PREFACE

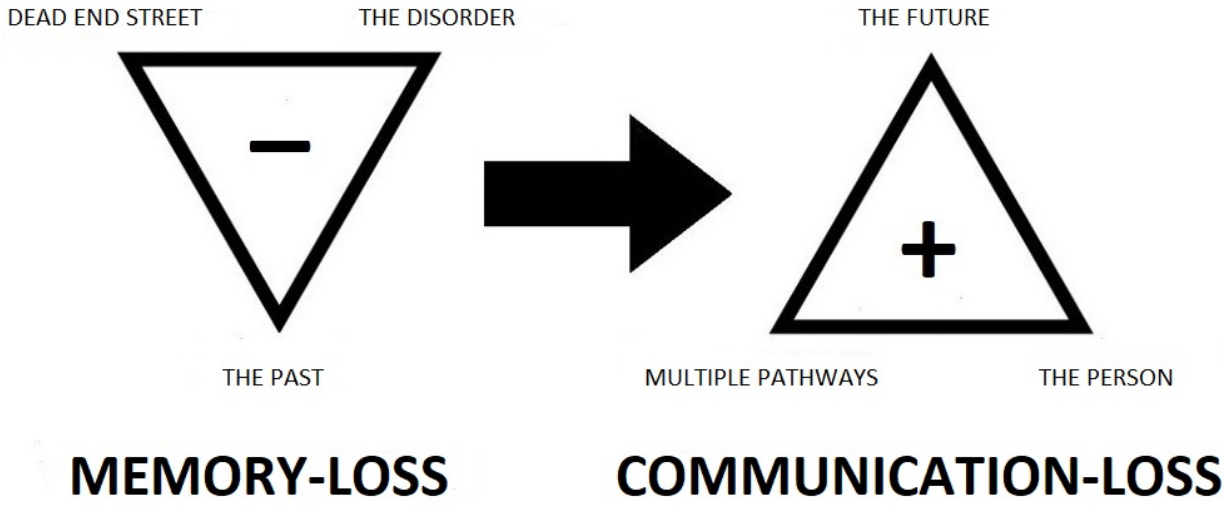
Starting points related to the doctoral thesis
A New Memory Palace - with accompanying application 'MemoryHome'

1. Dementia is more than memory loss. It is also a 'communication loss', both for patients and their environment. To the extent that these insights contribute to a broader way of communication, also in areas outside of dementia-research, we can have a modest impact.
2. If you want something to change, don't keep on doing the same thing. Dementia is irreversible, but the triangle on which the thinking about the disease is based, can be turned around by looking more at the person than at the disorder, more at the future than at the past and more at new pathways. By so doing new insights arise.
3. It is partly due to the new structures at the university that students can specialize in different domains. My studies in philosophy, psychology, communication, marketing and persuasive communication have encouraged and made possible the kaleidoscopic and multidisciplinary approach of this research. My supervisors belong to the fields of Social Sciences and Psychiatry.
4. The reader is already familiar with the meaning of all the words in this text. The innovation is in the order in which these words are placed. After reading this text, connections will hopefully grow in the mental landscape of the reader that were not present before. More valuable than the idea 'this is the solution' is to bring in the insight 'there are several approaches'.
5. There are always options. You cannot 'not communicate.' You cannot 'not influence'. The compliance techniques described are not only applicable to people with dementia, but to everyone. That is because people with dementia are still 'people'.
6. At the end of an educational process, (informal) caregivers who are constructing memory palaces should not only be able to operate the mobile application, but also be able to introduce it successfully. It is about learning a basic communicative attitude that is valuable in the context of dementia, but also far beyond.

7. Healthcare technology can be as professional as possible, but if ‘the other’ is not prepared to start working with it, everything is in vain and a waste of effort.
8. Compliance techniques are frequently applied in the advertising world and the commercial sector. There is nothing wrong with the research of these strategies, but it is a shame that we mainly use them for pointless purposes.
9. The goal of a psychosocial intervention is not to cure an incurable condition, but to support patients in maintaining a meaningful and connected life, despite the presence of discomforts.
10. The efficiency of a psychosocial intervention is not only determined by the presence of demonstrable effects, but also by the extent it succeeds in becoming implemented in daily practice.
11. Qualitative findings make a valuable contribution to the evaluation of e-Health-interventions, although they may deviate from the quantitative research results. The power of the story prevails over the impact of the number.
12. We did not wait for the results. In the course of the research, concrete ‘tools’ emerged, such as the book ‘What Alz?’, ‘The Game of the Imagination’ and the mobile application ‘Memory Home.’
13. Forgive me the relentless stream of references to Quintillian's words. I can't help it that he knew more than two thousand years ago everything we seemed to be forgotten along the way.
14. The primary objective of scientific research should be first and foremost to serve society. This doctoral thesis was therefore intentionally written in Dutch, so that the text is also accessible to all ‘hidden victims’ and people with dementia that I have met in Flanders and the Netherlands in recent years. Now the translation in English builds the bridge to the rest of the world.

Communicative strategies to strengthen memory for significant others and to improve the quality of life in Alzheimer's disease

Paradoxically, the ‘disease of the future’ revolves around people who ‘risk losing their past’. There are currently more than 50 million people with dementia worldwide and the number is expected to triple by 2050. However, it is not just about the patients themselves, but also about the ‘hidden victims’. In this way, the condition affects three times as many ‘secondary patients’ (Alzheimer's Disease International, 2018). When the memory fades away, communication also threatens to degenerate into fear, incomprehension and ultimately silence. As a result, patients are often confronted with a ‘social death’, which precedes the physical end of life. Every insight and approach leading to better forms of communication, not only increases the quality of life of dementia patients, but also of their environment and ultimately the whole of society.



The thinking and communication about dementia can usually be summarized in a negative triangle: the one-sided emphasis on ‘the disorder’ and ‘the past’ results in a ‘dead end street’. Due to the underlying attitude of ‘the irreversibility of the disease’, this triangle of thought is often regarded as unalterable itself. But is that really the case? To tackle a communicational problem, it helps to be able to rely on the philosophical background that I have developed as a researcher. This concerns wonder (‘The last thing the fish discovers is the water’), the permanent belief in possibilities and the reframing of self-evident things. With Alzheimer's disease and dementia it is not only about ‘memory- loss’ but also about ‘communication-loss’. In this way it is possible to reverse the negative triangle and depart from ‘the person’ (instead of the disorder), ‘the future’ (instead of the

past) and ‘multiple pathways’ (instead of a dead end street). We cannot ‘not communicate’ (Watzlawick, Beavin, & Jackson, 1967), but how do we increase the efficiency of communication in domains where it will deteriorate anyway, such as with dementia?

The insights from psychology and economics, demonstrate that people execute most of their actions unconsciously, so that our behavior is not only measurable but can also be manipulated. In the field of advertising and consumer behavior, these methods are frequently applied to stimulate sales and purchases by appealing to emotional drives or by anchoring mental images. Suppose we could do more meaningful things with these strategies, which could contribute to the quality of life of people, if possible in situations where communication seems to disappear, such as in the healthcare sector and more specifically with people with Alzheimer's disease and dementia? Communication should not be taken for granted. These convincing techniques can be deployed as an efficient tool to achieving goals and positively influence people's behavior.

In order to examine the essence of persuasive communication, even in difficult situations, we can consult the oldest Western sources in this area: those of the classical rhetoric, which are focused both in theory and in practice on the art of convincing and the most efficient forms of communication leading to compliance. In addition, Quintillian's 'Institutio Oratoria - Training of an Orator' (1st century AD) is still regarded as one of the most important standard works: 'the culmination of five centuries of theory-building around this theme' (Quintilian, [95] 2015, p 15).

Why is Quintilian's approach still inspiring and applicable in the 21st century? Professor James J. Murphy, affiliated with the University of California, recently (2016) investigated the relevance of Quintillian for the contemporary time. He states that most observers are mistaken when they consider that what Quintilian says is solely about ‘rhetoric’. According to him, Quintilian's greatest endeavor is to make efficient resources available for self-sufficient and self-learning people. It is not about teaching a number of rules, but rather about teaching a multitude of approaches and introducing a vocabulary to become familiar with a wide range of conversational options. Rhetoric is a means to clarify that people don't always have to be educated but that they can take control of their own lives and their own learning processes (Murphy, 2016a).

Quintilian also emphasizes the great importance of practical exercises and applications: ‘If you had to separate theory and practice, practice without theory is always more valuable than theory without practice’. He is looking for in-depth meanings to change and influence human's psyche through

language. His insights are not ‘old’ but surprisingly ‘new’ for anyone who takes the trouble to delve into his work. Many persuasive techniques are nowadays mainly used in marketing to seduce consumers, often to the purchase of redundant products. In addition to efficiency, Quintilian also introduces aspects of morality and ethical conduct (Murphy, 2016b).

The common ground between Quintilian and the present doctoral research are numerous and determinative: developing communicative strategies, promoting self-management, inventing practical applications, penetrating into memory, providing a broader communicative framework and daring to opt for quality of life.

Therefore we are delighted to use Quintilian as a guide for our research and gradually discover striking parallels between his thinking and contemporary research into communicative strategies and efficient memory techniques. We thereby follow the five canons in each rhetorical approach: the invention, the arrangement, the style, the memory (mnemonics) and the delivery (Quintilianus, [95] 2015).

1. The invention. The lack of medication forces us to zoom in on the person instead of the condition. The improved memorization of the faces of others then appears to be part of a much larger process, in which ‘the other’ and ‘communication’ play an essential role. In this way it quickly becomes clear that Alzheimer's disease and dementia, unlike many other conditions, are not only about the patient, but to a large extent also about the family and the caregivers. They usually come into the picture as ‘hidden victims’ who are burdened by a heavy weight on their shoulders. How can we involve them in a positive way and as crucial players in the broader story of improved communication?

2. The arrangement. Focusing on new forms of communication is rapidly interpreted by caregivers as an additional increase in the already high burden of daily tasks. The one-sided focus on ‘the deficit’ and ‘the hopelessness of the disease’ paralyzes communication efforts. How can we find multiple pathways to circumvent this resistance and even consider it to be necessary, temporary and useful? In which optimum condition can we bring people, so that they are prepared to display the desired behavior? In this way we not only want to develop practical instrument, but also develop a universal communicative basic attitude that can be applied in different disease processes (and even beyond). This process must ultimately lead to increased self-esteem and a better quality of life for all involved.

3. The style. The vast majority of the insights from rhetoric are devoted to this particular section. After all, we can develop plenty of strategies, resources and methods but, if the intended user does not want to accept or apply them, these efforts will lead nowhere. What are the tools available to effectively penetrate the mental landscape of the other person? How can we increase the willingness of those involved to get started and to continue to apply the learned techniques from the developed interventions?

4. The memory. In order to guarantee or to extend the effect of the foregoing, it is best to anchor the communication messages as firmly as possible in the memory of the other person. The 'method of loci' and other forms of 'memory palaces' are suitable instruments to accomplish this. Classical memory training, however, usually focuses on the individual and repetitive reproduction of neutral content. Can we also turn that around and focus more on the collective, the connecting and the meaningful? The reproduction of thoughts is not an end in itself, it is a means to evoke lasting associations that can be anchored in the long-term memory. Can we not close the gap between the learning environment and the living environment, which plays a crucial role in implementation, by turning the living environment into the learning environment itself?

5. The delivery. This last phase is forgotten in many academic studies. The vast majority of psychosocial interventions are stopped once the research period has ended. This doctoral research, digging for 'a new memory palace', is an exception. After all, not only is a mobile application being developed ('MemoryHome'), but also a whole range of communication skills is constructed that are widely applicable. For 'the proof of concept', twenty students set to work on a specific 'Memory Palaces trajectory'. In addition, they created such a technological palace with the patient and his or her immediate environment and monitored their implementation by studying the impact on quality of life, feelings of depression and the strength of the relationship with the confidant. This results are reported in both quantitative trends and qualitative diary reports. Based on the proposed changes, we went one step further by engaging professional caregiver from large healthcare organizations, both in home care and in residential care environments. They work with the optimized trajectories, over a longer period, in which, among other things, the communicative element is strengthened.

All of these steps result in understandings and tools that can contribute to communicative strategies to strengthen memory for meaningful others and to improve the quality of life in Alzheimer's disease and dementia. It would be pleasant if it turned out that these instruments can also be applied more broadly, for example with healthy elderlypersons, loneliness, depression and other disorders, so that their influence extends beyond the impact on validated measuring scales. After all, it is about the person behind dementia. That attention for the tender, weak, searching person, both as regards the patient and his environment, is a common thread in this research. The prominent difference between Cicero and Quintilian is, according to the Italian poet Petrarca, that the former is especially suited to show the way to the more advanced individuals, while the latter, due to his careful attention, also cherishes the less powerful (Quintilian, [95] 2015, p 23).

Quintilian is brief about the function of the introduction. The introduction has no other purpose than to make recipients compliant for the rest of the oration. Only three things are therefore important: that it makes them attentive, benevolent and interested (Quintilian, [95] 2015, p. 191).

I am convinced that Quintilian will be reading over our shoulder.

GENERAL CONCLUSION

In this general conclusion we summarize the most important insights from the research and we link them each time to the specific application that we have developed, used and tested during the course of this PhD under the name 'MemoryHome'.

CHAPTER 1 – THE INVENTION

FOCUS ON QUALITY OF LIFE

The provisional lack of a medical remedy for dementia promotes a person-centered approach, making the concept of 'quality of life' more omnipresent. It appears that 'the other' is inherently linked to the quality of life of the patient. They influence each other mutually. Every good intervention is a dyadic intervention.

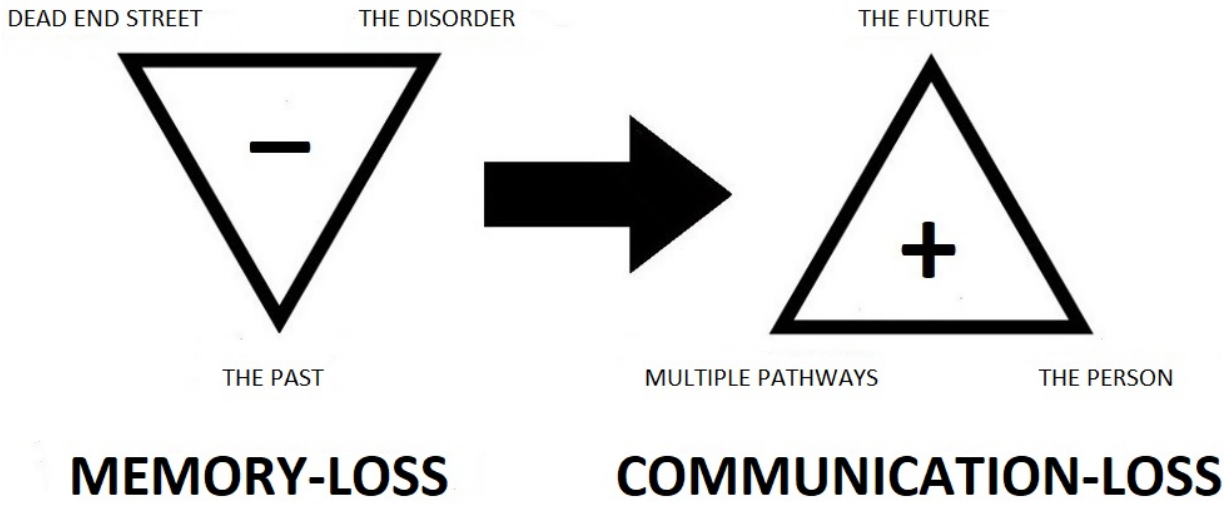
MemoryHome tries to alleviate the communication-loss between patient and the surrounding environment.

THE OTHER AS 'HIDDEN RESOURCE'

The concept of 'caregiver burden' originated from Alzheimer's disease research due to the prominent characteristic of a long agony for both the patient and the surrounding environment. The burden primarily affects the main informal caregiver, but it also aggravates the weight on the shoulders of the wider family network and therefore on society as a whole. These caring people are often described as 'secondary patients' or 'hidden victims'. An intervention aimed at improving the quality of life should not only aim at the experience of the patient, but also take into account the burden on the hidden victims.

MemoryHome transforms 'hidden victims' into 'hidden resources'.

CHAPTER 2 – THE ARRANGEMENT



This doctoral thesis has the intention to shift the emphasis from 'dementia as memory-loss' to 'dementia as communication-loss'. The negative triangle (the past – the disorder – dead end street) is inverted to the positive triangle (the future – the person – multiple pathways).

THE PAST vs. THE FUTURE

'Reminiscence' is the most widespread form of communication when dealing with dementia patients. However, this approach departs from a shortcoming, a deficit (memory-loss). The one-sided focus on the past threatens to bereave dementia patients of any future perspectives. Dementia is broader than memory-loss, there is also future-loss. People with fewer memories also have fewer prospects. One of the side projects of this doctoral research was the publication 'What Alz?' which uses effective advertising techniques to entice people with dementia to share the content of their dreams (in the near future).

MemoryHome encourages every memory walk to be rounded off with a cliffhanger, a prospective element that puts the gaze ahead. With a memory palace the emphasis is not so much on 'memory' but on 'palace' which refers to an inexhaustible capacity: the imagination.

THE DISORDER vs. THE PERSON

A stigma affects not only the patient but also the environment. The negative discourse in the media and in the public sphere amplify an 'excess disability' on top of the actual severity of the disorder itself. There is a considerable lack of positive counterexamples. Dementia patients not only appear to be incurable but also unreachable, which increases the possibility of dying a social death before arriving at their physical end of life. The two most effective instruments for reducing stigma are: coming into contact (with patients and hidden victims) and education. One of the side projects of this doctoral research is 'The Game of Imagination', where the environment is encouraged to approach people with dementia from their abilities rather than from their shortcomings. Fantasy is inexhaustible. It is much more important *that* we tell than *what* we tell.

MemoryHome starts from the idea: you cannot 'not communicate'. The emotional world of people with dementia remains largely intact. Access to positive contents of thought can be facilitated on the basis of a memory palace. The method of loci appeals to associative imagery and therefore to brain structures that remain longer intact in the course of the disease. The fellow-walker is instructed to use feeling-questions in order to dig for memory contents that are emotionally charged.

DEAD END STREET vs. MULTIPLE PATHWAYS

Dementia is irreversible, incurable and progressive. There is currently no medicine to cure the disease. There is only medication available to alleviate the symptoms. Alzheimer's disease is a dormant condition. These pharmacological disappointments ensure that the scientific world seems to be increasingly focusing on the importance of early detection and prevention of dementia. In anticipation of the 'miracle drug solution', we are challenged to think 'beyond-the-pill' and exchange the paralyzing feeling of a dead end street for the freedom of movement of multiple pathways. One of the practical side projects of this doctoral research is the publication 'A new memory palace' with the accompanying mobile application 'MemoryHome'. This instrument approaches dementia as a communicational problem, driven by the core idea 'you cannot *not* influence', stimulating to walking multiple roads ('pathway thinking').

MemoryHome encourages memory walks through the familiar environment of dementia patients and is intentionally constructed in such a way that every walk is different. The handbook contains a basic communicative attitude to successfully introduce the tool 'MemoryHome', to build these memory palaces with sufficient variety and to bring in valuable concepts such as positivity, self-efficacy and future prospects.

CHAPTER 3 – THE STYLE

Approaching persons with dementia with dream-questions, games of imagination, memory palaces or any other activities, usually results in three recurring phases: 'resistance', 'e-motion' and 'upside-down'.

PART 1: RESISTANCE

Resistance is a logical by-product of depth and innovation. Techniques of 'compliance without pressure' offer an interesting tool to bypass resistance. The two main strategies are: descriptive language and the yes-room.

DESCRIPTIVE LANGUAGE

'Reality orientation' has been used for decades to enhance the well-being of people with dementia. It is a communicative strategy that puts the current situation into words, by means of 'descriptive language', in order to re-orientate participants in the here and now. The ultimatum of reality orientation is to describe the current situation, while Ericksonian hypnosis techniques utilize descriptive language as preparatory work to induce a mental state of compliance ('the yes-room'), making the other person more susceptible to suggestions. This person-oriented approach assumes that optimal communication can arise by letting the sentences of the sender coincide as closely as possible with the thought structure of the receiver. Deliberately using 'absolute truths', makes it possible to present undeniable

statements to the other person. The subtle attachment of a suggestion after a sequence of truisms, disguises the desired outcome as an irrefutable conviction. Ericksonian conversation is by definition an indirect approach. The persuasive techniques of 'compliance without pressure' reduce the possibility of resistance. The concept of 'utilization' forms the heart of the Ericksonian communication style. This notion implies that everything the client provides, can be a valuable starting point for therapeutic treatment. Even resistance itself is predictable, capable of being bypassed and can be used as a driving force.

MemoryHome departs from the world (memory palace) of the care recipient. The intentional copying of personal and positive memory contents in literally spoken connections is a hypnotic approach in itself. Caregivers are trained to start the introduction of the memory palaces with an absolute truth such as 'I see ...', 'I feel ...' or 'I hear ...'. In the technology, descriptive sentences are deliberately added (in a smaller font), to encourage the fellow-walker to put into words as many self-evident actions as possible.

YES-ROOM

The collection of communicative strategies that are intended to elicit docility, without exerting explicit coercion on the other person, are known as 'compliance without pressure techniques'. There is not one approach, but there are multiple pathways. One of the oldest and most studied methods of compliance without pressure is the 'foot-in-the-door technique'. It is a persuasive procedure in which a target request is intentionally preceded by a smaller, initial request to place the other person into an imaginary space of willingness: the yes-room. It is possible to come up with different variations within the same influencing technique. For example, a number of reinforcing factors of the foot-in-the-door technique were discovered such as: the short interval between the requests, the nature of the initial request, combined with other techniques or a double yes-room. The yes-room turns out to be functional not only in daily conversation, but also in interaction with (health)technology itself. The yes-room can increase the number of people who agree to take part in an intervention. However, the e-Health interventions often have to deal with high percentages of participants who drop out early in the process. For that reason, additional psychological techniques have to be included to guarantee sustainable participation.

MemoryHome trains students / caregivers to successfully introduce memory palaces based on the yes-room strategy. In addition, the technology itself contains several prior requests such as ‘Is this a good picture?’ or ‘Can you tell us something more about this person?’ in order to put a foot in the door.

PART 2: E-MOTION

People tend to repeat an activity more frequently when it gives them a ‘positive experience’ or a ‘pleasant feeling’. Participants are therefore more willing to complete an intervention as it takes place in the company of others (mirroring), as they have the impression to act without any coercion (freedom of choice) and as there is an element of variation included (alternation in the senses).

MIRRORING

People with dementia seem to be gradually losing more capacities and therefore small components of themselves. Several forms of communication-loss occur, such as word finding difficulties. Deteriorated recognition of emotions and facial expressions can reduce the initiation of mutual eye contact. The blurring of patients' own body boundaries makes it difficult to distinguish where our ‘self’ ends and ‘the other’ begins. However, the nearby environment can take on the role of ‘hidden resource’, because these people are able to reflect the self-image of patients through ‘mirroring techniques’. Social mimicry is a natural phenomenon in which participants in an interaction unconsciously display the tendency to mirror the other, in terms of intonation, words and body language, as the degree of affiliation and trust increases. Social mimicry is a capacity that is developed in early childhood and only disappears in the very last years of life. Furthermore, mirroring can also be used as a persuasive strategy to elicit altruistic behavior. There are two leading forms of mimicry: nonverbal (chameleon effect) and verbal (echo effect) mirroring. Mimicry differs from imitation, because it often happens unconsciously and under the radar.

MemoryHome encourages fellow-walkers to subtly reflect the words and gestures of the dementia patient so that the bond of trust increases. The fellow-walker can function as a mirror of the lost self-image of the care recipient.

FREEDOM OF CHOICE

As the condition progresses, people with dementia increasingly lose their ability to make decisions independently. However, it is beneficial for autonomy and favorable for quality of life to continue to involve patients in as many choices and decisions as possible. The paradox is that making choices can lead to either a sense of freedom or a sense of burden and responsibility. From the perspective of consumer behavior, people with dementia, despite the impaired ability in abstract reasoning, appear to be still able to express preferences and make choices through the intact affective decision route. Human behavior is a concatenation of choices and control. The 'sense of control' is a core aspect of the quality of life experience. The term 'illusion of control' means that people cherish the idea that they can exercise control over uncontrollable events. It is possible to augment the illusion of control by giving people the impression that they have a certain amount of freedom of choice. One effective instrument to accomplish that, is the compliance without pressure strategy called 'the evoking-freedom technique'. Simply adding the words 'feel free (to accept or refuse)' right after the target request, increases the chance that the other person will actually comply with the suggested proposition.

MemoryHome trains care providers / students to give the care recipient the feeling of freedom of choice. This is possible through communication: 'Would you like to make the memory walk now or do you prefer to start 15 minutes later?' and in the technology: 'Would you like to listen to the recorded story, or would you prefer to tell it yourself?'

ALTERNATION IN THE SENSES

There are four major challenges in the field of the five senses regarding dementia, on which experiential marketing can offer a fresh perspective. Firstly, resistance itself has become a routine. The predictability of repetitive care tasks leads to a lack of stimulation for dementia

patients. Sensory marketing makes it clear that the senses are not designed to perceive 'things', but 'changes'. In order to stimulate the senses, variation is necessary. A second challenge is the progressive loss of sensitivity in the senses associated with dementia. In addition to the general signs, such as a decline in vision and hearing abilities, there is a striking deterioration of odor recognition in people with Alzheimer's disease. Experiential marketing emphasizes the importance of a multisensory approach, so that a complete representation can emerge in the mental landscape of the consumer (or patient). Thirdly, Alzheimer's disease often manifests itself through apathy and social restraint on the one hand and irritability on the other. People with dementia run the increased risk of being totally under- or overstimulated. Sensory marketing and amusement park psychology indicate that the perception of people waiting in a queue, can be influenced by a number of ingenious interventions to minimize the chance of boredom or sensory overload. Time itself cannot be accelerated or reversed, but the experience of time can be manipulated. Fourth, dementia patients are often considered to be passive recipients of stimuli, making it more likely that they will be confronted with a 'social death', that precedes their physical end of life. Neuromarketing uses fMRI images to decipher consumers' unconscious motives. Dual-system-theories assume that human behavior is driven by cognitive and affective incentives, with more than 80% of the actions unconsciously regulated through emotional networks. The gradual loss of rational capacities, due to dementia, therefore seems to leave most of human judgment unaffected.

MemoryHome appeals to multiple senses of the owners of memory palaces: they touch the screen or the objects, they walk around physically through a familiar special environment, they hear the recordings of their own voice, they see personal images on the screen and they interact with the fellow-walker in real life. Moreover, the application contains a list with 100 positive characteristics, appearing ad random, so that the same walk can never occur twice. This intentional addition of variety aims to avoid a feeling of boredom among the participants. The new stories continue to be an impulse of alternation in the senses for the owner of the palace as well as for the fellow-walker to keep on carrying out the activity on a regular basis.

PART 3: UPSIDE-DOWN

Reversing the negative triangle ('upside-down') requires the two previous intermediate steps: bypassing the resistance and addressing the emotions of participants, in order for them to initiate the intervention and to persevere the trajectory for a long enough time for possible effects to occur. Once the willingness to cooperate has been obtained from the other ('resistance') and as soon as the relationship of mutual trust has been deepened ('e-motion'), the introduction of the positive triangle can take place: future perspective, self-efficacy and positivity.

FUTURE PERSPECTIVE

People with Alzheimer's disease demonstrate a proportional deterioration in recalling memories as in simulating future scenarios. In addition to the retrospective part of episodic memory, a future-oriented component is detected: the prospective memory. This is an important aspect in being able to complete activities of daily life or to continue living at home independently. Disruptions in the prospective memory are of frequent occurrence, sometimes harmless, sometimes life threatening. With Alzheimer's disease in particular, the reduced bundle of memories causes difficulties in thinking about the future. There are two types of prospective memory, based on the nature of the trigger to the planned intention: a time- or event-based variant.

Positive future-thinking is related to quality of life but is being put to the test by several conditions such as depression and Alzheimer's disease. There is a scarcity of interventions to strengthen the prospective memory. The two leading methods, with proven effects in healthy individuals and the Alzheimer population, are the 'intention-implementation method' and the 'virtual-task method'. The associations between triggers and tasks can be trained and intensified by the pronounced repetition, the visualization and the process of 'enactment'. Improving prospective memory can increase the quality of life of patients and their immediate environment, especially in the case of people struggling with daily activities. That is why it is essential to develop accessible, applicable interventions to reinforce prospective memory. Assistive technology can play an important and supportive role in this area.

The future of people with dementia is often difficult to discuss and not always clearly visible. The future is mainly reduced to a lingering agony of decline to the end of life. The concept of 'prospective memory' might nuance that limited reasoning by emphasizing that 'future thinking' is also involved in every day-to-day action. MemoryHome introduces a third sort of prospective memory: the object-related form. The objects from the memory palace gradually become triggers to positive memory contents. The diagnosis of dementia seems to deprive every possibility of developing positive future scenarios. MemoryHome stimulates 'positive future thinking' on the basis of the verbal repetition of sound fragments, the visualization of memory routes and the process of enactment with actual objects in the familiar environment. Health care professionals / students are trained to speak in the future tense, to look ahead to the next encounter and to conclude each memory walk with something positive, such as 'Congratulations, until next time!'

SELF-EFFICACY

The concept of sense-of-agency corresponds to the feeling of being the owner of one's own actions. It is part of the broader 'causality thinking' and it is a key element in distinguishing a 'self' from the outside world. Sense-of-agency is an indispensable ability in daily communication. There are two kinds of sense-of-agency: the explicit form and the implicit form. The explicit form is usually investigated with retrospective questionnaires and requires a conscious assessment of a behavior that has been carried out ('I did that' or 'I did not'). The implicit form is unconscious, pre-reflective, frequently present in day-to-day actions and can be examined on the basis of implicit measurements such as 'intentional bonding'.

Sense-of-agency is a feeling, and a perception that things can be influenced. Priming effects indicate that a higher predictability between action and effect generally increases sense-of-agency. Incorporating an element of movement is essential to be able to speak of sense-of-agency. Physical exhaustion and mental efforts decrease implicit sense-of-agency, while physical activity increases sense-of-agency. Experiencing control and freedom of choice strengthens the impression of sense of agency. Making mistakes leads to a decrease in sense of agency.

Sense-of-agency is important for human well-being, to manifest itself as an entity of 'self' in the external environment. However, dementia poses various challenges for maintaining independence. Dementia patients want to preserve their autonomy and they want to perform their activities of daily living for as long as possible. MemoryHome has the ambition to increase sense-of-agency by the deliberate addition of: predictability (a fixed sequence of assignments at each anchor point), freedom of choice (play the sound fragment or listen to it), an aspect of movement (physical walk and independent touching of the screen) and error-free learning (no wrong answers are possible). Furthermore, MemoryHome has the intention to connect optimally with the living environment (familiar route) and the unimpaired capacities of the patients (feeling positive and being narrator of their own story).

POSITIVITY

Positive reinforcement is an efficient learning method in behavioral research. The vast majority of learnt behavior in animal studies is the consequence of a learning process, in which positive reinforcement is the recommended instrument. Positive reinforcement has two key aspects, it deals with a positive and step-by-step approach. The positive attitude ensures that learning becomes a pleasant experience, as a result of which the animals get intrinsically motivated and a close bond can originate between the animal and the instructor. In addition, a step-by-step approach works most effectively. The desired behavioral outcome is divided into a number of logical intermediate steps, which can each be rewarded at every turn. MemoryHome departs from an inherently positive starting point by, for example, addressing the unaffected capacities of dementia patients (the imagination and 'you cannot not communicate'), supporting participants stage by stage and rewarding them for carrying out each desired response (collecting photos before walking through the memory palace).

The term 'positive health' means that health is more than the absence of a disease. Rather, it is an invitation to examine which elements ensure that people live happily, long and healthily and to examine how these aspects can be promoted. Social interaction can be used as a reinforcement in itself. 'Social health' can be divided into three components: participation in social activities, preserving independence and utilizing potential. Every element can be enhanced separately.

First and foremost, under-stimulation is a well-known problem in nursing homes. Dementia is often accompanied by an apathetic attitude, but the refusal to participate in social activities can be attributed for a larger part to lifeless environments and short-sighted, insulting perspectives of others. Most scales developed for measuring quality of life in dementia patients, do not even cover a component of 'purpose' or 'meaning'. People with dementia are perceived as drifting and purposeless, which means that the range of meaningful activities remains restricted. MemoryHome gives dementia patients a goal to start walking around in their familiar environment: exercising the memory palace. The significant others act as a 'hidden resources', because social interaction functions as a positive reinforcement.

Secondly, all kinds of context-aware auto-prompt systems are constructed to support dementia patients in performing day-to-day activities independently. The designers of these technologies base themselves on the communication techniques frequently used by caregivers. Through these research meanders, it becomes clear that caregivers rarely leave an opportunity for interaction or positive feedback and that they typically wait for the patient to make mistakes before intervening. MemoryHome encourages fellow-walkers to identify and encourage positive behaviors of dementia patients. The training suggests to participants that they should not wait with positive reinforcement until the end of an activity, but to apply these valuations step by step during the process.

Thirdly, it is very important to utilize the potential of dementia patients. Without denying the severity of the disorder, 'humor' remains a powerful capacity that is insufficiently addressed. Humor is much more than making a witty comment. Humor is a coping strategy, it requires cognitive flexibility and it deals with looking at the same reality from a different viewpoint. Group sessions of re-appraisal therapy are valuable instruments for 'hidden victims' to develop new perspectives in challenging situations. The objective is not a search for the best solution, but sharpening the ability to look at the world through someone else's eyes. However, not every form of humor contributes to well-being. The 'adaptive humor style' establishes positive social relationships, promotes self-image and is strongly linked to quality of life. These insights apply to both the patient and the immediate environment. MemoryHome stimulates participants to look at dementia differently by shifting from 'dementia as memory-loss' to 'dementia as communication-loss'. Introducing the positive

triangle is related to noticing patients' abilities. MemoryHome deliberately invites people to tell optimistic stories based on positive personality traits, without ignoring the gravity of dementia and without denying the stories of sadness.

CHAPTER 4: THE MEMORY

PART 1: METHOD OF LOCI - TRADITIONAL

Some 'mnemonic techniques' have a history of more than 2500 years. One of the most effective and evidence-based memory strategies is the 'method of loci' ('the memory palace'), which consists of three logical steps: forming a mental route (of a familiar environment), selecting specific anchor points along that pathway, and coming up with vivid associations between the information to be remembered and these anchor points. Traditionally, memory palaces were mainly used to memorize extensive lists of information, whereby the order of the items is important. These instruments of recollection are also well-known with contemporary memory champions. MemoryHome builds 'a new memory palace', where the order of the items is not necessarily essential and the memory contents can contain personal, meaningful information.

In recent decades, mnemonic strategies are increasingly being used to enhance memory for an older target population. Memory palaces can significantly improve the episodic memory performance in older adults. These memory benefits remain observable for up to five years after the training period and they can be attributed to the concept of 'cognitive reserve'. Intervention programs with memory palaces, of only eight weeks' duration, can result in cortical thickening. The neuroplasticity seems to be preserved over the entire life span and the method of loci provokes visible, neuronal changes. More and more research is moving towards investigation of the positive impact of memory palaces for people with mild cognitive deficits. A crucial element appears to be motivating participants to apply the acquired methods in the living environment. Most individuals only use the attained memory palaces in the laboratory environment, so that the desired effects are often not achieved. There are three central arguments encouraging participants not to apply the learnt memory strategies in the living environment: the mnemonic requires too much effort and a long training, it is too

complex by nature and it is simply not being inserted. MemoryHome employs the nearby environment as a 'hidden resource' to stimulate the creation of memory palaces and to encourage exerting the memory walks on a regular basis. The technology accelerates and simplifies the process. The primary objective is not to promote memory performance (although that can be a beneficial side effect), but to connect people.

PART 2: METHOD OF LOCI - CONTEMPORARY

MEMORY PALACES AND ALZHEIMER'S DISEASE (Belleville)

People with 'mild cognitive impairment' find themselves in a transition period between normal aging and Alzheimer's disease. These people do not belong to the category of dementia patients, because their activities of daily living are not disturbed. Mild cognitive impairment, as a precursor to Alzheimer's disease, may be a suitable target period for cognitive interventions, in particular for strategies based on visual and semantic mnemonics. The Canadian research team under the supervision of Professor Sylvie Belleville (Institut Universitaire de Gériatrie de Montréal) have developed an intervention program for individuals with mild cognitive impairment. They have achieved significant results regarding the ability to reproduce memorized lists of information using the memory palaces. People with mild cognitive deficits preserve the ability to enhance their episodic memory, provided that they have the proper cognitive training. This intervention seems to address brain structures that remain largely unaffected in the course of Alzheimer's disease. During follow-up research, the effectiveness of the training process is visualized by fMRI images. The training effects are clearly observable in the brain and people in the early phase of Alzheimer's disease retain their cognitive plasticity. The memory palaces activate new brain regions and also increasingly appeal to specific areas of the brain. The new areas of activation after the training are linked to semantic elaboration, visuospatial memory and skills acquisition, which corresponds with the character of the acquired mnemonic strategy of memory palaces. The training program genuinely stimulates several brain areas that remain unaffected for longer in patients with mild cognitive impairment.

During the intervention of Belleville and colleagues, in addition to teaching the memory palaces, extensive attention is given to the technique's proper introduction. In this way, participants gain a stronger sense of control over their memory capacities and several potentially obstructing beliefs are eliminated. The scientists use the technique of 'fading support', steadily promoting the independence of test subjects. In addition to the actual instruction of memory palaces, the adjusted introduction, clarifying the benefits and guaranteeing implementation are inseparable components of a successful, cognitive intervention. External memory aids ('virtual reality') are able to enhance the effectiveness of internal mnemonic techniques, even when these supporting instruments are not present at the time of recollection.

Besides operating the mobile application, MemoryHome includes a communicative approach in which caregivers / students are trained to introduce memory palaces as optimally as possible (descriptive language of the yes room). A whole range of psychological techniques are included to increase the probability of executing the memory walks repeatedly, to implement the intervention successfully (social interaction, freedom of choice and alternation in the senses) and to contribute to the quality of life of the care recipient (future perspective, self-efficacy and positivity). The technology serves as a supportive tool for the imagination. Memory palaces, otherwise too abstracted, are now visualised externally. The more real the representation feels, the stronger the memory benefit will be. MemoryHome utilises the real world instead of the virtual reality. Positive stories are anchored to visible objects from the familiar environment. The living environment coincides with the learning environment.

MEMORY PALACES AND DEPRESSION (Dalgleish)

Modern 'memory therapy' is the psychological tendency to counter memory problems of people with affective disorders with mnemonic strategies. People with depression use their memory in a different way from their healthy peers. There are four mnemonic horsemen in depression: a systematic bias for negative memory material, an impoverished experience of positive memory contents, limited access to specific details of the personal past and dysfunctional processes that are characteristic for the rumination of unpleasant experiences. The pioneering work of Professor Tim Dalgleish, and his research team at the University of

Cambridge, investigated the possibilities of using memory palaces as a permanent repository for positive recollections in people with depression. These scientists demonstrate that memory palaces can broaden the gateway to self-reinforcing memory contents (in the short and long term) allowing people with depression to regulate their state of mind (both in the laboratory and in daily life).

During the intervention of Dalgleish and colleagues, test subjects are carefully supported in the selection of suitable memory contents. These images preferably are specific, vivid, detailed, affective, concrete and sensorial by nature. Subsequently, these positive thoughts are deliberately anchored with a 'tagline' to stationary, visible objects from the familiar environment of the care recipient. Subjects are step-by-step and positively reinforced, until they are capable of recalling fifteen preselected memory contents independently. Homework assignments encourage participants to habitually walk through the memory palaces. The researchers emphasize the main advantages of the method of loci to be: easy to apply, possible to be taught to non-professionals and long-lasting effects on emotion regulation in daily life. The method of loci is clinically promising, especially as a simple strategy to regulate and reverse day-to-day, negative moods.

MemoryHome trains caregivers / students to search for fifteen positive, emotional connections in dementia patients and to anchor these images with audio fragments ('tagline') to visible, stationary objects from the familiar environment of care recipients. The living environment coincides with the learning environment. The incentive to start the walks is not imposed as a homework assignment, but comes from the nearby environment, taking the initiative as a 'hidden resource'.

A NEW MEMORY PALACE (Bormans)

In addition to the similarities between 'MemoryHome' and the classical application of the method of loci from the antiquity, the use of memory palaces by Professor Belleville and Professor Dalgleish, there are also important points of distinction with the 'new memory palace' as developed in MemoryHome.

The origin of the method of loci is attributed to the ancient Greek poet Simonides (556 BC) who, according to legend, was able to identify a group of mutilated people after the collapse

of a building based this mnemonic. Traditionally, the method of loci was mainly used for the reproduction of neutral memory contents where the order is important. MemoryHome reverses the process and examines its effectiveness on meaningful information, namely remembering the faces of meaningful others (as originally applied by Simonides). The emphasis is not so much on the right order of items or on the accurate reproduction, but on anchoring positive stories and stimulating connection between dementia patients and their environment.

Professor Belleville supports the imagination of participants by using a paper blueprint of a fictitious memory route during the intervention. MemoryHome uses a combination of augmented reality and the genuine reality and externalizes the actual, familiar environment of dementia patients. Belleville sets test subjects to a memory task of 12 items that must be remembered for a short time (reproduction after 30 seconds and after 10 minutes) while MemoryHome strives for a permanent storage of self-reinforcing memory contents. Belleville mainly has difficulty getting participants to apply the learnt techniques in daily life. MemoryHome purposefully anchors the positive memory contents to visible, stationary objects in the patient's familiar setting, so that the living environment coincides with the learning environment.

Professor Dalgleish instructs a supervisor to create memory palaces in one-on-one sessions with people with depression in the actual, familiar environment. Dalgleish expects participants to perform the memory walks regularly due to homework assignments. The memorization process thus remains an individual matter. The memory contents are mainly used to positively influence the individual state of mind of the depressed patient. MemoryHome utilises the 'hidden victims' as fellow-walkers and transforms the memory contents to conversation topics, leading to interpersonal connection. The mobile application is a supportive instrument for exercising memory palaces in the company of others. The emphasis is less on reproduction, but more on connection and mutual promotion of quality of life. MemoryHome is a dyadic intervention. The other person acts as a 'hidden resource' and functions as a permanent driving force to continue the memory walks together.

CHAPTER 5 – THE DELIVERY

PART 1: PROOF OF CONCEPT (STUDENTS)

QUALITATIVE RESEARCH

There is a shortage of nursing staff worldwide. It is difficult to recruit and to retain professional caregivers. The high rates of burnout and depression among nurses and occupational therapists are due to the heavy work packages, the exposure to numerous stressful situations and the considerable lack of positive experiences. In this doctoral research a collaboration was initiated with various institutions to submerge graduate students in an advanced intervention program based on memory palaces. The most remarkable added value reported by participants is the change of perspective: the focus is shifted from the negative triangle to the positive triangle. The most pronounced difference between working with the memory palaces in the home care situation and in the residential care setting, is the health condition (physical and mental) of the care recipient. People have the tendency to wait as long as possible before moving to a nursing home, making general communication (and the creation of the memory palace in particular) additionally challenging in the residential environment. Two major points for improvement with regard to the intervention are the limited time horizon (eight weeks) and the continuous difficulty of involving the nearby environment (even with the wide range of compliance techniques). Furthermore, the diary reports from the students indicate that one of the prominent advantages of the educational trajectory is the bundle of communicative insights and their personal conclusions suggesting that memory palaces are applicable to mental health in the broader sense.

QUANTITATIVE RESEARCH

In a quantitative perspective, there were visible trends, but no significant effects, observed concerning the quality of life, the feelings of depression and the strength of the relationship with the informal caregiver. These findings are not completely unexpected, because they are mainly due to the modest number of test subjects and the limited time horizon in which the research was executed. The lack of significant outcomes in the statistics does not imply that

the intervention cannot be useful. The results are not quantitatively demonstrable according to the classical, medical frameworks, but they are essential from an ethical and socio-psychological point of view.

The most important thing is that a connecting, digital instrument has been developed for carers, students and professional caregivers. We have called this application 'MemoryHome' in this research. The focus is above all on enhancing meaningful communication and quality of life. The purpose of a psychosocial intervention is not to make a mental disorder disappear, but to support people in being able to experience an enjoyable and valuable life despite the presence of complaints. This doctoral study is situated within the paradigm of social science research. This work describes visible trends, with limitations and recommendations. The end-goal of this PhD-thesis is not to prove that the 'MemoryHome' application works, but to compose a blueprint in which possibilities and limitations are clearly outlined, so that other scientists and research facilities can work with it independently and will be able to continue to build on it for future investigations.

PART 2: IMPLEMENTATION (PROFESSIONALS)

Over the past three decades, more than 200 psychosocial interventions have been devised, investigated and found to be effective, regarding (informal) caregivers of dementia patients. Only 3% of these interventions managed to get implemented in daily practice. MemoryHome is committed to belonging to that very select group. The vast majority of these interventions is discontinued at the end of the research period. These findings imply that the scientific justification of an intervention does not offer a necessary guarantee for its continuation. In addition to the impact study with quantitative analyses, it is therefore equally important to consider how an intervention could be implemented within the working environment. For that reason, this doctoral research cooperated with several prominent care organizations in the Flemish landscape, both in the home care situation and in the residential care environment, to investigate the main barriers and facilitators for the implementation of the digital tool based on memory palaces ('MemoryHome'). The intervention was adapted and optimized based on the suggestions from students who had already completed the memory palace trajectory: a longer horizon, an explicit emphasis on involving the patient's immediate

environment ('hidden resources') and a more pronounced role for communicative approaches.

In accordance with the graduate students, the professional caregivers point out that the main added value of the memory palace trajectory is the change of perspective (cf. positive triangle) and the wide range of communicative techniques that are not only useful within the memory palaces but are also part of a broad and basic attitude. The impact of the basic communication attitude extends beyond the world of people with dementia. It is applicable and useful in other domains, within the mental health in the broader sense: depression, loneliness, attachment disorders, intergenerational connection, or even communication with healthy elderly people.

The caregivers within the home care situation encountered a lighter form of resistance from the care recipient, which is largely caused by the milder form of the disorder, while in the residential care environment, residents are usually more advanced in the course of the disease. The most recurring suggestion for improvement, both in the home situation and in the residential care environment, is to start the intervention with clients as early as possible. It is preferable to begin the introduction of memory palaces when people are still living at home. The caregiver could deliberately include some objects in the memory palace that are easily to move out with them at a later stage. Participants from the residential care environment indicate how vital the moment is when the client comes into contact with the nursing home for the first time. It is a crucial time point to immediately familiarize clients with the memory palaces. In this respect, the transferability of memory palaces would mean an absolute advantage. During this investigation, one important limitation was that the memory palace was stored locally on a single device, which was brought along by the caregiver. That way, the surrounding people ('hidden resources') could not be sufficiently utilized as a driving force to initiate the memory walks regularly. The follow-up version of the 'MemoryHome' application will therefore function in a cloud-based manner, making it possible for multiple users with different devices to simultaneously create or adjust the memory palaces.

The challenge for the future is to translate 'hidden victims' into 'hidden resources' in order for them to discover a short, shared activity that usually brings about new and positive topics of conversation. These instruments support them in being able to continue to connect with dementia patients. In this way, these 'hidden resources' reduce the probability of dementia patients dying a 'social death' that precedes their physical end of life.

Quintilian concludes his magnus opum in this way. The words apply equally to this PhD-thesis:

"With this, I thought I had contributed as well as I could to the system of rhetoric. And if it is of no great use to young students to become acquainted with it, they will, at least, which I find more important, have gotten the right attitude from it (Quintilian, [95] 2015, p. 657)."