic care, using the COM-B model and Theoretical Domains Framework. The analysis includes a system of behaviours that could be targeted through behaviour change interventions, to promote empathy in elderly care. Furthermore, the results include a suggestion of relevant intervention functions and behaviour change techniques to explore in future studies, based on a set of criteria developed for behaviour change intervention design.

The discussion chapter reviews the methods and results from an academic perspective, and reflect on what could have been done differently.

The last chapter, Future Research, suggests how to proceed with designing interventions based on the findings of this study.

Empathy in Healthcare

This chapter covers what empathy is believed to be, ways to increase and measure it, how empathy is beneficial in the interaction between nursing assistants and clients, and how the wrong circumstances may lead to compassion fatigue.

Defining empathy

Despite its long history as an observed phenomenon, empathy as a topic of research is still developing. In fact, the scientific community has yet to reach full consensus on what the term empathy really represents, as decades of research have left us with a multitude of competing definitions. Some definitions focus on the ability to experience the world from someone else's perspective, e.g. "the imaginative transposing of oneself into the thinking, feeling, and acting of another, and so structuring the world as he does" (Dymond, 1949, p. 127) or "the unique capacity of the human being to feel the experience, needs, aspirations, frustrations, sorrows, joys, anxieties, hurt, or hunger of others as if they were his or her own" (Clark, 1980, p. 187).

Other definitions distinguish between feeling and understanding feelings, e.g. "the intellectual or imaginative apprehension of another's condition or state of mind without actually experiencing that person's feelings" (Hogan, 1969, p. 308) or "the ability to share or recognize emotions experienced by another person" (Haas et. al., 2015, p. 1).

Yet others bring a behavioural response into the definition, e.g. "empathy is a multidimensional construct with cognitive, affective and behavioural elements" (Wang et. al. 2003) or "empathy is the drive or ability to attribute mental states to another person/animal, and entails an appropriate affective response in the observer to the other person's mental state." (Baron-Cohen & Wheelwright, 2004, p. 168).

The above definitions seem to be focusing on roughly the same things, emphasizing the capability of understanding, and to some extent also vicariously experiencing, the needs of another, which in some cases drives a behavioural response. Empathy is described as a capacity, a drive, an ability, an apprehension - or simply a construct. It seems to involve attribution, recognition, transposing, feeling, structuring and sometimes responding. But are these attempts to describe the same phenomenon, different aspects of the same phenomenon, or *different* phenomena? Some have suggested we should forget about the term empathy altogether and replace it with

something less ambiguous (Levy, 1997). To make matters even more confusing, the term *empathy* is often used interchangeably with seemingly similar terms such as *sympathy* and *compassion* (Hofmeyer et. al., 2016; Hojat, 2016; Holm, 2001; Pérez-Manrique & Gomila, 2018, Batson, 2010).

The lack of scientific agreement raises some red flags in empathy research, because it is difficult to know if studies have even investigated the same things. But many researchers agree that empathy should be regarded as a phenomenon with multiple dimensions, that somehow relate to each other.

Cognitive and affective dimensions of empathy

One increasingly established distinction made in the context of healthcare, is that between *cognitive* and *affective* ways of responding empathically. These dimensions are triggered by different stimuli, lead to different behavioural responses and contribute to different patient health outcomes; the ability to *cognitively* understand what the patient is experiencing leads to more productive action than *affectively* taking on the patient's feelings entirely (Hojat et. al., 2011; Hojat, 2016; Holm, 2001, Schell & Kayser-Jones, 2007). We will revisit this claim in a bit.

Neuroscientific research has provided some basis for the distinction: cognitive empathic responses activate the *parasympathetic* neurological regulatory process, while affective empathic responses activate the *sympathetic* neurological regulatory process (Hojat, 2016). Putting together these neuroscientific findings with the observed outcomes of affective and cognitive empathy respectively, Hojat (2016) suggests affective empathy is driven by self-oriented motives, aiming to avoid aversive experiences and reduce the emotional and physiological arousal we feel, when we empathize with someone. Cognitive empathy, on the other hand, is driven by other-oriented motives; we understand someone else's situation and want to reduce their distress without any expectation of reward. De Waal (2008) makes a similar case, describing three levels of empathy driven by self-oriented or other-oriented motives:

1. **The first level, *emotional contagion*,** is a simple emotional state-matching and emotional response, either passively or actively passed on between humans and other animals.
2. **The second level, *sympathetic concern*,** is other-oriented and combines emotional contagion with cognitive empathy, resulting in behaviours such as consolation to relieve the distressed party.

3. **The third level, *empathic perspective-taking,*** is also other-oriented but manifests in so-called *targeted helping*, meaning help that is fine-tuned to someone else's specific situation and goals.

In a literary review of complex forms of empathy in non-human animals, Pérez-Manrique & Gomila (2018) take a step back from motivations behind empathic behaviour, and propose observable, operative criteria to the levels of empathy in the above model (applicable to both human and non-human animals), in terms of reactions, responses and outcomes. They add to the model that other-oriented empathic behaviours seem to occur at a moderate level of arousal, while the self-oriented emotional contagion (also referred to as personal distress) is triggered by an aversive emotional overarousal.

The behavioural aspect of empathy has been contrasted with simply cognitively or affectively relating to the experiences and needs of others, as a meaningful distinction in healthcare settings too (Holm, 2009; Hofmeyer et. al., 2016; Hojat, 2016). Hofmeyer et. al. (2016) emphasize "the action to respond to the needs and suffering of a person, not just a general intention to care for others" (p. 202) in their explanation of *compassion*, contrasted with empathy because it includes a behavioural response. Holm's model of empathy (2009) has been used in research on empathy in healthcare, encompassing the affective, cognitive and behavioural aspects in a simpler manner than de Waal's model does. It states that empathy consists of the following:

- **An affective reaction** to the feelings of another person.
- **A cognitive assessment** of someone else's situation.
- **A behavioural dimension** where we take action out of need to get our understanding across to someone we empathize with.

Comparatively, de Waal's model does a better job of distinguishing well-meaning (but not necessarily individually tailored) *consolation* from the flexible and fine-tuned *targeted helping* we expect of healthcare professionals. It is the latter we should aim to stimulate with behaviour change interventions.

For this purpose, it is proposed that developers of behaviour change interventions should think of empathy as a psychological phenomenon driving behaviour, that to varying extent can be based on cognitive and affective processing of another's situation and needs. Empathy can occur at different levels of emotional arousal, cause different reactions leading to different responses and ultimately different outcomes. It is

not a new definition of empathy, but a slightly different way of explaining the model described by de Waal (2008) and elaborated by Pérez-Manrique & Gomila (2018), adding in the cognitive and affective dimensions, so the model makes sense in the light of these two dimensions being discussed in medical research. This is illustrated in the figure below.
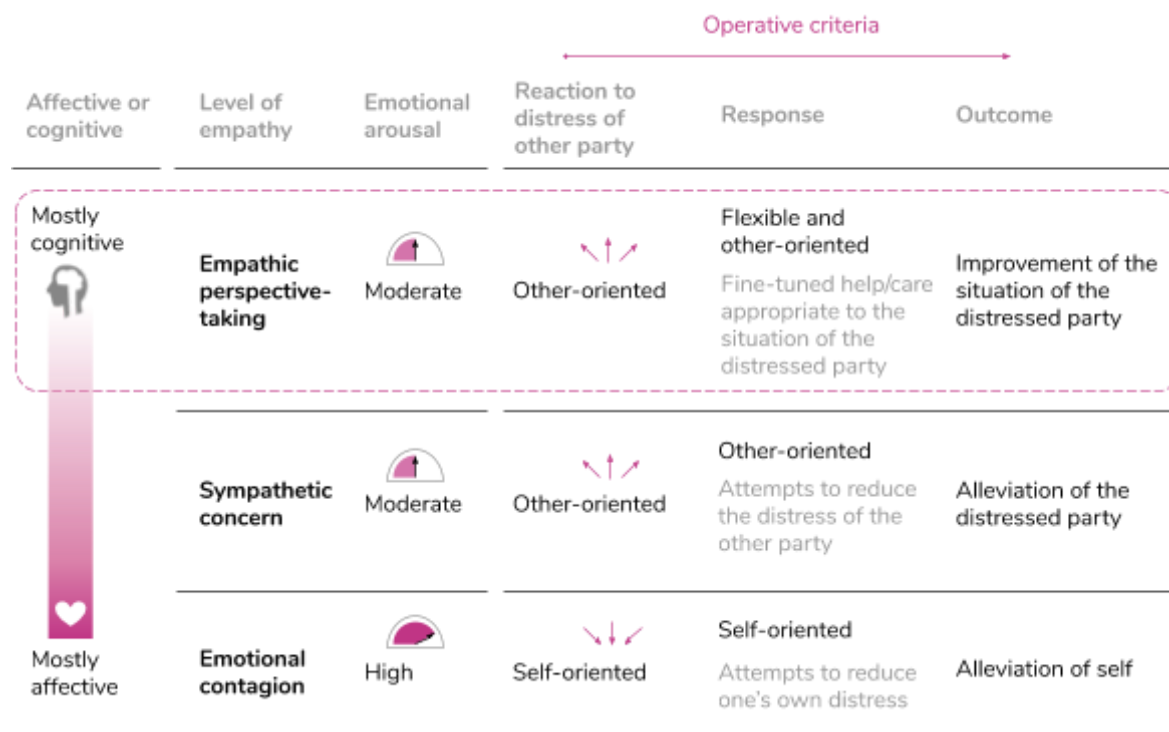
Figure 1: A model of different aspects of empathy, combining the affective-cognitive dimension with the levels of empathy (de Waal, 2008) and the operative criteria (Pérez-Manrique & Gomila, 2018). The empathic perspective-taking is the type of empathy desirable in healthcare, where staff regulate their emotional arousal, react oriented towards the patient, and fine-tune their response to the situation, aiming to improve it.

Addressing the dimensions of empathy separately becomes important when designing for systematic behaviour change in elderly care, since they will yield different behavioural outcomes. The behaviour change interventions we want to create, should aim to stimulate cognitive empathy, and regulate affective empathy, in order to stimulate targeted helping behaviour oriented towards clients, while providing the nursing assistant with the opportunity and capability to perform that behaviour.

Professional empathy

Empathic ability on the cognitive side of the spectrum is promoted by medical research. Healthcare professionals should strive to understand or identify with a patient's or client's emotional state, but not join them (Hojat, 2016; Schell & Kayser-Jones, 2007). Holm (2001) suggests this understanding requires a balance between cognitive and affective empathy, and the ability to switch between observing and experiencing. Bloom (2013) compares the affective dimension of empathy to a spark, necessary to ignite the cognitive empathy we need to help in constructive ways.

A literature study (Bäck-Edberg & Janmarker, 2009) explored the perception of what abilities in nurses create proficient encounters with patients, from the perspectives of patients and relatives as well as nurses themselves. Being present, by showing engagement, kindness, warmth and humour, was perceived by patients as very important. A friendly tone of voice, person-centered view of patients and openness in conversation were also key factors in creating a meaningful relationship even during a short encounter, which can leave the patient feeling better afterwards. Central in all of this is authenticity in the nurse's attempt to connect with and treat patients with empathy, and they must dare to meet the patient in their current state. Active listening requires the ability to show respect and empathy, and have the courage to sometimes stay silent (Bäck-Edberg & Janmarker, 2009).

Svärdson (1999) proposes a strategy of three steps to empathize, which reflects Holm's model of empathy (2009). It begins with an internal experience and might result in empathic behaviour:

1. **Decentering:** switch to the other person's perspective.
2. **Role-taking:** interpret the feelings and emotions of the other person, which involves both affective and cognitive processes.
3. **Communicating:** shape the action.

An interview study of registered nurses in Sweden presented four categories of strategies to improve one's empathic ability (Berhin, Lundgren & Theodoridis, 2014):

- **Patient-focused strategies** made use of knowledge about the patient, and reflections about how the patient experiences certain situations. The nurses would inform themselves about the patient's background and remind themselves

that the experience of receiving healthcare can be both physically and mentally taxing.

- **Choosing a state of mind** was perceived as helpful, and could be achieved by e.g. visualizing oneself in the other's situation, or focusing on staying neutral during communication with patients and colleagues, or simply fake empathy until the body actually feels it.
- **Focusing on one's own part in the situation** also helps, by reminding oneself of the role as nurse, or applying one's own personal philosophy of life.
- **Indirect factors** leading to a change in empathy were also found to be important. Stress and lack of time leads to a decrease in empathy. Possibilities for the nursing assistants to train their empathy are important. The way the board prioritizes and what care means in the specific organization matters too.

Supervisors recognizing skillful empathic care has been identified as a factor contributing to empathic ability in nursing home frontline staff, along with other parameters such as approbation from clients' families, and feeling pride in work as well as in having delivered good care (Schell & Kayser-Jones, 2007).

Increasing empathic ability in healthcare staff

Empathy has been shown to increase with practice and training during medical education, for example through use of video recordings of oneself during medical training (Werner & Schneider, 1974), guidance from a mentor (Holm et. al., 1997), group seminars letting students reflect on patient outcomes in case scenarios and vignettes (Richardson, Percy & Hughe, 2015) and problem-based learning (Holm & Aspegren, 1999; Rasoal & Ragnemalm, 2011).

Simulations using fake patients are common during medical training, and medical students are evaluated by mentors on their ability to give empathic, patient-centered care. Simulation training has been suggested as a suitable form of intervention to promote empathy (Goodwin & Trocchio, 1987) and found effective for healthcare professionals already working in elderly care (Braun, Cheang & Shigeta, 2005; Ross, Anderson, Kodate et al, 2013).

Especially relevant for elderly care are interventions that train staff to care for clients with dementia, which requires a different skill set in communication, needs assessment and understanding of clients' situation (Beer, Hutchinson & Skala-Cordes, 2012). Talking to the clients who receive care, e.g. in a discussion panel at work, has

been recommended to increase empathic understanding among nursing assistants (Goodwin & Trocchio, 1987).

Hojat (2016) summarizes ten evidence-based approaches to enhance empathy in healthcare education as well as practice, with the majority of research findings referencing educational interventions that take place outside the work schedule (such as role playing, audio or video-taping of patient encounters, shadowing a patient, or the study of literature and the arts). One approach that may be integrated into the work is exposure to role models, probably most suitable for less experienced staff. Hojat goes on to emphasize the lack of research on the long term effects of educational interventions, and suggests empathic capability is something that must be used regularly to be maintained.

Compassion fatigue in healthcare professions

Healthcare professionals can exhaust their empathic ability during unfortunate circumstances, and compassion fatigue can set in, primarily associated with the use of affective empathy (Hojat, 2016). Headaches, sleep disturbances, mood swings, depression and poor concentration are hallmarks of compassion fatigue (Lombardo & Eyre, 2011), which can result in avoidance of certain situations or patients, and a decrease in ability to empathize. Ultimately, it can lead to compromised patient safety and medical errors, as well as burnout for the nursing assistants (El-bar, Levy, Wald & Biderman, 2013). Compassion fatigue can occur abruptly and as a direct result of someone else's trauma (Bride, 2007). A review of the existing research on compassion fatigue found several other factors related to compassion fatigue, such as intense patient settings, conflicting family and patient interaction, delivering bad news and low managerial support (Sorensen et. al., 2016).

The risk increases for more inexperienced nursing assistants who have poor coping strategies. One study found that nursing assistants in nursing care facilities displayed a significantly high level of compassion fatigue compared to normalized scores of other helping professionals (Harris, 2015), which might suggest nursing assistants work under particular pressure, or lack sufficient coping mechanisms.

The occurrence of compassion fatigue might be decreased by educating healthcare providers about its existence, as well as strategies for prevention and coping (Sorensen et. al., 2016). Self-care, education and teamwork were mentioned as significant preventative strategies. Self-efficacy, which is the belief that you can accomplish something, and ability to cope with emotionally trying situations were

reported to decrease the risk. Learning how to recognize and prevent compassion fatigue can increase resilience and coping mechanisms (Sorensen et. al., 2016). Short, regular meditations during the workweek, to increase compassion satisfaction as well as decrease compassion fatigue and stress, proved to be effective in a study with oncology nurses (Hevezi, 2016). A mindfulness-based group intervention, with meditative exercises such as body scans and mindful communication, was also successful in reducing compassion fatigue, and was well-received by participating oncology nurses in another recent study (Duarte & Pinto-Gouveia, 2016a).

Measuring empathy

Many tests devised to measure empathy are not constructed based on conceptualizations of empathy commonly agreed upon. So far, there are no particularly promising results of trying to determine how empathy tests correlate with each other (Hojat, 2016), which suggests researchers have not been measuring the same things.

The three most known and widely used instruments for measuring empathy are questionnaires developed to measure empathic ability in the general public. In support of the validity of *the Empathy Scale* (Hogan, 1969), high scorers were shown to be more likely to be sensitive to social nuances, whereas low scorers were more likely to e.g. be less sensitive to the feelings of others. The construct validity assumed by the test has been questioned (Baron-Cohen & Wheelwright, 2004), because factor analyses have ended up with differing factors (Blank Greif & Hogan, 1973; Johnson, Cheek & Smither, 1983). *The Emotional Empathy Scale* (Mehrabian & Epstein, 1972), is not very well fit for healthcare purposes, because it primarily measures affective aspects of empathy. Lastly, *the Interpersonal Reactivity Index* (Davis, 1983), is intended to measure four aspects of empathy: perspective taking, empathic concern, fantasy and personal distress. Factor analyses have yielded varying support of these subscales (Cliffordson, 2002; Litvack-Miller, McDougall & Romney, 1997).

The most known instrument for measuring empathy in healthcare is the *Jefferson Scale of Physician Empathy (JSPE)* a 20 item questionnaire answered on a 7-point Likert scale (e.g. Hojat, 2016). The scale measures empathy as a predominantly cognitive attribute involving understanding and an intention to help, which corresponds well with the aspect of empathy this thesis focuses on. Overlap has been found between the JSPE and the IRI dimensions perspective taking and empathic concern (Hojat, Mangione, Kane & Gonnella, 2005).

The *Empathetic Care Scale*, a 10 item self-report scale, was developed to measure empathic care (supporting clients' socioemotional capabilities and addressing their emotional needs), by measuring extra-role behaviour, emotional support and relational richness (Lamberton, Leana & Williams, 2015). Results from two factor analyses suggested the psychometric properties were desirable, the scale had convergent and discriminant validity, and no social desirability bias. The questions are phrased in accessible language, such as "Part of my job is to get to know pretty much everything about the people I care for". Whereas the other questionnaires range between 20-64 items, this short and accessible test may be suitable for use in "real life settings" to measure impact of an intervention promoting empathic behaviour, beyond research projects, and this scale may be interesting to further examine for this purpose.

Chapter summary

This chapter has introduced research on empathic behaviour. Being empathic is more complex than just "being nice" to clients. The practice of empathy is not constricted to a few specific behaviours to check off at every encounter with a patient or client, but rather a flexibility and attentiveness in choosing the right behaviour for each situation, because healthcare professionals encounter so many vastly different situations in their daily work. There are, however, certain behaviours that are recommended (such as active listening), and strategies one can use to provide empathic care that serves both client and nursing assistant.

Behaviour change interventions may therefore benefit from focusing on these more clearly defined behaviours and strategies, in initial stages of exploration. The type of empathy interventions should focus on is mainly cognitive and results in a fine-tuned targeted helping behaviour, which requires emotional regulation.

Promoting empathy in healthcare professionals has been tried through various types of interventions, such as simulation training, experiencing the client's side of the situation, reflection exercises, positive reinforcement and observing role models. Many forms of training require that the staff set aside time to meet in groups and that the interventions are delivered in person by a facilitator, who may need certain qualifications.

There is a need for interventions that may be delivered as more integrated parts of workshifts, to make uptake possible despite high workload, limited resources and limited access to mentors.

Behaviour Change Theory

Behaviour change can refer to change in a pattern of behaviour, to an occurance of some behaviour that is not normally performed, and to preventing some behaviour from being performed (West & Michie, 2016). Interventions to change behaviour can come in many shapes and forms, but especially digital behaviour change interventions (DBCIs) can be effective and cost-effective because they can be adapted to user needs, e.g. through personalization, they can deliver information in an engaging, rewarding way, and they can elicit, record and use responses for these purposes (West & Michie, 2016). How we can make use of technology to promote desired behaviours and attitudes is the focus of a research area called *persuasive technology*, which combines theory from various disciplines, such as social psychology, organizational psychology and marketing (Spagnolli, Chittaro & Gamberini, 2016). This part of the theory chapter provides a brief introduction to theories and best practices in the field, and describes in greater detail the approach chosen for this study.

Ethics of digital behaviour change interventions

Early on in this part of the chapter, the issue of ethics in behaviour change interventions should be addressed. Information technology always influences attitudes and behaviours in some way (Oinas-Kukkonen & Harjumaa, 2008), even though it might not be the intention of designers and developers. Designing for behaviour change should only mean exerting this influence consciously and responsibly. It may be argued that extra caution should be taken when introducing interventions that promote behaviour change in a workplace, where employees have no choice but to use the technology, and perhaps this is especially important in healthcare. Persuasive technology should never coerce or condition users into changing their attitudes and behaviours; these strategies are explicitly excluded from the field (Fogg, 2003). Participatory design, involving users themselves in the design process, could reduce the likelihood of creating unethical behaviour change interventions (Davis, 2010). This will also increase the likelihood of designing for a behaviour change that is desirable to the intended users.

It is worth noting that any change in behaviour is difficult to bring about in people who do not wish to change that behaviour (Fogg, 2009). Building on small successes has been identified as the best way forward, e.g. by choosing an easy target group and

promoting a behaviour they are already willing to adapt, through a channel they are already familiar with, as this minimizes resistance to change (Fogg, 2009).

Theories, constructs and frameworks in behaviour change

Some of the most cited theories and constructs (key concepts in theories) in behaviour change address how individual factors (e.g. knowledge and personality) influence behavioural choices (Whitlock et. al., 2002), as described in the *Health Belief Model* (Rosenstock, Strecher & Becker, 1988) and *Theory of Planned Behaviour* (Ajzen, 1985). Others address processes between the individual and primary groups providing social identity and support, as described in the *Social Cognitive Theory* (Bandura, 1986). A recent literature study (Spagnolli, Chittaro & Gamberini, 2016) looking at current concepts in persuasive technology, identified some constructs that seem to work as predictors and preconditions for behaviour change. One such construct is *self-efficacy*, which has been observed to enhance an individual's motivation (Bandura, 1977; Schunk, 1995). Self-efficacy seems to influence whether someone engages in a given health behaviour, as well as their motivation to change that behaviour (Holloway & Watson, 2002). Two more constructs recurring in the literature study are the *credibility* of a message delivered through a persuasive technology, and *locus of control*, which is the amount of control a person experiences over the outcomes of a situation.

The area has grown to include plenty of theories on behaviour change, and a lot of overlap in psychological constructs. A recent study identified 83 theories on behaviour change (Michie, West, Campbell, et. al., 2014). Principles, step-by-step processes, concepts, models, strategies and categorizations have been developed by various researchers in the field (see e.g. Oinas-Kukkonen & Harjumaa, 2008; Fogg, 2009, Halko & Kientz, 2010), trying to systemize the design of behaviour change interventions and connect them to scientific evidence. Designers, developers and researchers just entering the field are faced with a plethora of partly overlapping and competing approaches to choose from. To make behaviour change more accessible and tangible, pragmatic frameworks have been designed to consolidate information about existing theories and constructs. The purpose is to provide the missing links between psychological theories and design choices. This study will use a framework called the Behaviour Change Wheel.

The Behaviour Change Wheel

A systematic review analyzed 19 frameworks for behaviour change design, rating the frameworks on comprehensiveness, coherent structure and link to a model of behaviour (Michie, van Stralen & West, 2011). No framework met these criteria, and instead a new framework, the Behaviour Change Wheel (BCW), was created as a synthesis of the 19 analyzed frameworks. The Behaviour Change Wheel provides a structured path from behavioural analysis of the problem, all the way to tested interventions. The framework centers around a model of behaviour that connects to nine intervention functions synthesized from previous research. These intervention functions can be further broken down to smaller and more specific components: behaviour change techniques. Also included in the framework are nine policy categories, that describe how policy changes can be used to implement behaviour change interventions. Policy changes will however not be included in the scope of this thesis, as the delivery channel of behaviour change interventions is limited to a mobile application used by nursing assistants in elderly care organizations that have purchased it. The Behaviour Change Wheel framework is visualized as a wheel with the model of behaviour at its core, followed by the intervention functions, and lastly the policy categories.
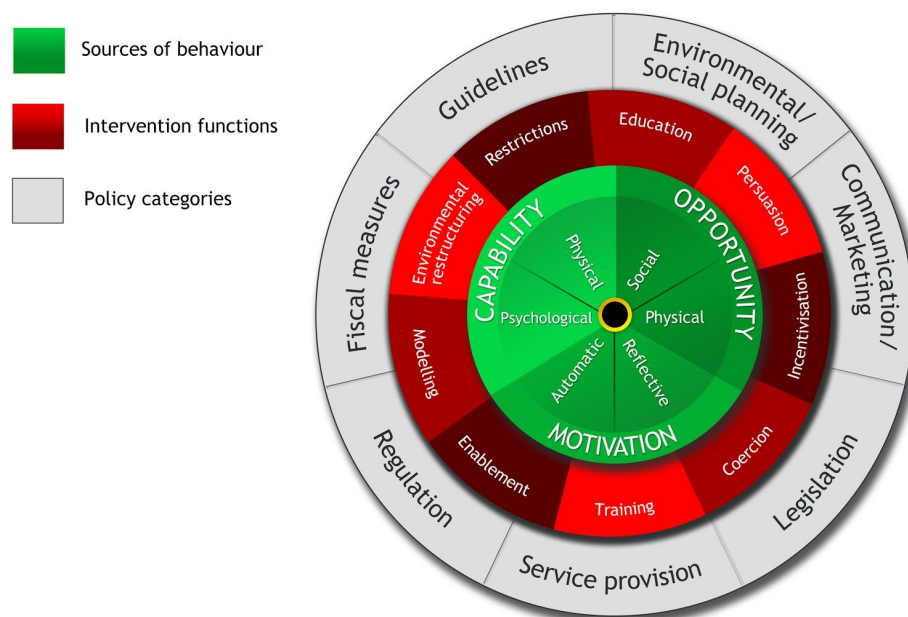

Figure 2: The behaviour Change Wheel (Michie, van Stralen & West, 2011).

23

The three layers of the Behaviour Change Wheel framework represent an assumption that behaviour exists within a context, beyond the individual person. Humans and their health are affected at different social levels, as illustrated by the Social Model of Health (Dahlgren & Whitehead, 2007). This model layers factors at the individual, community and societal level, all affecting the health and life of any individual.
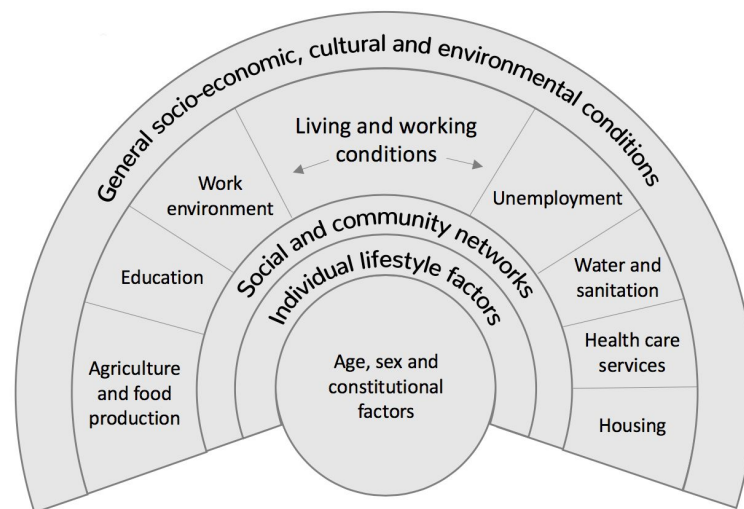
Figure 3: The Social Model of Health assumes that the health of an individual depends on various factors at different societal levels. Adapted from Dahlgren & White (2007).

The Behaviour Change Wheel emphasizes that behaviour change is most likely to occur and be effective when interventions are introduced simultaneously and consistently on all levels (Michie, Atkins & West, 2014). With a solid understanding of the surrounding factors that may influence a given behaviour, designers can develop effective and resource-efficient interventions.

The Behaviour Change Wheel framework outlines a process to analyze the behaviour that needs to change, identify relevant ways to change it, create content for those interventions and finally implement them. The primary purpose of the process is to encourage exploration of possible interventions, and systematically choose the options that seem most suitable for the problem at hand (Atkins & Michie, 2015). This creates a transparency in the intervention design and ideally lets one trace design decisions back through choice of intervention content, to mode of delivery, to selected behaviour change techniques, to selected intervention functions, to identified relevant influences on the behaviour that needs to change. The framework does not prescribe a certain level of detail or ambition in the research, but rather encourages researchers and designers to be transparent about the implementation and reasoning behind each step, and to adapt

their process according to the time and resources available. The process is outlined in the following figure.
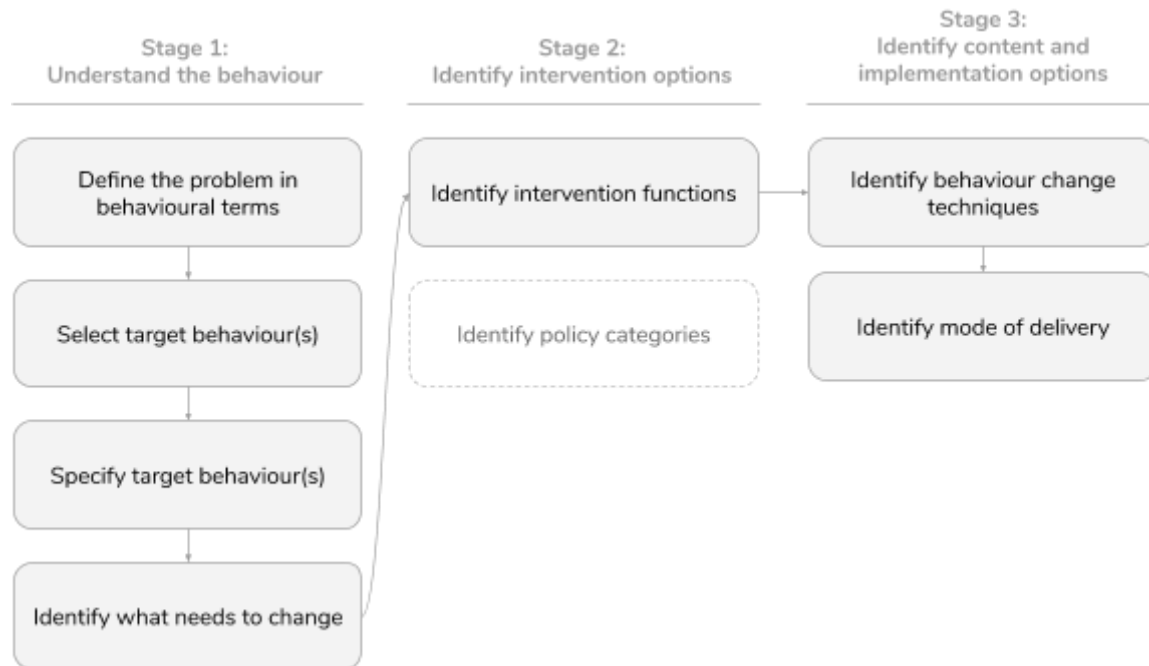
Figure 4: The Behaviour Change Wheel process, adapted from Michie, Atkins & West (2014). The research goes through three stages, starting by defining the problem in behavioural terms and then analyzing how to influence that behaviour, The second stage delimits intervention options according to what strategies are likely to work for the problem at hand (evaluation of policy categories is excluded from the scope of this thesis). In the third stage, designers get specific about which behaviour change techniques could successfully be applied to the selected intervention functions, what content to fill them with and how to deliver them to the target group.

The process is described in a linear fashion, but allows for circling back and forth between the steps, as more more is learned along the way (Michie, Atkins & West, 2014). It should, however, preferably start with an analysis of the behavior that needs to change.

The COM-B model of behaviour

The heart of the Behaviour Change Wheel is its model of behaviour, which conceptualizes behaviour as part of a system of elements interacting with each other. It states that for a behaviour to occur, the individual must be *capable* of performing the behaviour, and have the *opportunity* to do so (West & Michie, 2016). Lastly, the *motivation* to engage in a certain behaviour needs to be greater than the motivation to

engage in any competing behaviour. These three influences can be broken down into sub-influences of behaviour, according to the following figure.
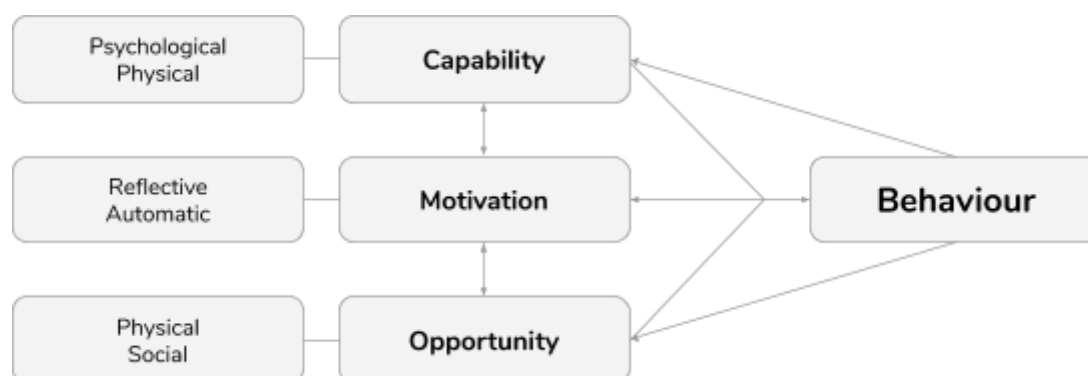
Figure 5: The COM-B model of behaviour, adapted from West & Michie (2016). A behaviour can occur when capability and opportunity allow for it, and the motivation to engage in the behaviour outweighs the motivation to engage in other behaviours. Motivation is influenced by, and also influences, the different aspects of both capability and opportunity. Engaging in the behaviour creates a feedback-loop into all three influences, possibly strengthening them.

The model can be used in behaviour change design, letting designers identify which elements need to change for a behaviour to change. The COM-B model has previously been applied to behaviour problems in the context of healthcare, such as smoking cessation (Gould, Bar-Zeev, Bovill, et. al., 2017), changing dietary behaviour (Atkins & Michie, 2014), and improving hearing-aid use (Barker, Atkins & Lusignan, 2016).

The Theoretical Domains Framework

The components of the COM-B model can be further broken down into 14 theoretical domains. This framework resulted from an integration of 33 behaviour change theories, and comprises a total of 128 psychological constructs (Atkins & Michie, 2015). Despite its intimidating name, the purpose of the Theoretical Domains Framework (TDF) is to make this mass of behaviour change theories more accessible to designers, creating a coherent step between the overarching COM-B model and intervention functions that aim to bring about behaviour change.

Table 1: The domains of the Theoretical Domains Framework (Michie, Atkins & West, 2014).

Domain	Definition
Knowledge	An awareness of the existence of something

Skills	An ability or proficiency acquired through practice
Social/professional role and identity	A coherent set of behaviours and displayed personal qualities of an individual in a social or work setting
Beliefs about capabilities	Acceptance of the truth, reality or validity about an ability, talent or facility that a person can put to constructive use
Optimism	The confidence that things will happen for the best or that desired goals will be attained
Reinforcement	Increasing the probability of a response by arranging a dependent relationship, or contingency, between the response and a given stimulus
Intentions	A conscious decision to perform a behaviour or a resolve to act in a certain way
Goals	Mental representations of outcomes or end states that an individual wants to achieve
Memory, attention and decision processes	The ability to retain information, focus selectively on aspects of the environment and choose between two or more alternatives
Environmental context and resources	Any circumstance of a person's situation or environment that discourages or encourages the development of skills and abilities, independence, social competence and adaptive behaviour
Social influences	Those interpersonal processes that can cause individuals to change their thoughts, feelings, or behaviours
Emotion	A complex reaction pattern, involving experiential, behavioural, and physiological elements, by which the individual attempts to deal with a personally significant matter or event
Behavioural regulation	Anything aimed at managing or changing objectively observed or measured actions

The Theoretical Domains Framework has been used in addition to the COM-B model of behaviour to identify barriers as well as opportunities to influence a certain behaviour. The TDF has also been used to identify implementation problems, as well as design interventions related to health, such as transfusion prescribing (Francis et. al., 2009) and hand hygiene (Dyson et. al., 2011). A generic questionnaire has been developed for inquiring about the 14 domains, to inform the selection of strategies to change behaviour (Huijg et. al., 2014).

Intervention functions

Intervention functions can be described as broad, high-level strategies to change behaviour. They are part of the Behaviour Change Wheel framework and were synthesized from the 19 frameworks analyzed in the crafting of the BCW (Michie, Atkins & West, 2014).

Table 2: Definitions of intervention functions (Michie, Atkins & West, 2014).

Intervention functions	Definition
Education	Increasing knowledge or understanding
Training	Imparting skills
Modelling	Providing an example for people to aspire to or imitate
Persuasion	Using communication to induce positive or negative feelings or stimulate action
Incentivisation	Creating expectation of reward
Coercion	Creating expectation of punishment or cost
Restriction	Using rules to reduce opportunity to engage
Environmental restructuring	Changing the physical or social context
Enablement	Increasing means/reducing barriers to increase capability (beyond education) or opportunity (beyond environmental restructuring)

Intervention functions are selected depending on which influences on the desired behaviour are identified as relevant. To help designers select appropriate intervention functions, a set of pragmatic criteria was construed by the Behaviour Change Wheel developers. This set of criteria, APEASE, will be described later on in this chapter.

Behaviour change techniques

The final step of the intervention design is to select behaviour change techniques (BCTs) relevant to the intervention functions. A taxonomy of behaviour change techniques was developed, to create a coherent language around the smallest active components in behaviour change interventions (Michie, Wood, Johnston, Abraham, Francis et. al., 2015). A BCT is "observable, replicable, an irreducible component of an intervention designed

to change behaviour and a postulated active ingredient within the intervention" (Michie, Atkins & West, 2014, p. 145). See two examples of BCT definitions in the below table.

Table 3: Example of behaviour change technique definitions (Michie, Atkins & West, 2014).

Behaviour change technique	Definition	Example
6. *Comparison of behaviour*		
6.2 Social comparison	Draw attention to others' performance to allow comparison with the person's own performance.	Show the doctor the proportion of patients who were prescribed antibiotics for a common cold by other doctors and compare with their own data.
7. *Associations*		
7.1 Prompts/cues	Introduce or define environmental or social stimulus with the purpose of prompting or cueing the behaviour. The prompt or cue would normally occur at the time or place of performance.	Put a sticker on the bathroom mirror to remind people to brush their teeth.

In a suite of studies, 93 behaviour change techniques were identified in research literature, described and grouped into 16 categories (Michie, Wood, Johnston, Abraham, Francis et. al., 2015). Some BCTs can be mapped onto the theoretical domains framework, and it is likely that the remaining BCTs cannot because they originate from multiple domains. Detailed descriptions of the BCTs and how they link to intervention functions as well as the theoretical domains framework can be found in *The Behaviour Change Wheel: A Guide to Designing Interventions* (Michie, Atkins & West, 2014). To select appropriate BCTs, designers are encouraged to apply the APEASE criteria in the evaluation process.

APEASE criteria

The APEASE criteria were formulated to help designers of behaviour change interventions make pragmatic decisions regarding intervention functions and behaviour change techniques (Michie, Atkins & West, 2014). The criteria concern practical issues designers have to consider when crafting and implementing interventions to solve a real world problem. The criteria are described in the table below.

Table 4: Description of the APEASE criteria (Michie, Atkins & West, 2014).

Criterion	Description
Affordability	Interventions often have an implicit or explicit budget. It does not matter how effective, or even cost effective it may be if it cannot be afforded. An intervention is affordable if within an acceptable budget it can be delivered to, or accessed by, all for whom it could be relevant or of benefit.
Practicability	An intervention is practicable to the extent that it can be delivered as designed through the means intended to the target population. For example, an intervention may be effective when delivered by highly trained staff with extensive resources but in routine practice this may not be achievable.
Effectiveness and cost-effectiveness	Effectiveness refers to the effect size of the intervention in relation to the desired objectives in a real world context. It is distinct from efficacy which refers to the effect size of the intervention when delivered under optimal conditions in comparative evaluations. Cost-effectiveness refers to the ratio of effect to cost. If two interventions are equally effective then clearly the most cost-effective should be chosen. If one is more effective but less cost-effective than another, other issues such as affordability come to the forefront of the decision-making process.
Acceptability	Acceptability refers to the extent to which an intervention is judged to be appropriate by relevant stakeholders (public, professional, and political). Acceptability may be different for different stakeholders.
Side effects/safety	An intervention may be effective and practicable but have unwanted side-effects or unintended consequences. These need to be considered when deciding whether or not to proceed.
Equity	An important consideration is the extent to which an intervention may reduce or increase the disparities in standard of living, wellbeing, or health between different sectors of society.

Dimensions of intervention delivery

When designers have settled on one or more behaviour change techniques to implement, they can get down to the specifics of the intervention; namely the eight dimensions of delivering it (Whitlock et. al., 2002; Davidson et. al., 2003; Michie, Atkins & West, 2014). The mode of delivery is a given for this particular study; since it explores the possibilities of promoting healthy empathic behaviour through an mHealth application, the mode of delivery will be through a tablet/mobile phone app. The other seven dimensions to consider are listed in the table below.

Table 5: Definitions of intervention dimensions (Michie, Atkins & West, 2014).

Content	What was delivered
Provider	Who delivered it
Setting	Where it was delivered
Recipient	To whom it was delivered
Intensity	Over how many contacts it was delivered
Duration	Over what period of time it was delivered
Fidelity	The extent to which it was delivered as thought

Chapter summary

Digital behaviour change interventions (DBCIs) can make use of behaviour change theory to help people change their behaviour. It is recommended to develop DBCIs with the intended user group, to increase the likelihood of the interventions being ethically sound and the behaviour change desirable by the users. There are many competing theories and principles for behaviour change, though few approaches to designing interventions are both pragmatic and well-grounded in theory.

The Behaviour Change Wheel framework provides a structured approach to behaviour change intervention design in the healthcare domain, combining knowledge from several frameworks and theories on behaviour, in a format that is intended for research as well as application by designers and developers without a background in psychology. The step-by-step process can be adapted to the means available for each new project, and the frameworks supports a pragmatic way of developing and testing

interventions. A behaviour that needs to change is fed into the framework, and influences on that behaviour are analyzed using the COM-B model of behaviour. This generic model maps onto the more detailed Theoretical Domains Framework (TDF), that allows intervention designers to be more detailed in their behavioural analysis. Designers use defined sets of criteria to select influences to target with one or more intervention functions and behaviour change techniques. Lastly, the intervention designed is concretized by defining dimensions of delivery. A overview of the process is visualized below, outlining the constructs mentioned above.
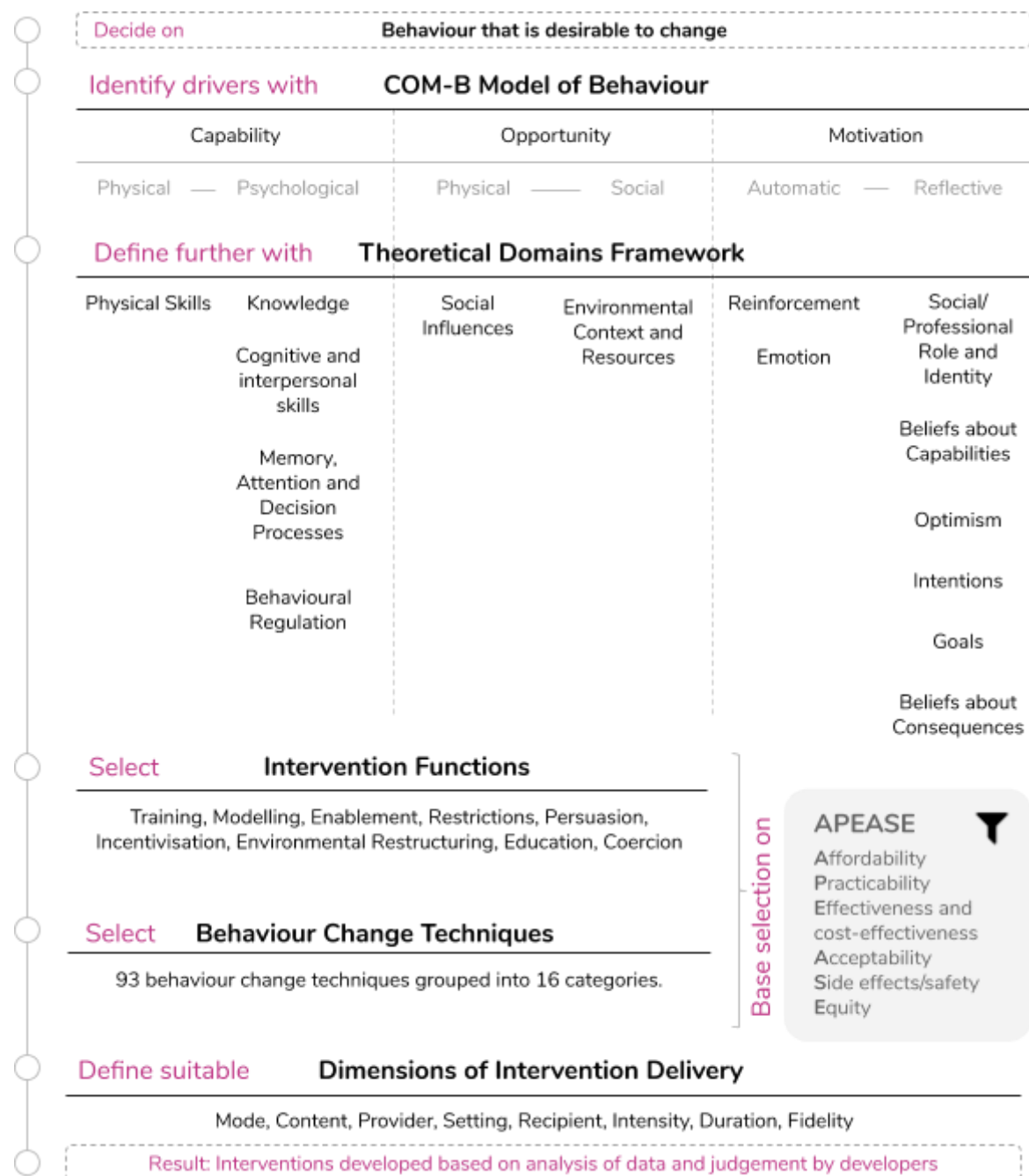
Figure 6: The Behaviour change Wheel framework includes models, techniques and evaluation criteria that were crafted to connect to each other through theory. This figure provides an overview of these constructs and how they lead up to a designed intervention.

Method

Outline of procedure

The overarching approach to answer the research questions of this thesis was to apply the Behaviour Change Wheel framework on lessons drawn from previous research, current guidelines and best practices concerning empathy in care work, combined with interview data from Swedish nursing assistants.

Steps from the Behaviour Change Wheel framework were adapted and applied in this study, to form an understanding of existing opportunities to support targeted helping in elderly care through digital behaviour change interventions. The process is visualised in the figure below, and each step will be described in the following sections.

Figure 7: Visualization of the procedure applied in the thesis work.

Data collection

A group interview was conducted, to gather empirical data regarding the beliefs, experiences, needs and attitudes among nursing assistants in Swedish elderly care, that could be compared to previous research, current guidelines and best practices

concerning empathy in care work. The combination of these would form the basis for assessing opportunities to support empathic care through digital behaviour change interventions.

Participants

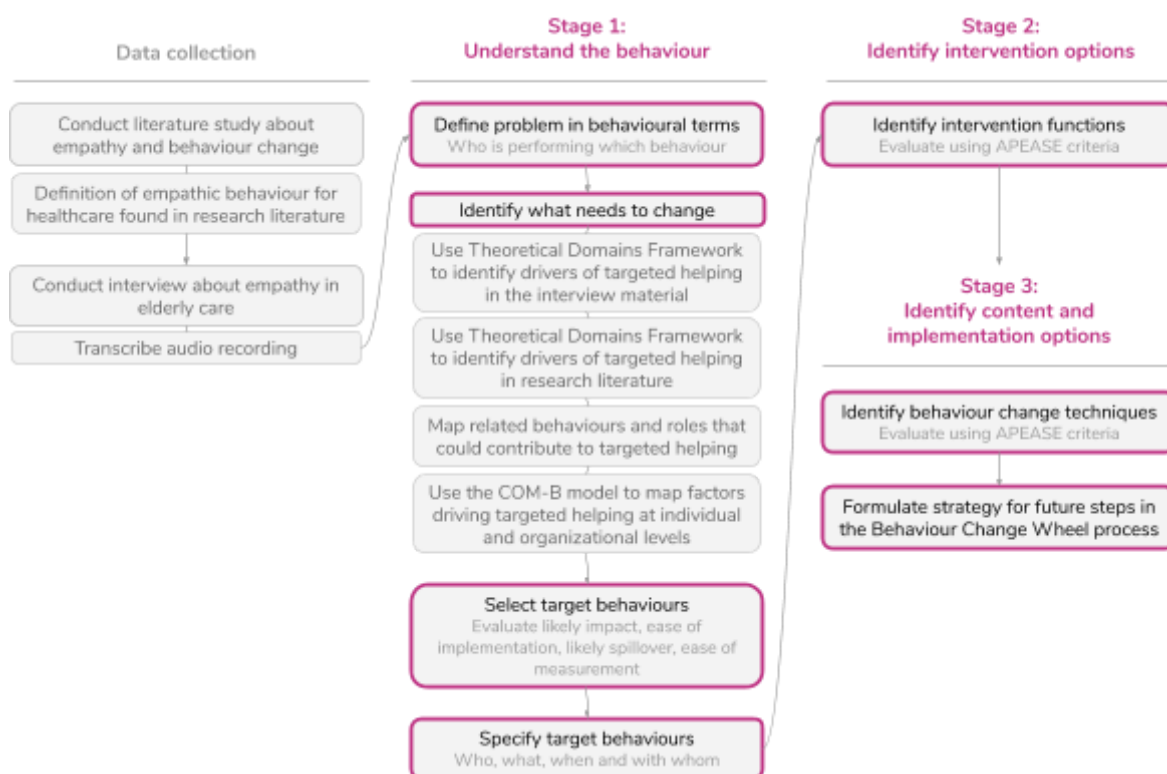Six staff members from four different home care organizations in a large Swedish city participated in the study. Four participants worked day shifts and two worked night shifts. The participants were recruited through an inquiry to the home care area managers in the city. All participants had been using the Phoniro app between two and eight weeks. The group size and format reflects the aim to balance constraints of data collection and the wish to represent multiple organizations as well as different times for work shifts.

Interview setup

The group interview took place in a conference room, where the participants and facilitator were seated around a table. The interview was semistructured, with a prepared interview guide (see appendix). The interview guide consisted of three parts:

1. Beliefs about empathy in their profession
2. Experience of empathy at work
3. Attitudes towards digital support for empathic care

The first part of the guide was designed to inquire about beliefs the participants held about empathy as a skill in their profession, what kind of importance it has, and in which ways they believed it might be necessary for doing a good job. The second set of questions concerned their personal experience of needing empathic ability in their professional role, factors hindering or driving empathic ability at work, any strategies they might employ to remain empathic in difficult circumstances, and any training they might have had to give empathic care. The last set of questions concerned their attitudes towards receiving support in their work applications to give empathic care: what type of support would be acceptable to them and in what situations they could be receptive to it. The questions were open-ended to promote exploration of ideas, and follow-up questions were asked.

The participants were instructed to answer the questions by first jotting down a thought on a post-it note and place it in the middle of the table, then (in any order)

35

comment on their thoughts and join the discussion about all the answers. These steps were taken in order to ensure that everyone contributed in some way, and prevent someone from being the only one to speak, which is a common phenomenon in group interviews (Bryman, 2011). The facilitator asked the questions and distributed the word. The session lasted 60 minutes. Audio was recorded with a smartphone placed on the table.

Stage 1: Understand the behaviour

Defining the problem in behavioural terms

The problem to be solved by any digital behaviour change intervention should be specified in behavioural terms, according to the Behaviour Change Wheel framework (Michie, Atkins & West, 2014). The definition of the problem was formulated to encompass a description of the desired behaviour, tied to the definition of targeted helping, along with who should perform it, when it should be performed and how.

Identifying what needs to change

According to the Behaviour Change Wheel process, this step would come after specifying target behaviours, and its purpose would be to identify what needs to change in order for those target behaviours to be performed. In the present study however, this step was applied to identify drivers and barriers that affect targeted helping in elderly care, the "end goal" behaviour.

    The group interview was transcribed word for word and, during multiple read-throughs, the data was categorized into the Theoretical Domains Framework, and the corresponding components of the more over-arching COM-B behaviour model: capability (physical and psychological), opportunity (physical and social), and motivation (reflective and automatic). These frameworks make it possible to link future choices of intervention functions to the various aspects of the desired behaviour (Michie, Atkins & West, 2014). This analysis of drives, enablers and barriers to targeted helping was illustrated by quotes from the interview participants, translated to English. Insights from previous research findings, as well as guidelines for health and social care, presented in this thesis were grouped the same way, complementing the interview data.

    To represent how the drivers on different levels in a home care organization may affect targeted helping in nursing assistants, a visual system of drivers and behaviours

was constructed, where behaviours affected by capability, opportunity and motivation at organizational level in turn affected capability, opportunity and motivation at individual level. The schematic was inspired by the approach of English (2013), who visualized a similar hierarchical system of COM-B influences concerning the behaviour of paediatric service leaders.

The analysis served as input for the next step, which was to identify behaviours performed either by the nursing assistants or groups they interact with at work, and that influence the targeted helping the nursing assistants are expected to perform. These behaviours may be targeted by interventions to promote targeted helping.

Selecting target behaviours

A list of 74 behaviours surrounding targeted helping was created and, to facilitate the process of identifying the behaviours, they were gathered in a conceptual map as described by Barker, Atkins & Lusignan (2016). The map visualized which behaviours needed to be performed by whom. A set of inclusion criteria was formulated to select target behaviours, as expressed in the table below.

Table 6: Inclusion criteria for target behaviours.

Inclusion criteria
The behaviour is deemed **likely to lead to engagement in cognitive** rather than affective empathy, promoting an other-oriented reaction and a flexible, other-oriented response (targeted helping).
The behaviour is **related to the normal work** performed by the staff, or to interventions that have been tried and recommended as a regularly occurring part of the work.
The behaviour is **feasibly repeatable**, since long-term enhancement of empathy requires practice and reinforcement (Engler et. al., 1981; Hojat, Axelrod et. al., 2013).
The behaviour is **performed by one or more of the following**, who might interact with the mHealth solution that would function as the mode of delivery for the DBCIs: ● Nursing assistants   ● Coaches/mentors employed by the care providing organizations   ● Management   ● Providers of mHealth solutions   ● Clients   ● Relatives of clients
The behaviour was **identified** in the group interview data, from research and guidelines referenced in earlier chapters, or assumptions made by the author about which behaviours might

be performed as one of the Behaviour Change Techniques that link to the relevant theoretical domains. The behaviours were coded:

- *Italicized font*: Retrieved from the group interview data.
- **Bold font**: Retrieved from previous research and guidelines.
- ***Bold and italicized font***: Overlap in the aforementioned categories.
- Regular font: Assumptions made by author based on BCT descriptions.

Identifying target behaviours was a back-and-forth process, going through the sources above several times, until there seemed to be no more relevant target behaviours left to identify.

In accordance with Michie, Atkins & West (2014), the list of behaviours was reduced to only a handful of behaviours that seemed most relevant to the problem at hand. The BCW framework suggests using the following criteria to filter out the most interesting behaviours.

Table 7: Descriptions of the selection criteria.

Criteria	Description
Likely impact	The likely impact on the situation if the behaviour were to be changed.
Ease of implementation	How easy it would likely be to change the behaviour, considering local circumstances such as financial and human resources.
Likely spillover	How the behaviour, if changed, would also have an impact on other behaviours in the system of behaviours.
Ease of measurement	How easy it would be to measure the extent to which an intervention has changed a target behaviour.

One additional criterion was added, because the given medium was a smartphone app: *attractiveness from a system provider perspective*.

In accordance with Michie, Atkins & West (2014), the following scale was used to evaluate each behaviour on the criteria:

- 0 = Unacceptable.
- 1 = Unpromising but worth considering.
- 2 = Promising.
- 3 = Very promising.

Specifying target behaviours

The target behaviours selected in the previous step were further specified in this step, because it is generally easier to target behaviours with interventions when the behaviours are specified in detail (Michie, Atkins & West, 2014). The following parameters were specified according to the BCH framework:

- Who would perform the behaviour
- What that person would need to do differently to achieve the desired change
- When (and how often) they would do it
- With whom they would need to do it

Stage 2: Identify intervention options

The next step in the BCW process would be to identify what would need to change for a selected target behaviour to occur, but this was delimited from the scope of the thesis. The intervention functions and behaviour change techniques analyzed do therefore not pertain to a specific target behaviour, instead their suitability for the purpose and domain in general was evaluated.

Identifying intervention functions

The APEASE criteria (see table 5) recommended by Michie, Atkins & West (2014) were used to identify intervention functions suitable for the purpose and domain.

Stage 3: Identify content and implementation options

Identifying Behaviour Change Techniques

The 93 behaviour change techniques (BCTs) in the taxonomy were also evaluated using the APEASE criteria (see table 5), as recommended by Michie, Atkins & West (2014), to identify BCTs suitable for the purpose and domain.

Results

Definition of the Desired Behaviour

The desired behaviour is to use cognitive empathy to identify empathic opportunities, and provide clients in elderly home care with the kind of empathic care described in national guidelines for elderly care, as well as research on empathy in care professions. The behaviour should be other-oriented, fine-tuned to the client's needs and intended to improve the client's situation. In empathy research, this is called *targeted helping*.

The target group involved is nursing assistants in elderly home care.

The desired behaviour should occur during, or related to, interaction between the client and the nursing assistant, usually in the client's home, or wherever the client might be during a visit. It should be incorporated into every encounter. The behaviour may extend to relations of the client, as well as coworkers of the nursing assistant.

A defining characteristic of the behaviour is its adaptability to each unique context, which might make it difficult to isolate for measuring, but nevertheless central to really good care.

Drivers of Targeted Helping

This section presents a categorization of identified influences on targeted helping in healthcare. Influences identified in the interview data, as well as from previous research reported in the theory chapter, were grouped into those relating to the capability, opportunity and motivation required to bring about targeted helping, and then broken down into the domains of the Theoretical Domains Framework. Grouping insights this way provides a theoretical foundation to build on and link back to, when designing behavioural interventions according the Behaviour Change Wheel framework.

Physical capability

Physical capability includes one domain, *physical skills*, from the Theoretical Domains Framework. Examples of physical skills necessary to perform targeted helping were found in both the interview material and research literature.

PhC: Physical skills

The nursing assistants who took part in the group interview of this study provided examples of putting **body language skills** to use to express empathy during interaction with clients, such as sitting down when talking to clients, to get on the same physical level.

> "I usually, like, sit down at the same height as the clients who use wheelchairs, get down on the knees and talk a little." - P4

Healthcare professionals should be aware of, practice and use nonverbal communication skills such **eye contact, facial expression, posture and tone of voice** to build rapport (Riess & Kraft-Todd, 2014).

Psychological capability

Psychological capability includes four domains from the Theoretical Domains Framework: *knowledge; cognitive and interpersonal skills; memory, attention and decision processes; and behavioural regulation.* Changeable factors driving targeted helping were found for all of these domains in both the interview material and research literature.

PsC: Knowledge

Nursing assistants are expected to **see the person behind the diagnoses and medical needs, and think of each client as an autonomous individual** (Hörnsten & Udo, 2017a). **Being familiar with each client and their needs** is also important to be able to make the right decisions (Berhin, Lundgren & Theodoridis, 2014). Previous research has also indicated the importance of **having, and being able to call upon, knowledge of the experience of receiving care**, which can be both physically and mentally taxing (Berhin, Lundgren & Theodoridis, 2014; Hojat, 2016). This quote from a participant illustrates how the nursing assistant tries to put the emotions of a client into perspective by considering both their physical and social situation:

> "When they are at their lowest point, that is when they feel their... It might be that they are feeling their disease, their diseases, or if they have had word that a relative is perhaps... sick, or dying." - P1

Knowledge specific to the domain of elderly care, such as knowing how people change with ageing and how age-related diseases may affect elderly and their behaviour, is important to be able to base decisions and actions on a combination of cognitive empathy and evidence-based information, and is also a requirement articulated by the Swedish Ministry of Social Affairs (SOSFS 2011:12 (S)), for frontline staff in elderly care. This knowledge can be compromised when nursing assistants are recruited, because of the growing need for staff (Bergqvist, 2014). Insights from the group interview of the present study suggests individual, medical and organizational knowledge would help to give the proper assistance, such as when a client has trouble breathing and cannot communicate their need clearly to the nursing assistant. This participant expressed how the staff can sometimes be at a loss in pressed situations, and not know what to do:

"Should we call the ambulance or the nurse on duty? It is very difficult." - P5

Having knowledge about strategies for providing empathic care may make it easier, such as knowing when to take on a listening, more silent role (Bäck-Edberg & Janmarker, 2009).

There was no mention of any difference between ways of empathizing, that could indicate **knowledge of the difference between the affective and cognitive aspects of empathy**, and the terms "compassion" and "empathy" were understood as the same thing when it comes to performing it, as illustrated by this quote:

"Changing the words will not change the thing." - P2

Previous research indicates it helps frontline staff to **know what expectations employers place on them in terms of providing empathic care**, i.e. what care means in the organization (Berhin, Lundgren & Theodoridis, 2014). Some aspects of this knowledge are communicated and taught through official documents (e.g. value statements regarding elderly care, as mentioned in the background chapter) on national as well as local levels, and can also be explored through moderated group discussions at each workplace, such as those described in the group interview.

Some expectations also concern situations in which it is not desirable for staff to remain with the client, e.g. when they feel threatened. This participant gave an example of a situation when nursing assistants are expected to use their judgement to decide whether or not to stay:

"Because of disease or another mental state. Yeah, mean or threatening or such. But if you are feeling threatened, then it is just, goodbye." - P1

PsC: Cognitive and interpersonal skills

Care professionals must develop skills to **recognize empathic opportunities**, such as when the client expresses emotions or concerns, both spoken and unspoken (Hojat, 2016; Hörnsten & Udo, 2017b). To do this, they must be able to **switch to another person's perspective** (Svärdson, 1999; Schell & Kayser-Jones, 2007) and also **switch back and forth between observing and experiencing** (Holm, 2001; Svärdson, 1999).

Other than just perceiving what clients express voluntarily, nursing assistants must also acquire **skills in exploring the state of a client. It helps to ask open-ended questions, to confirm that what the client said was heard and to continually reflect on the interaction as well as one's own behaviour during it** (Hörnsten & Udo, 2017b).

PsC: Memory, attention and decision processes

Developing the ability to **make decisions on the spot, regarding what the client needs and how those needs may be catered to** (also in stressful situations when clients may not be able to communicate, as mentioned under *Knowledge*) is important, and respondents emphasized the need for a very flexible mindset at work, where they can't anticipate what their day will look like:

"No work shift is like any other." - P4

During interaction with clients, nursing assistants must be able to **stay present and attentive** (Hörnsten & Udo, 2017b), which was also echoed by the respondents of this study.

PsC: Behavioural regulation

Avoiding to take out other frustrations on the clients was mentioned by the respondents as an essential part of regulating behaviour at work, and a strong norm in the profession. They must consider why a client is behaving the way they are, and try to see past their own feelings while they balance the needs of several clients, to be able to provide the right help, as indicated by this quote:

"You cannot take it out on clients either. If you know that you have four other alarms waiting and this one calls all the time, then it, like, becomes a frustration. You know the person is not feeling well inside, you try to empathize too, but it is very difficult." -

P4

Expressions of affective empathy should be regulated in favour of cognitive empathy (Hojat, 2016).

Physical opportunity

Physical opportunity includes one domain, *environmental context and resources*, from the Theoretical Domains Framework. Changeable factors driving targeted helping were found for this domain in both the interview material and research literature.

PO: Environmental context and resources

Nursing assistants need to **have opportunities to distribute their energy wisely** over the course of a workshift, to make the most of their empathic ability, according to the respondents. They struggle with clients who demand a lot more attention than they can provide without negligating other clients, and to cope better with this, they often ask for help between teams:

"They (the other team) beg 'Please go there, we cannot anymore, we are on our knees, the alarms from other clients are not coming through'." - P4

"We discussed earlier, being able to move clients between schedules, it has not been easy when someone has gotten stuck in an alarm situation." - P4

Being able to easily swap or delegate tasks, when they need a break to recover, is one way the respondents would like to create better opportunities for empathic care. **Having time to oneself and the tools for mental recovery at work** (such as training in self-compassion) can prevent compassion fatigue (Hevezi, 2016; Duarte, Pinto-Gouveia & Cruz, 2016; Duarte & Pinto-Gouveia, 2016).

Nursing assistants should **have time to be present and build rapport with clients**, as well as **time and opportunity to reflect on their own behaviour** (Hörnsten & Udo, 2017b).

Receiving **practical support from the employer, e.g. opportunity to receive mentoring** can also help develop professional empathy skills (Berhin, Lundgren & Theodoridis, 2014), which was confirmed by the participants of the group interview.

"It is difficult to organize, it is, but there are those who can mentor, but it is difficult to pull off, it is difficult that everyone is working at the same time, who needs it. But it does exist. It is supposed to be accessible at every (work) place." - P2

Social opportunity

Social opportunity includes one domain, *social influences*, from the Theoretical Domains Framework. Changeable factors driving targeted helping were found for this domain in both the interview material and research literature.

SO: Social influences

The participants of the group interview mentioned how they were helped and relieved by the **social support they receive from colleagues**, both spontaneously and at their own request, e.g. after a difficult encounter with a client.

"You talk to, you do have colleagues you talk a lot to, but it can also be a client who is not particularly nice, so you get mentoring or get to talk to someone or..." - P2

Reflective motivation

Reflective motivation includes six domains from the Theoretical Domains Framework: professional role and identity; beliefs about capabilities; optimism; beliefs about consequences; intentions; goals. Changeable factors driving targeted helping were found for these domain in both the interview material and research literature.

Being aware of what defines the professional role as a nursing assistant and wanting to identify with that role, has been reported as a way of promoting empathic care (Berhin, Lundgren & Theodoridis, 2014). An example of this may be **feeling pride in work and in giving empathic care** (Schell & Kayser-Jones, 2007).

By describing practices, skills and attributes, the group interview participants indicated how they perceive the nursing assistant role and responsibilities. Some of these were: adaptability in behaviour, attentiveness to the emotional state of clients, flexibility in mindset, willingness to be present and support clients as well as their families and one's colleagues, and the ability to see the larger context in each situation.

"When the client or colleague has a bad day or, with deaths and such, that is something that happens every now and then. We do not have anyone else to call. We are the ones who have to support relatives and wait for doctors on duty." - P4

"Relatives come and break down and, yeah. So we really have to show compassion." - P4

"You have to think big when you work with people." - P4

These quotes indicate a strong sense of responsibility regarding colleagues as well as clients and their loved ones. As a nursing assistant, you are expected to recognize the needs of others and tend to those needs in difficult circumstances, acting on your own initiatives and possibly without the support of others.

Some of this identity is built during exchanges with other nursing assistants, e.g. during the group discussions at the workplace mentioned in the group interview. The interview itself also provided an opportunity to build on the understanding of the nursing assistant identity.

"Sometimes, like now, when you are saying it is difficult with the alarms, but when you are sharing that, we are all laughing because we recognize ourselves in it, so you get like, how nice, people know what it is, but when you are in the situation it can be tough. Then you can just, like you now, you laugh and might joke about it because, because it gets easier then." - P2

The participants expressed **concern about their capability to continue providing care under the increasing pressure of clients whose needs lead them to misuse alarms**. This behaviour puts emotional strain on the staff and increases the workload, without adding much benefit for the clients themselves.

"And when you are there for the seventh time that night. Then you sort of feel that empathy is not quite what- you just feel…" - P4

"But somehow, it has to become visible that the staff cannot go on either, it eats away at one's patience. Everyone has to feel this, everyone has theirs (clients who misuse alarms) in their areas." - P4

"Sometimes you try to say 'you have sent an alarm' or we do not care or well, 'is there something you want help with' or we just go." - P2

A sense of helplessness and frustration is evident in these quotes, reflecting limited ability to change circumstances that clearly affect the patience and capability to empathize with clients.

Exchanging experiences and discussing challenging situations with colleagues provided participants with opportunity to reflect on their own capabilities, which gave them support and built competence as well as a mutual understanding of good care in the group, preparing them for future challenges.

"You can bring up a difficult case you have had and so on." - P2

"Someone who has had a hard time, you bring it up, and you get support and discussion." - P3

"And how you might work with that in the future or if someone has ideas how you can do it instead." - P2

"It has actually been really great." - P3

This sort of group training in the workplace centers around real and relevant situations and uses discussion as well as social support to develop at work. It is evident that the participants believe their capability increases with the training.

RM: Optimism

Thinking positive thoughts right before a potentially difficult visit was mentioned in the group interview, as a strategy used by the participants to reach a mental state in which they could more easily be empathic towards a client.

"Take a deep breath and positive thoughts." - P6

RM: Beliefs about consequences

The respondents emphasized the need to practise empathy in their work so that they could **better tend to the needs of the clients they interact with** (see quotes in the section below). It seemed that this belief could be affected by a hopelessness that would set in when a client misuses the alarm and then does not want help (see the section "Beliefs about capabilities" above).

RM: Intentions

The intentions to provide targeted helping and strive for reciprocity were evident in the group interview, perceived to be a central part of the work nursing assistants do. As illustrated by this quote, they **believed empathy to be required regardless of the emotional and physical state the client**, but perhaps especially needed when the caretaker is experiencing distress or pain.

"Almost always I think, compassion is required when you feel bad but then you also want it when you have something happy to share, something fun. Then you have to, like, follow along with that too and listen to that too, just like you listen to the rest, it must always be there in some way." - P2

"I am thinking the same. No matter if they are feeling good or bad." - P3

Previous research suggests both the person giving care and the person receiving it must be willing to create a relation to one another (Angell Andresen & Engström, 2011). On a national level in Sweden, healthcare professionals are expected to have

the intentions to **provide caretakers with a dignified life and well-being** (Social Services Act, 2001:435, 5 chapter 4§). They should also **strive for dialogue, willing to be present listening to thoughts, questions, hopes and fears** (Hörnsten & Udo, 2017b).

RM: Goals

The group interview participants expressed the **wish to continue developing their interpersonal skills at work**, like they had during the workplace group reflections and mentoring.

Automatic motivation

Social opportunity includes two domains, *reinforcement* and *emotion*, from the Theoretical Domains Framework. Changeable factors driving targeted helping were found for these domains in both the interview material and research literature.

AM: Reinforcement

A workplace culture that supports empathy and recognizes skillful empathic care can contribute to better use of empathy, as can **positive feedback and bonding with relations of clients** (Schell & Kayser, 2007). Supervisors can provide such reinforcement through informal compliments on the work during shifts, or more formal awards for exceptional care, and by passing on feedback from clients and their families.

Respondents in the group interview had received positive reinforcement through group reflections facilitated by a colleague or mentor, spontaneously provided or sought-out support, e.g. via a phone call after a difficult encounter with a client.

AM: Emotion

Negative emotion experienced at work, such as stress, frustration, helplessness and confusion, can inhibit the ability to be empathic towards clients. These emotions can rise from a difficult encounter, or just from having a bad day.

> "If a person is not nice to someone or really mean to someone, then you have a difficult time showing empathy to that person, who did something mean." - P3

Before, during and after interacting with caretakers, respondents of this study try to **regulate their emotions so that they are ready to be mindful of someone else's emotional state**. Strategies to do this would include eating a snack, calling a colleague, thinking positive thoughts, taking deep breaths or reminding themselves that the work shift would soon be over.

Developing strategies against stress and negative emotion is important to avoid compassion fatigue and not be overrun by affect (Hevezi, 2016; Duarte & Pinto-Gouveia, 2016), which has been suggested to lead to self-oriented behaviour rather than targeted helping (Pérez-Manrique & Gomila, 2018).

Drivers at Individual and Organizational Levels

Providing empathic care is not only dependent on the nursing assistants' desire to perform it, but on the capabilities, opportunities, motivation and behaviours feeding into each other at different organizational levels, as visualized in the figure below. A digital behaviour change intervention could intervene at frontline staff level as well as organizational level, to bring about the behaviours in the blue boxes.
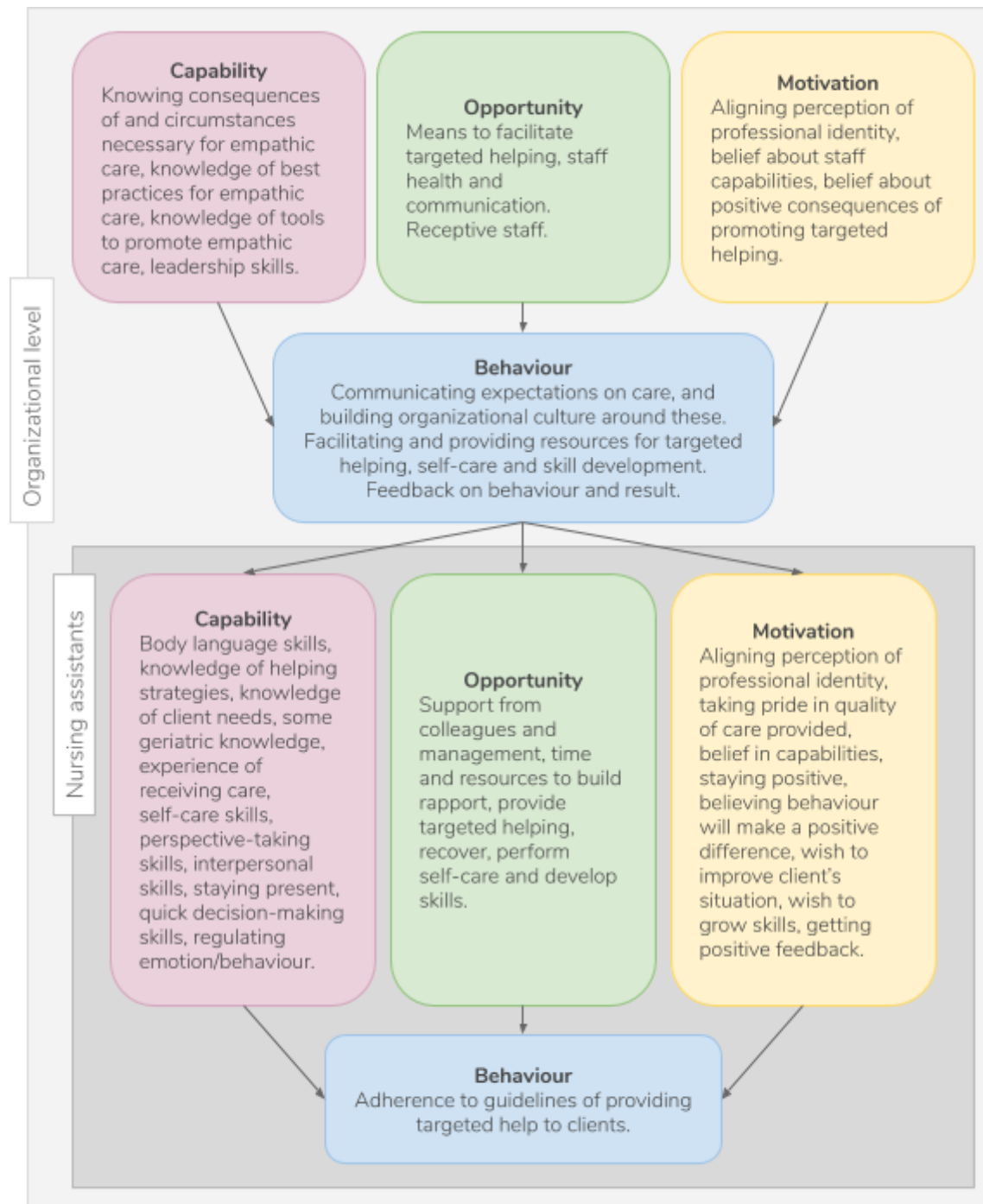
Figure 8: System of behaviours and behaviour drivers that enable empathic care.

Suggested Target Behaviours

Targeted helping exists in a context of other behaviours, performed by various actors, interacting as a system. Some of these behaviours may be interesting targets for behaviour change interventions. A conceptual map of these potential target behaviours and actors who perform them is visualized in the figure below (see larger version in

appendix). The map was delimited to only include behaviours that are potentially interesting to promote, not behaviours that might be interesting to inhibit, in order to bring about targeted helping.
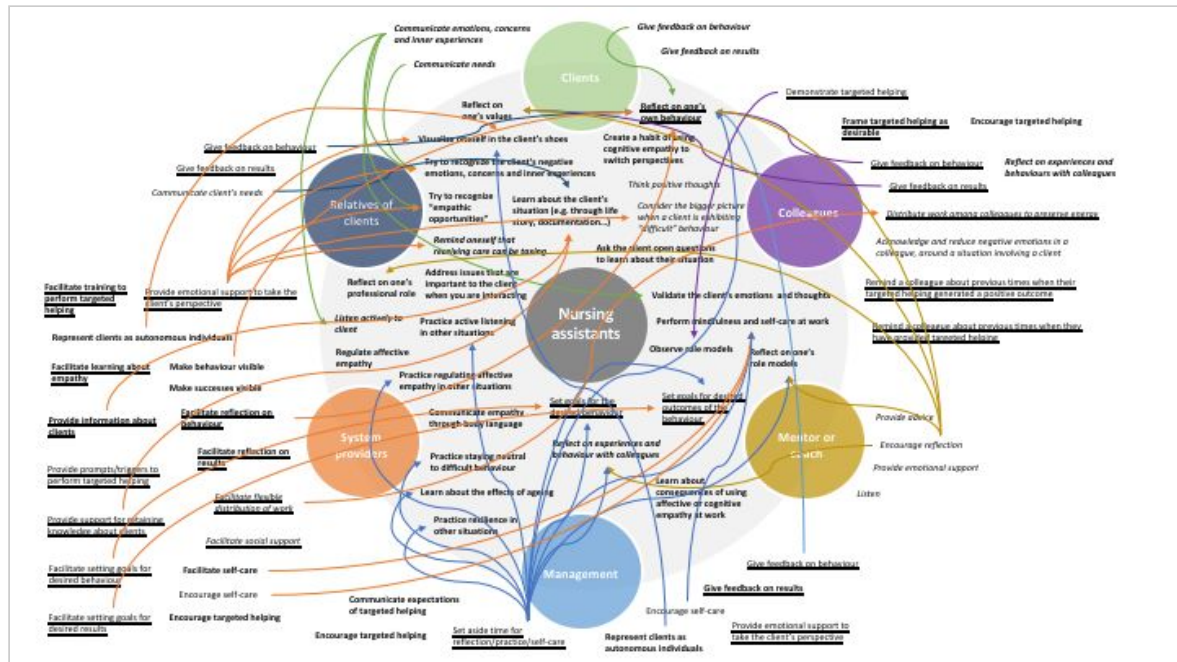
Figure 9: Conceptual map visualizing a system of behaviours that may promote empathic care. The arrows show behaviour dependencies, pointing to nursing assistant behaviours potentially affected by behaviours performed by surrounding roles.

A total of 74 behaviours were identified (see full list in the appendix). Out of these, 13 behaviours scored the highest (8/12 points) when evaluated on *likely impact, ease of implementation, likely spillover, ease of measurement* and *attractiveness from a system provider perspective.* These behaviours are specified in the table below. None of the them must be performed at a particular location.

Table 8: Selected target behaviours.

What	Who	When	With whom
Learn about the client's situation. Read the documentation and a life story if available, to get to know the needs and circumstances of each individual.	Nursing assistant	At the start of every work shift, or before they go to a client	Alone
Learn about the effects of ageing. Study how diseases, declining health,	Nursing assistant	Continually throughout the career, preferably on	Alone

isolation and other circumstances affect needs and behaviour of elderly people.		designated work time	
Learn about consequences of using affective or cognitive empathy at work.	Nursing assistant	Continually throughout the career, preferably on designated work time	Alone
Remind a colleague about previous times when their targeted helping generated a positive outcome.	Colleague	Preferably on a regular basis, following situations where targeted helping was provided	Nursing assistant
Remind a colleague about previous times when they have provided targeted helping.	Colleague	Preferably on a regular basis, following situations where targeted helping was provided	Nursing assistant
Distribute work among colleagues to preserve energy. Agree to take a visit for a colleague, then receive the necessary information and access.	Colleague	When the workload gets too high, e.g. because of too many alarms	Nursing assistant
Encourage self-care. Communicate the benefits of self-care and frame it as a natural part of work.	System provider	Regularly during the working week	Nursing assistant
Facilitate self-care. Instruct and guide nursing assistant through self-care exercise.	System provider	When nursing assistant chooses to perform self-care exercise	Nursing assistant
Provide prompts/triggers to perform self-care.	System provider	Regularly during the working week, between visits	Nursing assistant
Facilitate reflection on behaviour. Guide nursing assistant through reflection on whether and how they have tried to provide targeted helping, and have them write it down as part of the reflection and to measure the behaviour.	System provider	On a regular basis, weekly or monthly	Nursing assistant
Facilitate reflection on results.	System	On a regular basis, weekly	Nursing

Guide nursing assistant through reflection on results of their targeted helping, and have them write it down as part of the reflection and to measure the behaviour.	provider	or monthly	assistant
Give feedback on behaviour. Communicate how they experienced the assistance provided.	Client	After interaction	Alone or with someone who assists
Give feedback on results. Communicate how they feel after being assisted.	Client	After interaction	Alone or with someone who assists

Suggested Intervention Functions

The following intervention functions were selected using the APEASE criteria (see table 4) to evaluate their general suitability for the purpose and domain.

Table 9: Suggested intervention functions with description and evaluation, along with the theoretical domains they can affect.

Theoretical domain	Intervention function	Evaluation
Knowledge Behavioural regulation Professional/ social role and identity Beliefs about capabilities Optimism Beliefs about competence Intentions Goals	**Education** *Increasing knowledge or understanding*	**Affordability:** Only requires app to educate. **Practicability:** Can be incorporated in routine work in several different ways. **Effectiveness/cost-effectiveness:** Proven to increase empathic ability in similar contexts. **Acceptability:** Previously accepted by nursing assistants. **Side effects/safety:** No risks identified. **Equity:** No risks identified.
Physical skills Cognitive and interpersonal skills Memory, attention and decision processes Behavioural regulation Reinforcement Environmental context	**Training** *Imparting skills*	**Affordability:** Social skills are best trained with others, but training (e.g. simulations) can be provided using only the app too. **Practicability:** Can be incorporated in routine work in several different ways. **Effectiveness/cost-effectiveness:** Proven to impact empathic ability in similar contexts.

and resources		**Acceptability:** Previously accepted by nursing assistants. **Side effects/safety:** No risks identified. **Equity:** No risks identified.
Behavioural regulation Professional/ social role and identity Beliefs about capabilities Optimism Beliefs about competence Intentions Goals	**Modelling** *Providing an example for people to aspire to or imitate*	**Affordability:** Only requires app to demonstrate. **Practicability:** Can be delivered with different intensity and without interfering with work tasks. **Effectiveness/cost-effectiveness:** Proven to impact empathic ability in similar contexts. **Acceptability:** Examples have previously been accepted by nursing assistants, but must not interfere with tasks. **Side effects/safety:** No risks identified. **Equity:** No risks identified.
Professional/ social role and identity Beliefs about capabilities Optimism Beliefs about competence Intentions Goals Emotion	**Persuasion** *Using communication to induce positive or negative feelings or stimulate action*	**Affordability:** Only requires app to communicate. **Practicability:** Can be incorporated in routine work in several different ways. **Effectiveness/cost-effectiveness:** Impact of positive stimulation has previously been proven to impact empathic ability in healthcare staff. **Acceptability:** Positive stimulation has previously been accepted in healthcare contexts. **Side effects/safety:** No risks identified. **Equity:** No risks identified.
Intentions Goals Reinforcement Emotion	**Incentivisation** *Creating expectation of reward*	**Affordability:** Does not require material reward. **Practicability:** Likely to need participation by organization more than other IFs. **Effectiveness/cost-effectiveness:** Likely to have impact on the wish to improve empathic ability. **Acceptability:** Likely to be acceptable. **Side effects/safety:** External incentivisation might lead to uptake of interventions just for gratification, not for doing a better job. **Equity:** No risks identified.
Memory, attention and decision processes Reinforcement Environmental context and resources Social influences	**Environmental restructuring** *Changing the physical or social context*	**Affordability:** Might require organizational changes, but could likely be provided through an app alone. **Practicability:** Unknown. **Effectiveness/cost-effectiveness:** Unknown. **Acceptability:** Likely to be acceptable if not restricting staff or making their work more

		difficult. **Side effects/safety:** Restructuring of work environment might lead to inefficiencies in the workflow. **Equity:** No risks identified.
Memory Behavioural regulation Beliefs about capabilities Optimism Goals Emotion Environmental context and resources Social influences	**Enablement** *Increasing means/reducing barriers to increase capability (beyond education) or opportunity (beyond environmental restructuring)*	**Affordability:** Might require organizational changes or additional technical resources. **Practicability:** Might require organizational changes. **Effectiveness/cost-effectiveness:** Likely to reduce barriers to empathic ability. **Acceptability:** Likely to be acceptable. **Side effects/safety:** No risks identified. **Equity:** No risks identified.

Restriction was not selected, because it is not practicable or acceptable to the target group. *Coercion* was also omitted because it would not be acceptable to the target group. Because the mode of delivery is an mHealth application, a mode that lends itself well to providing support and information by various means, the possibilities of implementing the other intervention functions in some manner seem promising.

Suggested Behaviour Change Techniques

The APEASE criteria were used to evaluate behaviour change techniques, to determine how appropriate they were likely to be for the problem, the target group and their circumstances, as well as the mode of delivery. Out of the 93 existing, the evaluation resulted in a selection of 45 behaviour change techniques:

Table 10: Selected behaviour change techniques and their groupings.

Grouping	Behaviour change techniques
1. Goals and planning	1.1. Goals and planning 1.3. Goal setting (outcome) 1.4. Action planning 1.5. Review behaviour goal(s) 1.6. Discrepancy between current behaviour and goal 1.8. Behavioural contract 1.9. Commitment
2. Feedback and monitoring	2.3. Self-monitoring of behaviour 2.4. Self-monitoring of outcome(s) of behaviour 2.7. Feedback on outcome(s) of behaviour
3. Social support	3.1. Social support (unspecified)

	3.2. Social support (practical)
4. Shaping knowledge	4.1. Instruction on how to perform a behaviour 4.2. Information about antecedents
5. Natural consequences	5.1. Information about health consequences 5.2. Salience of consequences 5.3. Information about social and environmental consequences 5.4. Monitoring of emotional consequences 5.6. Information about emotional consequences
6. Comparison of behaviour	6.1. Demonstration of the behaviour 6.2. Social comparison 6.3. Information about others' approval
7. Associations	7.1. Prompts/cues 7.3. Reduce prompts/cues
8. Repetition and substitution	8.1. Behavioural practice/rehearsal 8.3. Habit formation 8.6. Generalization of target behaviour 8.7. Graded tasks
9. Comparison of outcomes	9.3. Comparative imagining of future outcomes
10. Reward and threat	10.9. Self-reward
11. Regulation	11.2. Reduce negative emotions 11.3. Conserving mental resources
12. Antecedents	12.2. Restructuring the social environment 12.6. Body changes
13. Identity	13.1. Identification of self as role model 13.2. Framing/reframing 13.4. Valued self-identity
15. Self-belief	15.1. Verbal persuasion about capability 15.2. Mental rehearsal of successful performance 15.3. Focus on past success 15.4. Self-talk
16. Covert learning	16.2. Imaginary reward 16.3. Vicarious consequences

These behaviour change techniques are not tied to any specific target behaviour identified in this result, but would still provide intervention developers with a starting point to devise intervention content for the problem.

Chapter summary

The results chapter included a formulation of the problem in behavioural terms, which makes it possible to apply the Behaviour Change Wheel to it. The COM-B model of behaviour and the Theoretical Domains Framework were used to identify and categorize potential drivers and barriers to targeted helping in the interview data and insights from

previous research. Dependencies between drivers and behaviours at individual and organizational levels were visualized in a schematic. 74 potential target behaviours and their dependencies were identified and visualized in a system of behaviours performed by seven key roles that could potentially affect the context through an mHealth app: clients, client relations, colleagues, mentors/coaches, management, system providers and the nursing assistants themselves. 13 of these behaviours scored high on likely impact, ease of implementation, likely spillover and ease of measurement.

Of the nine existing intervention functions, seven were suggested suitable for the purpose and domain: education, training, modelling, persuasion, incentivisation, environmental restructuring and enablement. 45 behaviour change techniques were suggested suitable for the purpose and domain.

Discussion

Discussing the Results

This thesis explored empathy in healthcare and especially elderly care. The purpose of this thesis was to find out if there is a way to define, in behavioural terms, the professional empathy that is desirable in elderly care, and how that empathy could be promoted, evidence-based and systematically, through behaviour change interventions. The desired result was the identification of opportunities where providers of mHealth technologies in elderly care might make a positive difference in behaviour, by developing behaviour change interventions in the applications used by the nursing assistants at work.

This thesis proposes that, as the starting point for designing Digital Behaviour Change Interventions to promote empathy in elderly care, designers should use the following definition of an empathic behaviour called targeted helping. Targeted helping is characterized by a regulated emotional response to the distress of another (be it a client, a client relation or a colleague), a reaction directed towards the other party instead of oneself, and a fine-tuned response to the situation, aiming to improve it. Digital Behaviour Change Interventions should therefore stimulate cognitive rather than affective empathy, help the staff regulate their emotional response and give them the capability, opportunity and motivation to direct their response towards improving the situation of the distressed party. This answers the first research question:

> 1. What kind of empathic behaviour is desirable in care work and is there a way to define it?

Assuming this definition of empathy desirable in elderly care, the thesis identified drivers and barriers of targeted helping, combining previous research and guidelines on promoting empathic care with empirical data from an interview with elderly care staff in a Swedish municipality. The results included a categorization (using the Theoretical Domains Framework) of these drivers and barriers, an overview of drivers at different organizational levels (categorized according to the COM-B model of behaviour), and lastly a map of contributing behaviours that are or could be performed by seven target groups. These results answer the second research question:

2. Which are the factors affecting such empathic behaviour in nursing assistants working in elderly home care?

To analyze these factors and explore opportunities to systematically design Digital Behaviour Change Interventions that could promote targeted helping, a framework for behaviour change was applied. This framework, the Behaviour Change Wheel, is based on a synthesis of theories in the field of behaviour change and provides a step-by-step process with pragmatic considerations for researchers as well as designers without a scientific background. The framework has primarily been applied to problems related to healthcare and previous findings show promise of successful applicability to various domains. The framework was applied in this study to formulate the problem to be solved, analyze contributing factors and evaluate different opportunities to design behaviour intervention for the purpose and domain. The thesis did not encompass the entire process to design and test interventions, so whether the framework can contribute to actually successful interventions that promote targeted helping in elderly care remains to be investigated.

One big advantage of this framework, however, is the structured approach to intervention design that creates transparency in the theoretical assumptions as well as design decisions made by the researcher or designer. This provides systematicity in evaluating success and alternate approaches. Another big advantage is the flexibility in the rigorosity of implementing the process, meaning it can be used both in research and the industry, which makes it possible for more actors to advance the development of interventions and increase their knowledge. If this type of intervention development catches on in the industry for eHealth tools for nursing assistants and similar professional groups, a common approach may be that of a design team working with stakeholders on the end-user side to investigate needs and test solutions, and the Behaviour Change Wheel was designed to help them do just that. So it seems the Behaviour Change Wheel provides a promising way of systematically designing interventions that could lead to the promotion of targeted helping in elderly care, which answers the third research question of this thesis:

3. Can interventions to promote such empathic behaviour be developed in an evidence-based, systematic manner, with transparent links between theory and design choices?

The results of this thesis work present a behavioural analysis of factors that seem likely to influence targeted helping in elderly care. Opportunities to bring about this change were identified in the form of potential target behaviours, that were evaluated based on what impact they would likely have on the change, how easy they would be to implement, how likely they were to generate desirable spillover effects, and how easy it would be to measure whether they were being performed. Only behaviours that could be supported by an mHealth application were considered, and furthermore they had to be feasible to implement on a long-term basis in Swedish elderly care organizations. Intervention options in terms of functions and behaviour change techniques were evaluated to see which might be affordable, practicable, effective, cost-effective, acceptable, safe and equitable for elderly care in Sweden. These results create a foundation for further exploration of opportunities to target relevant behaviours with the right techniques and dimensions of delivery. This answers the final research question:

4. Which opportunities to promote such empathic behaviour may be worth exploring, given that the intervention channel is an app for staff in elderly care?

The following section will discuss the methods used to arrive at the above answers to the research questions.

Discussing the Methods

Some aspects of this study pose challenges to the interpretation, validity and reliability of the results. The format of data collection, a group interview, does not provide as rich or comprehensive data to analyze, compared to other qualitative or immersive methods such as individual interviews or participatory observations, and the analysis of the interview was not followed up with the participants. This implicates that important aspects of the challenges and needs connected to empathic care may have been overlooked or misunderstood. The chosen method does, however, allow for multiple perspectives to be heard and tested against each other in a time-efficient manner, and it allows participants to bounce ideas off each other during the session. Getting all respondents to actively participate in group interviews can be challenging, and this was reflected in the data collected; not everyone participated to equal extent, as some seemed more comfortable to voice their thoughts than others did.

The group interview was conducted early on in the thesis work, and going back and forth between the steps of the study (studying theory, analyzing data and writing this report) has made obvious some flaws in the design of the interview guide. Compared to similar studies using the BCW framework or the COM-B model of behaviour, the data collection of this study lacked a deliberate connection between the interview guide and the behaviour model used for data analysis. Formulating the interview guide based on the theoretical framework would likely have given the participants better opportunities to provide more data, and more relevant data, that could be sorted into the model. After the interview was conducted, the theory chapter was further developed with a deeper understanding of empathy, and had this understanding been in place at the time of the interview, the participants might have been provided with better guidance when sharing their thoughts and experiences around empathy at work.

The BCW framework does state that the approach for each new project is expected to be adapted to the circumstances, e.g. time and budget. An example of how the process was adapted to this project was conduct a behavioural analysis on targeted helping, the "end goal" behaviour, in order to identify influences it. Targeted helping is a complex behaviour that is not straightforward to pin down and define. Analyzing its influences using the COM-B model of behaviour and the Theoretical Domains Framework made it easier to grasp and facilitated the identification of potentially relevant target behaviours.

When the potential target behaviours identified had been evaluated, further exploration of the 13 highest scoring behaviours was delimited from the scope of the thesis work due to time constraints. Selecting one or two of them to design interventions for (as recommended in the BCW framework) ideally includes further data collection and participation by the target group, as participatory design increases the likelihood that the interventions are efficient, effective and ethical. An approach to do this is suggested in the chapter Future Research. Not including further analysis of what needs to change for a specific target behaviour to occur meant that the intervention functions and subsequently the behaviour change techniques could not be evaluated in terms of suitability for a target behaviour. Instead, their suitability was evaluated concerning the purpose and domain in general. The reduced sets of functions and techniques form a more purpose-fitted starting point for future studies.

Future Research

Going forward from this study to design behaviour change interventions, one or more organizations should be involved from an early stage, to be part of decision-making and design testing during the development process, which should be iterative and based on close communication with the target groups (Davis, 2010; Michie, West, Campbell et. al., 2014; Abraham, Kelly, West & Michie, 2009). Since the goal is to develop interventions that may be used by many organizations in elderly care, it is preferable to involve more than one organization and find common denominators, to increase the likelihood of identifying solutions that may be applied to multiple organizations.

The target behaviours with the highest score in the evaluation conducted in this study should be evaluated the same way with stakeholder representatives from both frontline staff and management in the participating organizations, to ensure the design efforts will be focusing on something that is acceptable to the end users. One or very few target behaviours should be selected to design interventions for, to focus the efforts.

Having reduced the target behaviours to just a few, a behaviour analysis should be conducted on these using the Theoretical Domains Framework, to specify what needs to change - i.e. what the interventions should try to accomplish. The analysis should be verified with the stakeholders before moving on to selecting appropriate intervention functions that correspond with the theoretical domains where a need for change was identified. For each intervention function, this study identified behaviour change techniques that would meet the APEASE criteria for the purpose and domain. Brainstorming and verifying intervention content for these, together with stakeholders (e.g. through a workshop where storyboard vignettes are created) would make it possible to end up with a selection of likely relevant and feasible intervention designs.

Using the APEASE criteria to evaluate intervention concepts early, together with stakeholders, is suggested to increase the likelihood of getting the right design and getting the design right for the problem and the context. Because the interventions are digital, evaluations should ideally also encompass effectiveness, engagement and usability (West & Michie, 2016).

It is commonly advised in the behaviour change field of research to start out small with a population who already wish to change their behaviour. As uptake catches on, the intervention may be scaled and adapted to other situations or populations.

One way of testing effectiveness during a pilot would be to use an empathy test like the JSPE or the simpler Empathic Care Scale, before and after piloting the intervention. Measuring client satisfaction through two or more surveys might be a way to see if a change in empathy experienced by the nursing assistants is also experienced by clients. In the long run, a change in empathic behaviour towards the more cognitive sort of empathy should reflect in metrics mentioned in the theory chapter: stress levels, sick leaves due to burnout, job satisfaction and client health outcomes.

This study did not explore the possibilities of personalization and tailoring of behaviour change interventions, but it should be of interest to explore in future projects. Previous research has indicated that behaviour change strategies applied to technology varies in success between different personality types (Halko & Kientz, 2010; Anagnostopoulou et. al., 2017). If personalization is not possible, design choices may be based on intervention strategies likely to have "the greatest aggregate effect while minimising any adverse effects", according to Michie, Atkins & West (2014, p. 123). Elderly care is a profession that is primarily social, and technology is ideally only present to provide seamless support in the daily work.

Conclusion

This study has identified a gap in research on behaviour change interventions that can be integrated into the daily routines and tools of nursing assistants in elderly care, to promote empathic caring for clients. There is existing research on factors that can influence empathy positively or negatively in healthcare and elderly care specifically, but no existing digital behaviour change interventions that do not require time-consuming extracurricular activities and additional tools could be identified at this time. The findings of this study contribute with a deeper understanding of empathic care as a result to design interventions for, applying the theoretical models and processes of the Behaviour Change Wheel framework.

The study has made contributions in terms of a description of empathic care that can be linked to the COM-B model of behaviour and used for intervention design, and it has also applied part of the Behaviour Change Wheel framework to a new problem and domain, namely that of promoting targeted helping among nursing assistants in elderly care. Drivers and barriers of empathic behaviour were identified at different organizational levels in elderly care, and opportunities to use interventions were identified in the form of relevant target behaviours that seem likely to affect the ability of nursing assistants to provide empathic care. A set of intervention functions and behaviour change techniques were selected as promising for the problem and domain, using evaluative criteria from the BCW framework. The study concludes that promoting targeted helping in elderly care through evidence-based Digital Behaviour Change Interventions seems possible and worthwhile trying, and it would seem the BCW framework can provide designers with a suitable process to develop and evaluate with.

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Appendix

Interview guide

- What does empathy mean to you in your profession?
- In which situations is it important to be able to feel empathy, to do a good job?
- When do you need empathy the most?
- When is it the most difficult to feel empathy? What might stop you from acting empathically?
- What can boost empathy? Colleagues, places, experiences, exercises, thoughts, triggers...
- Do you know of any techniques/strategies to feel empathy even when it is difficult to?
- Have you had training in empathy for healthcare? If so, when and how?
- How would you feel about an app trying to support you in working empathically?
- What type of support could you imagine receiving?
- When would you like to receive support? When are you the most receptive? The least receptive?

Potential target behaviours

The figure below contains all identified potential target behaviours, and the arrows show identified ways the behaviours can influence each other.
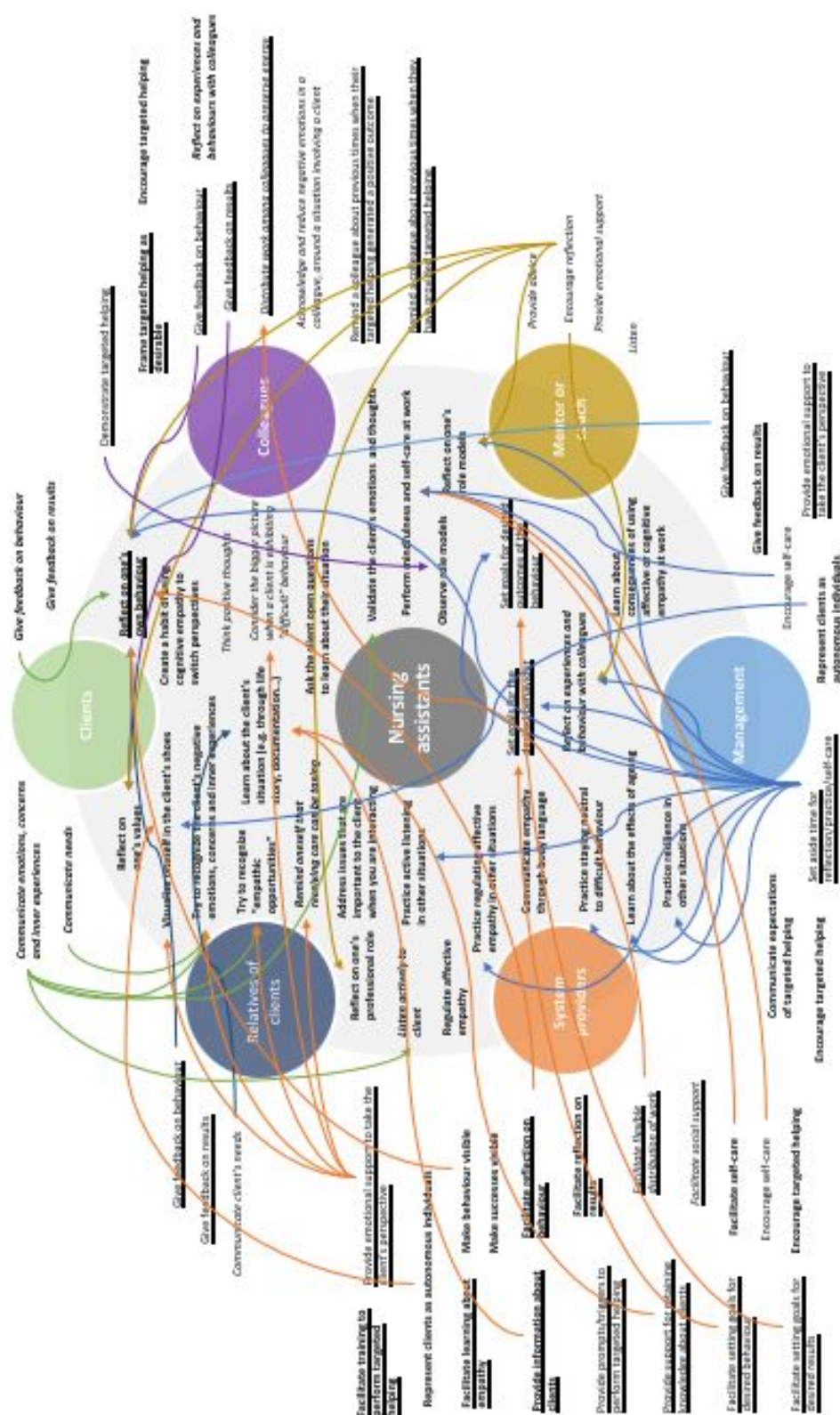
The table below contains all identified potential target behaviours, and their evaluation scores. The behaviours are formatted according to their source:

- *Italicized font*: Retrieved from the group interview data.
- **Bold font**: Retrieved from previous research and guidelines.
- ***Bold and italicized font***: Overlap in the aforementioned categories.
- Regular font: Assumptions made by author based on BCT descriptions.

Table 11: Evaluation of potential target behaviours.

Key: **0** = unacceptable, **1** = unpromising but worth considering, **2** = promising, **3** = very promising *LI = Likely impact, EoI = Ease of implementation, LS = Likely spillover, EoM = Ease of measurement, A = Attractiveness from a system provider perspective, T = Total Score*							
Potential target behaviours	Who	LI	EoI	LS	EoM	A	T
Ask the client open questions to learn about their situation	Nursing assistant	3	1	2	1	1	7
Address issues that are important to the client when you are interacting	Nursing assistant	3	1	2	1	1	7
Listen actively to the client	Nursing assistant	3	1	2	1	1	7
Try to recognize the client's negative emotions, concerns and inner experiences	Nursing assistant	3	1	2	1	1	7
Validate the client's emotions and thoughts	Nursing assistant	2	1	2	1	1	6
Communicate empathy through body language	Nursing assistant	2	1	2	1	1	6
Reflect on one's values	Nursing assistant	2	2	1	2	1	7
Reflect on one's own behaviour	Nursing assistant	2	2	1	2	1	7
Reflect on one's professional role	Nursing assistant	2	2	1	2	1	7
Observe role models	Nursing assistant	2	1	1	1	1	5
Reflect on one's role models	Nursing assistant	2	2	1	2	1	7
Visualize oneself in the client's shoes	Nursing assistant	2	2	1	2	1	7
Create a habit of using cognitive empathy to switch perspectives	Nursing assistant	2	2	1	1	1	6
Try to recognize empathic opportunities	Nursing assistant	3	1	1	1	1	6
Regulate affective empathy	Nursing assistant	2	1	1	1	1	5
Think positive thoughts	Nursing assistant	2	1	1	1	1	5

Consider the bigger picture when a client is exhibiting "difficult" behaviour	Nursing assistant	3	2	1	1	1	7
Remind oneself that receiving care can be taxing	Nursing assistant	2	2	1	1	1	6
Practice regulating affective empathy in other situations	Nursing assistant	2	2	1	1	1	6
Practice active listening in other situations	Nursing assistant	2	2	1	1	1	6
Practice staying neutral to "difficult" behaviour	Nursing assistant	2	1	1	1	1	5
Practice resilience to stressful situations	Nursing assistant	2	1	1	1	1	5
Perform mindfulness and self-care at work	Nursing assistant	2	3	1	1	2	7
Learn about the client's situation (e.g. through life story, documentation…)	Nursing assistant	2	3	1	2	2	8
Learn about the effects of ageing	Nursing assistant	2	3	1	2	2	8
Learn about consequences of using affective or cognitive empathy at work	Nursing assistant	2	3	1	2	2	8
<u>Set goals for the desired behaviour</u>	Nursing assistant	1	2	1	2	2	6
<u>Set goals for the desired outcomes of behaviour</u>	Nursing assistant	1	2	1	2	2	6
<u>Demonstrate targeted helping</u>	Colleagues	2	1	2	1	1	6
<u>Frame targeted helping as desirable</u>	Colleagues	2	1	2	1	1	6
Encourage targeted helping	Colleagues	2	1	2	1	1	6
<u>Give feedback on behaviour</u>	Colleagues	2	1	2	2	1	7
<u>Give feedback on results</u>	Colleagues	2	1	2	2	1	7
Reflect on experiences and behaviours with colleagues	Colleagues	2	1	2	2	1	7
<u>Remind a colleague about previous times when they have provided targeted helping</u>	Colleagues	2	2	2	2	1	8
<u>Remind a colleague about previous times when their targeted helping generated a positive outcome</u>	Colleagues	2	2	2	2	1	8
<u>Distribute work among colleagues to preserve energy</u>	Colleagues	2	2	2	2	2	8
Acknowledge and reduce negative emotions in a colleague, around a situation involving a client	Colleagues	2	2	2	1	1	7
Provide advice	Mentor/Coach	2	1	1	2	1	6

Encourage reflection	Mentor/Coach	2	1	1	2	1	6
Provide emotional support	Mentor/Coach	2	1	1	2	1	6
Listen	Mentor/Coach	2	1	1	2	1	6
Encourage targeted helping	Management	2	1	1	2	1	6
Communicate expectations of targeted helping	Management	2	2	1	2	1	7
Give feedback on behaviour	Management	2	1	1	2	1	6
Give feedback on results	Management	2	1	1	2	1	6
Provide emotional support to take the client's perspective	Management	2	1	1	2	1	6
Encourage self-care	Management	2	1	1	2	1	6
Set aside time for reflection/practice/self-care	Management	2	1	1	3	1	7
Represent clients as autonomous individuals	Management	2	1	1	1	1	5
Encourage targeted helping	System provider	2	2	1	2	2	7
Provide prompts/triggers to perform targeted helping	System provider	2	2	1	2	2	7
Facilitate setting goals for desired behaviour	System provider	1	2	1	2	2	6
Facilitate setting goals for desired results	System provider	1	2	1	2	2	6
Provide information about clients	System provider	2	1	1	2	2	6
Provide support for retaining knowledge about clients	System provider	1	1	1	2	2	5
Facilitate training to perform targeted helping	System provider	2	1	1	2	2	6
Facilitate flexible distribution of work	System provider	1	1	2	2	2	6
Facilitate social support	System provider	1	2	2	2	2	7
Encourage self-care	System provider	2	3	1	2	2	8
Facilitate self-care	System provider	2	2	1	2	2	7
Provide prompts/triggers to perform self-care	System provider	2	2	1	2	2	7
Represent clients as autonomous individuals	System provider	2	2	1	2	2	7
Make behaviour visible	System provider	2	1	1	2	2	6
Make successes visible	System provider	2	1	1	2	2	6
Facilitate reflection on behaviour	System provider	2	3	1	2	2	8

Facilitate reflection on results	System provider	2	3	1	2	2	8
Communicate needs	Client	3	1	2	1	1	7
Communicate emotions, concerns and inner experiences	Client	3	1	2	1	1	7
Give feedback on behaviour	Client	3	2	2	1	2	8
Give feedback on results	Client	3	2	2	1	2	8
Give feedback on behaviour	Relatives of clients	2	1	1	1	1	5
Give feedback on results	Relatives of clients	2	1	1	1	1	5
Communicate client's needs	Relatives of clients	2	1	1	1	1	5