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Aging in multilingual Netherlands

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Aging in multilingual Netherlands

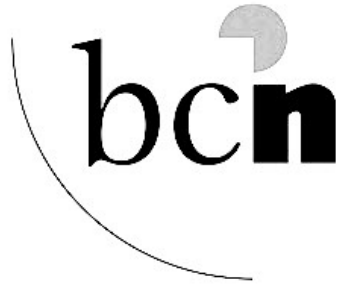
Effects on cognition, wellbeing and health

Anna Pot



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The research reported in this thesis has been carried out under the auspices of the Center for Language and Cognition Groningen (CLCG) of the Faculty of Arts of the University of Groningen and the School for Behavioural and Cognitive Neurosciences (BCN) of the University Medical Center Groningen.



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Aging in multilingual Netherlands

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CHAPTER 1

Introduction

In the coming decades, the population in the western world will grow increasingly older as a result of increased life-expectancies and dropping fertility rates (Kalache et al., 2005). In the Netherlands alone, the proportion of older adults will rise from 18% in 2017 to 26% in 2060, with the increase being especially noticeable in the proportion of oldest adults (i.e. individuals over the age of 80) (CBS, 2017). At the same time, global migration over the course of the twentieth century has resulted in increased ethnic and cultural diversity, which will be increasingly reflected in the older population in the coming decades (Longino et al., 2005; Torres-Gil and Moga, 2002). In the Netherlands, 28% of the older population in 2060 will be comprised of older migrants (CBS, 2017). As a result of this diversity, society will become increasingly multicultural and multilingual.

Optimal aging will be high on the agenda of aging societies in the coming decades. The European Commission has identified aging as one of the greatest social and economical challenges for the 21st century (EC, 2015). Indeed, as the costs and needs of caring for the expanding older population will rise, insights into how society may promote the aging of individuals in the most optimal way become increasingly important. Recently, research on aging has become increasingly attentive to the idea that cognitive enrichment – boosting cognitive abilities – is an effective strategy to facilitate optimal aging for healthy individuals (Ienca et al., 2018). Speaking multiple languages has been put forward as one such cognitively effortful event that enhances overall cognitive abilities. In a globalising

environment, the ability to speak multiple languages obviously holds communicative advantages. However, if multilingualism is indeed a cognitively beneficial life-experience, it may inform programmes and schemes to promote multilingualism across the lifespan as a tool to ward off or delay the onset of cognitive decline (cf. Bialystok et al., 2016).

But far from only advantageous, an increasing multilingual society also poses challenges for older adults for whom the main language is different from the dominant language in the environment. This has been vastly underresearched. This is especially the case if their command of this language is limited (Meuter et al., 2015). Whereas multilingualism may on the one hand boost brain functioning, it can impede the maintenance of a high sense of wellbeing when a lack of language knowledge prevents participation in social activities and access to society's aging provisions. Moreover, such a decline in wellbeing may trickle down on cognitive functioning (cf. Shankar et al., 2013). A full account of multilingualism and aging should take both facets into account. This thesis presents such a complementary perspective: the chapters explore multilingual experiences in relation to cognitive aging processes in a group of older multilingual adults, as well as in relation to health and wellbeing outcomes in a group of older migrant adults.

Indeed, up until now, multilingualism and cognitive aging have been studied in relative isolation from the multilingual society in which this aging takes place. Moreover, studies on multilingual populations often include a very specific subset of language users, through which positive results are not always replicated in other studies, using other multilingual populations. In recent years, this has led to a heated discussion on the existence of the so-called bilingual advantage (Antoniou, 2019). In contrast to monolinguals, the continuous monitoring and inhibiting of one of the languages in the bilingual mind is suggested to allow bilinguals to train their domain-general cognitive control mechanism. This enhanced cognitive control would in turn facilitate faster performance on tasks measuring certain aspects of executive functions, most notably inhibitory or attentional control. Studies on between-group comparisons, however, do not consistently reveal that bilinguals outperform monolinguals on these cognitive control tasks, because of the many confounding variables involved (e.g., Paap et al., 2015). In addition, much is still unknown about the mechanisms underlying bilingual language control (see for example Hartsuiker, 2015).

As a contrast, it is very rare for studies on the health status of older migrants to systematically investigate the influence of language on the migrants' aging processes. This is striking, as studies do reveal that a low proficiency in the host language is often a limiting factor in communicating about health and emotions (e.g., De Maesschalck et al., 2011). Healthcare provisions in western societies are typically geared towards highly proficient users of the dominant language. Even for native speakers with low-literacy abilities in the L1, health status may be impaired through insufficient ability to clearly communicate their healthcare needs (Jagt et al., 2015). Without linguistic assistance or society's awareness of their language backgrounds and linguistic abilities, vulnerable groups such as low-literate and low-proficient speakers are at risk of disappearing under the healthcare radar.

On a policy level, the expanding and diversifying aging population goes hand in hand with an increase in multilingual health care and information practices (Rechel et al., 2013). This implies that society needs to develop a stronger multilingual healthcare policy. This policy should, on the one hand, embrace multilingualism and promote its beneficial communicative and cognitive effects and stimulate language learning. On the other hand, however, this policy should safeguard the inclusion in health provisions of minority groups with restricted proficiencies in the dominant language. This requires more awareness of language barriers on the side of care professionals, and the development of relevant strategies and instruments to circumvent or lower these barriers (Harmsen et al., 2008). By gaining more insight into the linguistic practices of older adult migrants, policy can be better tailored towards preventive strategies to ward off a decreasing sense of wellbeing, loneliness and mental health problems, before they culminate in physical incapacibilities and more severe mental problems.

In general, it should be noted here that aging policies often depart from the notion of aging as a problem or challenge (cf. EC, 2015). The restrictions of old age are put at the center: the growing group of older adults pose an economic burden on the working population, and in relation to that the focus is often on increasing disabling conditions (e.g. Alzheimer's disease). The 'problem' of old age has arisen over the course of a century, when advances in healthcare and living conditions boosted life-expectancies. Increased longevity meant that provisions needed to be created for the growing group of older adults: pension schemes and the welfare state emerged (Johnson, 2005). It also put an unprecedented demand

on the healthcare system, with more hospitalisation and more use of (expensive) drugs and therapies.

This restrictive view on old age derives from the notion that aging is a gradual process of physical and mental decline. Much of this deficit view on aging stems from research observing a decrease in processing speed of individuals over time (Salthouse, 2000). However, the general slowing of processing capacities often observed in older individuals may not stem from a decline in abilities, but may rather be a result of an accumulation of experiences (Ramscar et al., 2014). When experiences grow with age, older adults have larger memory search demands, leading to them taking longer to reach the target information. This idea of aging as an accumulation of experiences allows for a more positive view on aging and denounces the stereotypical notion of decreasing capabilities and loss of functionality (Ramscar et al., 2013).

It is precisely this stereotypical notion of aging as a process of decline that is also reflected in language use. A view of society that problematises aging can trigger behaviour that is geared towards this negative belief. A case in point is a form of communication known as ‘elderspeak’: a way of talking to older adults that reinforces this stereotypical notion of loss of functionality. A slow speech rate, loud tone of voice and often a simpler register and short sentences are characteristics of this communication style (Kemper and Harden, 1999). Elderspeak may reinforce the detrimental view on aging and induce a mindset in older individuals and those around them whereby the belief that their brains and body remain capable of change and improvement (plasticity) is abandoned.

However, when adopting a positive view on aging, this stereotype may be circumvented and older adults may adopt a positive (or ‘growth’) mindset towards aging, in which they still believe that their brains are capable of change (Dweck and Molden, 2017). This ‘growth’ view on aging lines up with the concept of critical geragogy, an educational framework that aims to empower older adults to engage in education and learning by promoting a positive view on aging and a tailored learning experience for older adults (Formosa, 2012). Preventative (health-related or cognitive) strategies could crucially benefit from such a positive perception of the aging process. Cognitive enrichment, perhaps through language training (see Antoniou et al., 2013) at a later age, could be a viable way to promote optimal aging behaviour.

The main aim of the combined chapters that make up this dissertation is to promote our understanding of the context in which multilingual aging takes place and gain insight into in what form multilingualism may contribute to optimal aging for various social groups. This is done by investigating the two sides of the multilingual aging coin outlined above. In this way, multilingualism is approached as a life-experience that is rooted in a social context.

To sum up, in the literature on cognitive aging, life-experiences such as musical training or enduring physical activity have shown to promote brain flexibility or plasticity and induce cognitive reserve; the brain's ability to compensate for or circumvent neural damage by calling upon alternate brain areas for processing (cf. Stern, 2002; Fauvel et al., 2013; Scarmeas and Stern, 2003). Researchers propose that a lifetime of juggling multiple languages in one mind can equally be regarded as such a stimulating life-experience (Bialystok, 2017; Dash et al., 2017).

However, the information above shows that this multilingual life-experience stretches beyond cognition and is indicative for larger societal processes. For many older adults, the multilingual life-experience is about dealing with two languages not in one's mind, but in the daily social environment. A mismatch between their home language and the language of the environment may make the multilingual experience not an asset in healthy aging, but actually a restricting experience, as has become apparent here. When proficiency in the dominant environment language is low, anxiety to communicate in L2 situations induces language barriers that confine social participation and limit access to health (care) facilities.

Combined, these two perspectives can shed more light on role of language in the aging process and its influence on cognition, wellbeing and health behaviour. The results from the various studies can inform multilingual aging policies to direct more attention to the growing linguistic diversity in the older population. In this way, multilingualism may become an asset in aging: as a cognitively enriching tool and as a means to stimulate innovative practices in health care and information to include all older adults from a variety of language backgrounds.

The focus of the studies in this dissertation is on the multilingual context of the Netherlands. The Netherlands is a highly multilingually diverse country; different L1s are spoken and the country is officially Dutch-Frisian bilingual, but there is also a substantial dialectal diversity. At the same time, Dutch society is

a fitting context to examine the links between language and aging as it is one of the contexts in which a high proportion of older adults is expected in the coming years, including older migrants from various backgrounds (CBS, 2017). As highlighted in the first paragraph of this introduction, Dutch society will become increasingly multilingual and multicultural (cf. KNAW, 2018), and provides the ideal testing ground to examine the relations between language and aging.

1.1 Outline of chapters

The dissertation is divided into two sections that each have their own research questions and can be read as separate studies in their own right. The first section deals with the cognitive side of multilingual aging. **Chapters 2 and 3** report on a large epidemiological study ($n = 387$) towards the cognitive consequences of multilingualism in a highly diverse, older multilingual population sample in the Netherlands. In **chapter 2**, we review the literature on the bilingual advantage, and highlight the inconsistencies that have been observed regarding cognitive benefits in older populations in previous studies. The main research question that is answered in this chapter is under which circumstances multilingualism may be an asset in observing enhanced cognitive performance. The study is unique in embedding multilingualism in a broader social context and examines different aspects of the multilingual experience along a continuum, rather than dividing participants into distinct mono and bilingual groups.

It therefore builds on models like the Adaptive Control Hypothesis by Green and Abutalebi (2013). This model postulates that the intensity of switching between languages that a particular interactional context requires is indicative for observing cognitive effects. A communicative context that relies most on controlled language usage, whereby switching occurs but needs to be continuously monitored, would induce the greatest cognitive benefits. This relates to the observation that rather than simply knowing different languages, cognitive effects can be observed depending on the frequency and context of usage.

Moreover, recent work has argued for the approach of bilingualism as a continuum, rather than a dichotomous variable, that is shaped by individual factors such as acquisition onset, language proficiency and language exposure (Bonfieni, 2018). Along this continuum, all of these factors interact and shape the bilingual

experience. This makes every individual a unique bilingual language user who likely also differentially utilises language control mechanisms. The studies in this dissertation fit in with this newly started tradition of a continuum. Moreover, the studies aim to extend beyond it, by providing new insights gained through investigating precisely the two sides of the multilingual aging coin. Ultimately, the aim is to arrive at an integrative account of how multilingual aging shapes cognition, wellbeing and health outcomes.

A broad and continuous view on multilingualism, whereby in this dissertation also dialect usage is regarded as a form of multilingualism, helps to detail the role of multilingualism as a social construct, and how it interacts with other life experiences in observing cognitive effects. In investigating this issue, a relatively uncommon statistical technique is used: Partial Least Squares Regression modeling (PLS). This technique allows one to view which factors, such as multilingualism, education, socio-economic status and so forth co-vary and together explain a proportion of the observed cognitive effects (a part of the model's variance).

In **chapter 3**, the research on the diverse multilingual population is subsequently extended and details the social language usage of the multilingual cohort included in this study. Using a subset of the dataset from chapter 2 and the same statistical technique, the influence of linguistically more or less diverse close social relationships on language usage and cognitive control is reviewed, and linked to how this may promote brain plasticity. The rationale behind this study is that engaging in diverse social relationships has been shown to promote the formation of a cognitive reserve (Fratiglioni et al., 2004). As language is first and foremost a social phenomenon, the social environment of multilingual individuals impacts on the type of language that they use. The same holds true for monolinguals, who might vary their language use stylistically according to the setting and their interlocutor.

This is all the more reason to investigate whether multilingualism, along a continuum, triggers the formation of linguistically diverse close social relationships and whether this helps, through a more intensive use of different languages across various social domains, in explaining enhanced cognitive performance (see the discussion between Ikizer and Ramírez-Esparza, 2017; Vives et al., 2018, for a more detailed account). If this is the case, then it is more by virtue of using

multiple languages, and having the social opportunities to do so, that cognition may be enhanced. This has repercussions for the relation of multilingualism to cognitive reserve.

The second section of this thesis deals with the other side of multilingual aging. A multilingual context may hold certain cognitive advantages and contributes to healthy aging. Sometimes, however, multilingualism may be detrimental to optimal aging. In **chapters 4, 5 and 6** it is investigated how aging in an environment where the dominant language differs from one's mother tongue may put up linguistic barriers that can have detrimental consequences for optimal aging. In doing so, the focus is on the group of older, female Turkish migrants in the Netherlands.

Data from 2013 indicates that around 11 % of the Dutch population is comprised of non-western migrants. The largest migrant group are the Turkish, followed by Moroccans and Surinamese migrants (Mulder, 2013). Given that the Turkish individuals were, after the Italian and Spanish labour migrants, the first large group that was recruited as migrant workers by the Dutch government in the 1950s and '60s, they now form the first large-scale group of aging migrants in Dutch society. For this reason they are the focus of the investigation in the current chapters.

It is interesting in this respect that Turkish and Moroccan migrants generally demonstrate worse health conditions in comparison to other migrant groups, as well as to their native Dutch age-peers (Schellingerhout, 2004). At the same time, the Turkish migrant group may be a relatively special one. Level of education is generally low – especially female older Turks are oftentimes illiterate, and 60% lack proficiency in Dutch (Dagevos and Gijsberts, 2007). Overall, older Turks have few native Dutch contacts and often hold somewhat traditional views regarding family relations, culture and care (Schellingerhout, 2004). This may be especially the case for females, as they generally will have had limited opportunities to venture out of the house and interact in a Dutch-dominant environment. Because of this minimal contact, command of the Dutch language is typically low for first-generation Turkish adults. most notably women (Yagmur, 2011).

Chapter 4 examines the linguistic situation of older Turkish migrants in the Netherlands, by obtaining information from healthcare professionals with a relatively large Turkish clientèle. Through interviews based on an extensive ques-

tionnaire, the chapter provides an initial framework for a closer investigation of the presence or absence of a language barrier for older, female Turkish adults. The main question to be answered here concerns gaining insight into the linguistic situation of older Turkish migrants. How do they organise their day-to-day activities and how do they obtain the necessary (health) care, information and support?

As with the discussion of the role of the social context in multilingualism and cognitive aging in section one above, the investigation in the second section, too, examines the social context in which multilingualism is placed. It highlights that possibly detrimental effects of language or a language barrier stem from individual parameters in the social environment of individuals. These include, for example, the presence or absence of (L2 proficient) family members, social relations in the neighbourhood, level of education, literacy, the presence of facilities in the Turkish language, and so forth.

In essence, the variation in aging trajectories for these older adults reflects the variation in cognitive effects in the previous part: given the same language combinations and proficiency levels, some individuals show a cognitive advantage and others do not, depending on individual contextual parameters. As language is always rooted in a social context, it is crucial to observe its effects in advantageous (cognitive) situations, as well as disadvantageous situations. **Chapter 4** therefore provides the foundation for a more in-depth exploration of the individual linguistic situations in relation to health status and wellbeing of the older migrants in the next chapter.

In **chapter 5**, the effect of the linguistic environment on the aging process of a group of older, female Turkish adults across the Netherlands ($n = 39$) is assessed. With the input from the previous chapter, an extensive questionnaire was drafted and administered in an interview with these female Turkish informants. In addition, a crude measure of their proficiency in Dutch was obtained, as well as an indication of their L2 literacy abilities. Moreover, a cognitive measure was obtained in the form of a working memory test and the older adults' wellbeing levels were measured.

The main question that is asked in this chapter is how the individual older adults age (successfully or unsuccessfully) when their command of the dominant language is low. Under which circumstances does a low proficiency impede the ag-

ing process and which strategies do the older adults employ to successfully maintain a sense of wellbeing, quality of life and independence, and when is this compromised? The chapter demonstrates that – in line with the overall argument of this dissertation – detrimental effects of a language barrier on the aging process arise from the social context of individuals, most notably the presence or absence of a social network. This underscores the assertion that language is a social variable, and always rooted in a broader interactional context.

The final chapter in section two (**chapter 6**) investigates the language learning materials and provisions that exist in the Netherlands to help (older), low-literate adults to learn the Dutch language. As it has become evident that the brain retains much of its plasticity well into old age (cf. Li et al., 2014), language learning at a later age is certainly not a futile endeavour. It may boost cognition, as has been argued (cf. Antoniou et al., 2013), but for this group it more importantly boosts L2 proficiency, and in turn unlocks opportunities to age more optimally. To boost L2 proficiency, especially for low-literate adults, language learning materials need to be specifically tailored for this group.

In **chapter 6**, it becomes clear that there is a very limited set of educational materials for this group. This suggests that within Dutch society, the ability to improve L2 proficiency for older migrants is not actively encouraged, especially at an older age. The limited available and suitable material stands in stark contrast to the call that learning something new, especially at an older age, is beneficial. For the group of low-proficient and low-literate older adults that form the basis of this study, a positive view on third age language learning, both by the older adults themselves as well as by Dutch society and policy makers, would be an important first step in enhancing wellbeing and independence.

The last chapter of this thesis, **chapter 7**, provides an overall discussion of the findings put forward in the different studies. This chapter ties the two sections together by uncovering common themes and shows how the two aspects of multilingual aging connect with each other through the investigation of multilingualism as a dynamic, contextually (socially) embedded experience. Together, the two parts of this dissertation open up the field of multilingualism and aging and call for a reflection of how we approach the concept of multilingualism in aging. Language may be a proxy towards increased wellbeing and optimal health for some older individuals, as well as a life-experience that may itself - in interaction

with other life experiences - shape cognition and promote healthy aging. After all, the rapidly aging population and increasing international migration are two themes dominating societies all over the world today. Together, they underscore the need for studies looking into the effect of language on the aging processes of individuals in different multilingual environments.

PART I

**Multilingualism and cognitive
aging in the Netherlands**

CHAPTER 2

Multilingualism and cognitive effects

Abstract | This chapter reports on a study that considers those components of multilingualism that may relate to enhanced cognitive performance. To investigate which aspects of multilingualism drive a potential cognitive advantage, and how they interrelate with other individual variables, a large sample of 387 older multilingual adults from the northern part of the Netherlands is targeted. Two cognitive tasks, a Flanker task and a Wisconsin Card Sorting task, and an extensive background questionnaire on health, wellbeing, personality, language knowledge and language use are administered. Through linear mixed effects regression modeling and partial least squares regression modeling the chapter investigates under which multilingual circumstances enhanced attention control is observed. The findings are discussed in light of previous studies that try to uncover the nature of bilingualism and the cognitive processes that may drive an advantage. ¹

¹This chapter has been slightly adapted for this dissertation and is published as a paper in: Pot, A., Keijzer, M.C.J. and de Bot, K. (2018). Intensity of multilingual language use predicts cognitive performance in some older adults. *Brain Sciences* 8(5), 92.

2.1 Introduction

Following research that has demonstrated that certain life-experiences can shape cognition (e.g., enhanced spatial memory in taxi drivers in London, jugglers, and musicians (Maguire et al., 2000; Chobert and Besson, 2013), it seems intuitive that language, being one of the most intense and durable human life-experiences, could also enhance domain-general cognitive performance (Bialystok and Grundy, 2018). Cognitive advantages for bilinguals have indeed been observed in studies comparing performance of bilinguals and monolinguals on a series of cognitive tasks that measure (components of) executive control, most notably inhibition. Building upon the influential model of executive control by Miyake and colleagues (Miyake et al., 2000) that distinguishes four components of executive functioning; inhibition, switching, monitoring and updating, the dominant view is that the enhanced cognitive performance of bilinguals is due to their continuous inhibition of the nontarget language in a specific context to resolve competition for selection, as both languages in a bilingual brain are always active (Kroll and Bialystok, 2013). This continuous cognitively effortful task would carry over into non-linguistic cognitive tasks, making bilinguals respond faster to non-verbal cues in especially conflict-monitoring tasks – such as the Simon, Stroop or Flanker task – than monolinguals (Bialystok and Craik, 2010).

A seminal paper by Bialystok and colleagues from 2004 demonstrated that there was a bilingual cognitive advantage (faster response on a Simon task) for older bilingual adults compared to their monolingual age peers and younger monolinguals (Bialystok et al., 2004). In 2007, Bialystok and colleagues reported that bilingual patients diagnosed with probable Alzheimer’s disease received this diagnosis on average four years later than their monolingual peers, whereas they performed on a par on measures of cognitive control and there were no interfering effects of occupational level, gender and immigration status (Bialystok et al., 2007). These findings collectively sparked a wealth of research on what has become known as the ‘bilingual advantage’ (BA), with varying results. Since 2004, the strength of a BA has decreased from strong to moderate effects for specific populations of bilinguals or no differences between bi- and monolinguals at all (Paap et al., 2014; Hilchey and Klein, 2011; Hilchey et al., 2015). Recent (critical) reflections on the existence of bilingual advantages (see the discussion article by

Paap et al. (Paap et al., 2015), and corresponding commentaries in *Cortex*) have given rise to calls to uncover more about the underlying constructs of language and cognitive control, in order to move our understanding of the differential results regarding a BA forward.

2.1.1 Cognitive control

Hartsuiker (2015) observes in *Cortex* that the research on BAs lacks clear theories on how language management influences cognitive control. He argues that we need information on the source domain (language control) and how this transfers to the target domain (cognitive control). Without being clear on the processes involved in the source and target domain, we cannot even begin to interpret the transfer process. Currently, our main predictions on how bilingualism may impact cognitive performance is by the joint activation of languages in a bilingual brain, through which bilinguals exert enhanced control on processes of inhibition, monitoring or directing attention. This enhanced training carries over (it is unclear by which mechanism) into general processes of executive control.

However, there are a few problems with this view. First of all, the robustness of the inhibitory control account, whereby response inhibition was put forward as the driving force behind cognitive advantages, has been called into question by research on linguistic interference in (picture) naming. In a Dutch L1 picture naming experiment with a small group of university students, researchers found L2 English interference at the phonological level (Klaus et al., 2018), suggesting facilitation and interference effects of the non-target language (Calabria et al., 2012; Marian et al., 2007; Van Assche et al., 2013). This goes against the notion that selection of the appropriate language is solely accounted for by the mechanism to inhibit the non-appropriate language (form), hence propelling researchers to argue that inhibition *alone* cannot explain executive control advantages (e.g., Hilchey and Klein, 2011).

Even more, studies demonstrate that the cognitive tasks used in behavioural studies to elicit a BA do not necessarily correlate with each other, revealing (different combinations of) a multitude of cognitive processes measured by these tasks (see Paap and Greenberg, 2013). Tasks that measure executive functions always tap into multiple components of cognitive control, creating ‘task impurity’

(see Friedman, 2016). This makes it challenging to relate specific components of executive functions directly to bilingualism. Perhaps precisely because of this complexity and opaqueness, very few studies so far have attempted to grasp the underlying cognitive processes involved in bilingual decision making. This echoes the argument of Hartsuiker that clear theoretical underpinnings of the target domain and the transfer process are lacking.

2.1.2 What is bilingualism?

On the side of the source domain, in turn, we may have to take one step back and consider what it is that we define as bilingualism. Bilingualism is not a static 'state'. Treating bilingualism as a dichotomous variable; solely as the ability to speak more than one language (the initial operationalisation in the 2004 study), falls short on acknowledging the vast differences between bilingual groups, or indeed individuals. Ihle et al. (2016) tested whether the more languages an individual speaks, the better s/he performs on cognitive tasks, which would logically follow if the number of languages spoken directly relates to a BA. They conclude that, indeed, number of languages spoken contributes to cognitive reserve, yet not in all participants, and depending on other cognitively stimulating activities the participants engaged in, their verbal abilities in general, and basic cognitive processing speed. (See also Kave et al. (2008) who longitudinally followed a group of multilingual elders in Israel and observed that the number of languages spoken reflects better cognitive performance, independent of educational level). From the observations of Ihle et al. (2016) it becomes apparent that a pure 'knowledge-based' (do you *know* multiple languages, yes/no) operationalisation of bilingualism therefore falls short of explaining differences in research towards a BA.

Perhaps the best way to solve some of the controversy in the BA debate is to stop comparing groups of mono- and bilinguals and rather pay closer attention to the type of bilingualism under investigation, treating this on a continuum based on bilingual language use rather than as a knowledge variable (also see Koussaie and Taler, 2015; Luk and Bialystok, 2013). This is not a new idea, yet something that has perhaps been overshadowed in recent years by a stronger focus on group-comparisons and dichotomous categorisations. In the 1960s, Cooper (1969) demonstrated that Puerto-Rican speakers of English and Spanish in the

USA performed differently on word naming and association tasks depending on how much they used each language in five societal domains; home, religion, neighbourhood, education and work. He advocates for more fine-grained operationalisations of bilingualism according to how the languages are used. Similarly, Grosjean (1998) argues for the inclusion of language modes (how long is a subject in a monolingual or bilingual mode, and how much switching takes place in this bilingual mode), language stability and language function, and a more detailed account of the language history of subjects in bilingualism research.

The interactional nature of bilingualism, which goes beyond the static notions of number of languages and simultaneity of acquisition, is captured in Green and Abutalebi (2013)'s adaptive control hypothesis (ACH). The ACH posits that different interactional contexts, either single-language, dual-language or dense code-switching contexts, place different cognitive demands on an individual (related to e.g., conflict monitoring, interference suppression and goal-orienting). Greater neural efficiency is expected to be observed for bilinguals who frequently reside in a dual-language context, as they show skills in monitoring (language) cues, allowing for more rapid switching. In dense code-switching contexts and single-language contexts, effective communication is less affected by careful background monitoring of language cues, suggesting fewer switching advantages for bilinguals in these contexts.

The differential contextual demands of diverse populations of bilinguals may be explanatory in understanding the presence or absence of bilingual advantages. An illustration of the ACH is a study by Macnamara and Conway (2014) towards bimodal bilinguals (cross-sectionally measured with two groups of college students; one with and one without two years of experience with American sign language). They looked at whether high Bilingual Management Demands (BMDs), operationalised as degree and frequency of switching between languages (cognitive control), and the experience with managing those demands is the mechanism responsible for cognitive enhancement. High BMD experience was associated with better performance on tasks of cognitive control and working memory capacity after two years. They suggest that rapid switching and the coordination of simultaneously comprehending and producing in two languages, which becomes more efficient with experience, enhances cognitive control. Because of the variation within bilingual populations with regard to BMD (type, experience

and magnitude), the presence and absence of a bilingual advantage also varies, they argue.

Bilingual advantages may then have more to do with the domain of switching between languages. Indeed, studies have found that the degree with which bilingual switch languages is predictive of a bilingual advantage (Prior and Gollan, 2011; Verreyt et al., 2016; Woumans et al., 2015). However, language switching, especially when measured in isolation and under strict, artificial conditions (e.g., cued switching), is problematic from the view whereby language use is mostly interactional in nature. The question may be asked whether bilinguals indeed exert language control and inhibit one language when switching to the other, especially in conversational interactions where switching may occur mid-sentence, and the strict ‘boundaries’ that separate languages do not apply. Moreover, as de Bot (2017) aptly notes, switching is not unique to bilingual settings. Monolinguals may switch codes or registers depending on the situation. When switching is such a common phenomenon, both in bi- and monolinguals, can we then really assume that switching costs (even though evidence for lower switch costs for bilinguals is robust), or inhibition, is enough to drive a BA? (see De Bot, 2017).

Perhaps it is not merely language control, but rather the environment in which language is used, possibly in addition to other cognitively enriching experiences, by which a cognitive advantage may be observed. Informative in this regard is a study on performance on EF tasks by bilinguals and two monolingual groups in different linguistic environments (French-dominant Quebec and English-French bilingual Ottawa). The language environment seemed to offer a more robust explanation for enhanced EF performance – by English monolinguals in Ottawa, where they are exposed to French in their environment, contrary to French monolinguals in Quebec, who lack this bilingual exposure – than bilingualism itself (Kousaie et al., 2014).

The influence exerted by the environment on experiments is often overlooked. With an analogy of the temperature of boiling water – which depends on altitude – Bak argues that even when we control for differences in experimental settings, the selection of participants, and different methods of data analysis, the environment in which an experiment is conducted may result in different observations (Bak, 2016a). As such, he advocates for the importance to compare results conducted in different environments, rather than replicating the same ex-

periment in the same environment. As above, the context in which bilinguals use their languages (in a highly bilingual environment where switching is practised daily as opposed to a monolingual environment) may offer an explanation for some of the conflicting evidence for a BA.

Moreover, Bak argues that the attitudes towards bilingualism or certain languages in different environments (which may be more positive in highly bilingual populations such as in Brussels or more negative when language use is politically coloured) may additionally play a role in the conflicting evidence; believing that being bilingual is an asset rather than a disadvantage. A recent investigation into the different operationalisations of bilingualism in studies towards BAs between 2005 and 2015 (Surrain and Luk, 2017) revealed that the degree to which different characteristics of bilingualism are reported differs greatly. Moreover, there is also a lack of sociolinguistic information, which is of particular importance when viewing bilingualism as an interactive life experience. The authors advocate for a better documentation of the social context (usage and status of languages in the population), but also the quality of foreign language instruction, by which in some countries bilingualism is not a life experience, but a learning experience.

In a recent contribution to a special issue of *Linguistic Approaches to Bilingualism*, Valian (2016) argues that, as experiences accumulate over the lifespan, singling out executive function benefits belonging to certain experiences is increasingly difficult. Benefits of bilingualism may be additive, or additive up to a certain point or are only visible when they occur together with other benefits (e.g., from being physically active, playing a musical instrument, a specific diet, and so forth). The fact that there are no negative results reported for bilinguals (only positive or null results), leads Valian to propose that there is a benefit, but that this benefit competes with other benefits, hence showing positive results in some populations, but null results in others. Because individuals are so diverse in experiences, and tasks measure different aspects of executive functions, she argues that it is more likely that there are also different mechanisms by which executive functions may be enhanced.

When BA's are so haphazardly observed, we might want to delve deeper into the construct of bilingualism. Bak (2016b) speaks of a forest of confounding variables in research on bilingualism. Hence, rather than a factor in isolation, bilingualism may contribute to enhanced cognitive performance when it is viewed

together with other experiential factors. The visibility of such an effect then perhaps depends on the presence and strength of these other factors (see Baum and Titone, 2014; Valian, 2015). What we need are large-scale studies whereby bilingualism is present in many forms, and examine not only its static presence, but also consider language usage patterns, to be able to gauge whether there is indeed a benefit attributable to bilingualism, or whether BA's lie in the combination of experiential factors. This study is one of the first attempts to investigate the nature of multilingualism and possible cognitive effects in a large and diverse group of older adults.

2.1.3 This study

Moving away from a static, isolated and knowledge-based view of bilingualism, this paper details the observations of a study among a highly variable group of multilingual older adults in a small geographical area in the northern Netherlands, rich in dialects and languages. Given the contextual nature of bilingualism, it is informative to look at a bilingual population in an area where bilingual practices are widespread, but the degree of bilingual language use and type (two languages, dialect and standard language combinations, etc.) differ from person to person. We answer to the call to uncover more about the nature of bilingual advantages by investigating the different types of multilingualism (language combinations, usage intensities, social context, etc). By doing this in a population that is multilingual to varying degrees and in varying forms/manifestations, comparison to a monolingual population is not needed, and ineffective.

The main aim of this study is twofold:

1. To uncover more about if, and what aspect(s) of, multilingualism may facilitate enhancement of executive functions and what this tells us about the nature of multilingualism (as a knowledge- or experience-based variable) and the cognitive constructs that are involved;
2. Whether multilingualism can contribute to enhanced cognitive performance in the presence of other (known) 'confounding' factors relating to health, wellbeing, and quality of life.

For sake of continuity based on the persistent ideas of cognitive control in the literature, we assess inhibition, attention-direction and set-shifting processes in a diverse elderly multilingual population. For the first question, we expect that it is not the number of languages or degree of proficiency of individuals (the knowledge-based operationalisation) that enhances cognitive performance, but rather the intensities with which different multilinguals (who may differ in number of languages, proficiency and language combinations) use their languages in different contexts.

For this we draw on the premise of the adaptive control hypothesis, in that we expect that a more balanced use of different languages across different social contexts elicits better (faster or more accurate) performance on cognitive tasks related to switching and attention, similar to the observations by Macnamara and Conway (2014). If this is indeed the case, this may confirm the speculations that there are different BAs for different populations, and that these populations likely mainly differ in language usage intensities.

However, to truly assess the uniqueness of bilingual populations, and whether populations with enhanced EF performance can effectively be discerned on the basis of their language usage the second question forms the basis of a model in which we insert the linguistic information of our participants, together with demographic, health and lifestyle information.

We may be hard-pressed to find that speaking multiple languages is more effective for EF enhancement than other lifestyle factors, such as playing a musical instrument, and perhaps that only by putting these factors together in a model, a significant effect can be observed. Or there may be other, environmental factors, that offer a more ready explanation of enhanced EF performance.

The great variety in our multilingual sample in terms of language experiences, usage intensities and other demographic, health and wellbeing characteristics offers a unique insight into how these factors may, or may not, interact with each other and perhaps, under specific circumstances, show an effect of multilingualism, in some type or form, on cognitive performance. At least it offers more insights into why some research does and other does not find bilingual advantages, while at the same time also demonstrating the complexity of studying one isolated factor (bilingualism) in a social context.

2.2 Methods and materials

2.2.1 Participants

By means of calls put out in the local media (radio, newspapers) information flyers and personal networks we recruited participants in the three northern provinces of the Netherlands. Inclusion in the study was based on the following criteria:

- Participants were 65 years or older (the benchmark at which many people in the Netherlands used to retire).
- Participants were residents of one of the three northern provinces in the Netherlands (Groningen, Friesland or Drenthe).
- Participants were cognitively ‘healthy’ individuals; i.e., they did not consciously suffer from any form of cognitive impairment. (This was asked in the questionnaire and people with an affirmative response were excluded).

A total of 387 participants took part in the study. Participants ranged in age from 65 to 95 years, with a mean of 72.07 ($sd = 5.7$). Participants were more or less evenly distributed among the three provinces and the dataset was nicely balanced in gender (201 male and 185 female participants (missing information of 1 participant)), also see Table 2.1.

From Table 2.1 it becomes apparent that, overall, the participant sample is relatively highly educated (mean of 5 (higher education) on a scale of 1 to 6) and have a moderate to high income (around 2500 euro gross per month). They are in good average health (a mean of 3, equivalent of “good health”) and rate their quality of life generally high, with an 8 on a scale of 1 (low) to 10 (high). Two-third of the participants lead an active lifestyle and around a third of the participants play or have played a musical instrument.

Ease of access to the study was facilitated by giving participants the opportunity to participate online from home (which automatically creates a bias by including only people proficient in handling computers). By means of the online software application Qualtrics (2017), participants completed an extensive background questionnaire on demographics, health, wellbeing, personality, social networks and language proficiency and use. In addition, participants completed

Table 2.1: *Demographics of the participant sample.*

Statistic	N		Mean	St. Dev.	Min	Max
Age	387		72.067	5.708	65	95
Gender	Male	201	-	-	-	-
	Female	185				
Province	384		Friesland	173	0.840	-
			Groningen	103		
			Drenthe	108		
Education	387		4.925	1.073	2	6
Income	387		6.866	1.400	3	9
Self-reported health	386		3.311	0.924	1	5
Multimorbidity	387		1.388	1.271	0	7
QoL	387		8	0.908	4	10
Sport	387		Yes	282	-	-
			No	105		
Playing an instrument	387		No	261	-	-
			Yes, passive	66		
			Yes, active	60		

three cognitive tasks targeting executive functions. In addition to online participation, people without access to a computer could also set an appointment for a face-to-face interview at home. This resulted in about 90% online participation, and 10% home-visits. Both the online and face-to-face interviews adhered to the same setup, hence we did not expect any quality differences between the two modes of data collection.

Participants were informed about the nature of the project prior to the study and it was made explicit that by completing the questionnaire they gave active informed consent that their data may be used anonymously for scientific purposes (in compliance with the departmental guidelines for participant testing at the Faculty of Arts of the University of Groningen). Answers were anonymized by having participants create a unique ID-number based on a set of questions. This ID-number was created at the start of the questionnaire, and had to be filled in again (prompted by the same questions) at the start of the cognitive tasks. This

way, data from one participant could be easily combined without the need to obtain personal identification information.

Not all participants filled in all questions or performed all cognitive tasks. A total of $n = 387$ completed the language questionnaire. Of these 387 participants, $n = 311$ also completed the first cognitive task (an Eriksen Flanker Task), $n = 292$ completed a Wisconsin Card Sorting task and $n = 193$ also completed a Corsi forward span task.

Overall, the participants were well-educated ($M = 4.9$ on a scale of 1–6, 6 being a university degree) and rated their quality of life generally high (a mean score of 8 ($sd = 0.91$) on a scale of 1 to 10). The group was relatively in good to average health ($M = 3.3$ on a scale of 1 to 5) and the majority was physically active. Almost half of the population played a musical instrument (around 48%). For the calculations, all available data was used, however, as one measure has more data points than another, results need to be interpreted with caution.

2.2.2 Multilingualism in the northern Netherlands

For this study we consider bi- or multilingualism along a continuum, rather than dividing participants in groups based on the number of languages they speak or relative proficiency. Therefore, we explicitly informed participants that they could participate regardless of the number of languages they spoke and mastery of these languages. In addition, we stressed that we also regarded (regional) dialects also as linguistic varieties which can be listed separately from languages such as Dutch or German, as previous research has shown that dialects may also be regarded as ‘separate’ languages (Kirk et al., 2018). As the northern part of the Netherlands is rich in (regional) dialects, we hence defined multilingualism as any combination of languages or dialects. To uncover more about the operationalisation of multilingualism we included questions in the language questionnaire pertaining to:

- Number of languages, and which, in order of dominance (maximum 5).
- Number of languages, and which, in order of acquisition (maximum 5) (these questions were based on the LEAP-Q questionnaire (Marian et al., 2007) (see below).

- Self-rated proficiency (speaking, reading, listening and writing) in the first three languages listed (5-point scale).
- Age of onset of acquisition of the first three languages and mode of acquisition (school, work environment, friends/family, or combinations).
- Relative usage intensity of the five languages (ranking from low to high).
- Degree of usage (5-point scale) of each language in different social domains (see Section 2.2.3.1)
- Switching behaviour measured with questions from the Bilingual Language Switching Questionnaire (Rodríguez-Fornells et al., 2011).
- Language attitude

Regarding languages, the group of participants was highly multilingual, with an average number of 4 languages and most individuals reporting to know no less than three languages. As is inherent to self-reported data, some individuals might have been more inclined to also list the languages they know but rarely use, such as school-languages (English, German and French), whereas others only listed those languages they actively use on a daily basis. The high number of reported languages also stems from the fact that we asked participants to list languages as well as dialects. See Table 2.2 below for the language details.

Proficiency in both the first and second listed languages of the participant is overall high (a mean close to the maximum of 5), and proficiency in the third language is on average slightly lower (but with more variation between participants considering the higher standard deviation of 0.8).

The second and third language is acquired at a wide span of ages, but on average slightly later than the L1. Two third of the participants are categorised as “early bilinguals” according to whether they learned their second language before or after the age of 12. Participants generally have a positive attitude towards speaking both their first, second and third language, with high mean scores of around 4 on a 1–5 point scale. There is variability in the extent to which participants use their L1, L2 and L3 across different societal domains. The score is an aggregated total of use of each language in a specific social domain (see section 2.2.3.1). The L1 is used across most domains (high mean score). The L2 and L3 are

Table 2.2: Summary of outcomes of the language measures.

Statistic	N	Mean	St. Dev.	Min	Max
Number of languages	387	4.199	1.002	1	5
Proficiency L1	371	4.881	0.381	1	5
Proficiency L2	365	4.565	0.613	1	5
Proficiency L3	341	3.898	0.808	1	5
ΛoΛ L1	376	3.148	3.504	0	24
ΛoΛ L2	368	7.649	8.698	0	68
ΛoΛ L3	340	13.532	9.146	0	67
Early or late acquisition of L2	Early 264	-	-	-	-
	Late 104	-	-	-	-
Positive attitude L1	378	4.587	0.690	2	5
Positive attitude L2	372	4.315	0.831	1	5
Positive attitude L3	345	4.020	0.787	1	5
Across-domain L1	383	4.163	0.833	1.000	5.000
Across-domain L2	377	3.139	0.956	1.000	5.250
Across-domain L3	343	1.897	0.781	0.250	4.500
Degree of contextual switching	365	2.450	0.791	1.000	4.670

more tied to use in a number of specific domains, given the overall lower mean score. Degree of contextual switching is moderate.

2.2.3 The background questionnaire

A questionnaire targeting demographic, health, quality of life, personality and language information of the participants was distributed using the online questionnaire platform Qualtrics (2017). Participants were presented with a welcome screen which listed the different elements of the questionnaire and informed participants about the procedure, before continuing to the questions. Table 2.3 below gives an overview of the different domains and questions asked in the background questionnaire.

The health and wellbeing questions were derived from a standardized questionnaire on health and quality of life (The Older Person and Informal Caregivers Survey (TOPICS)), that is used in numerous projects targeting older adults Lu-

tomski et al. (2013). Questions and scoring methods can be downloaded from their website.

Table 2.3: *Items in the background questionnaire*

Theme	Adapted from	Items
Demographics	TOPICS-MDS Lutomski et al. (2013)	<ul style="list-style-type: none"> • Age (in years) • Province of residence (1=Friesland, 2=Groningen, 3=Drenthe) • Place of birth • Education (6-point scale; 1=only primary school to 6=University degree) • Income (9-point scale; 1=500 with increments of 500 until 9=>3000) • Hobbies
Health information	TOPICS-MDS	<ul style="list-style-type: none"> • Self-reported health (scale measures, see below) • Multimorbidity • Functional health • Resilience
Quality of life	TOPICS-MDS	<ul style="list-style-type: none"> • Self-reported quality of life (mark between 1 (low) and 10 (high)) • Emotional wellbeing
Language knowledge	Not applicable	<ul style="list-style-type: none"> • Number of languages and which, according to dominance and order of acquisition • Use of each language in past two weeks • Use of each language in different social domains
Language usage (x3)	LEAP-Q (Marian et al., 2007)	<ul style="list-style-type: none"> • Age of onset of acquisition • Degree of proficiency (speaking/reading/writing/comprehension) • Mode of acquisition • Reading/TV/radio/internet usage in each language • Attitude toward each language
Switch behaviour	Bilingual Language Switch Questionnaire (Rodriguez-Fornells et al., 2011)	<ul style="list-style-type: none"> • Degree of contextual switching • Degree of control over switching • Degree of conscious switching
Personality	TIP1 questionnaire Gosling et al. (2003)	Ten questions targeting the 'Big Five' personality traits: extraversion, conscientiousness, openness to new experiences, agreeableness, emotional stability.

We tried to capture as many factors as possible that we deemed could contribute directly to cognitive performance in the background questionnaire. We selected those factors that have been shown to influence cognitive abilities in previous studies, such as an active and socially integrated lifestyle (Fratiglioni et al., 2004). We therefore assessed measures of health, quality of life, wellbeing and hobbies (playing a musical instrument (Hanna-Pladdy and MacKay, 2011) and being physically active (Bixby et al., 2007)). In addition, previous research has shown that a resilient personality profile (less affected by stress, anxiety and depression) is related to a delay in the onset of clinical dementia (Terracciano et al., 2013). Also, low levels of conscientiousness and agreeableness and higher levels of neuroticism are associated with higher risk of cognitive impairment (Terracciano et al., 2017). Therefore, we also assessed wellbeing (with the TOPICS-MDS) and compiled a personality profile for each participant with the TIPI personality scale (Gosling et al., 2003).

We also asked participants to provide information on their primary social network (type and frequency of contact with five relations, and in which language this contact took place) as being socially active is related to less cognitive decline in old age (James et al., 2011). However, due to the operationalisation of the question, quantifying this information proved too difficult. For the current study, therefore, we discarded this variable. In addition, due to time constraints and the multitude of confounding factors we did not take into account e.g., a healthy diet Nijholt et al. (2016) or leisure activities (Wang et al., 2012). However, we do have more detailed information on the specific hobbies our participants engaged in (e.g., gardening, quilting, etc), which calls for a future study with more fine-grained analyses at the individual level.

2.2.3.1 Data transformation

In order to run statistical analyses on the questionnaire data, we collated the healthcare questionnaire from the TOPICS-MDS questions into two variables (functional health and emotional wellbeing) by means of a Principal Component Analysis (PCA) conducted in Rstudio (RStudio Team, 2016). Similarly, we did not include all questions from the original BSWQ into the questionnaire, through which we were unable to use the scoring method applied to the original BSWQ. By

means of a PCA we extracted three meaningful variables: contextual switching, conscious switching and unintended switching. A resilience index was calculated by using the scoring procedure laid out in the TOPICS-MDS scoring instructions, by combining answers to functional and emotional wellbeing questions. Quality of life was determined by a self-rating on a scale of 1 (lowest) to 10 (highest).

Regarding the language measures, number of languages was simply a count variable. Type of language combinations was determined by selecting the first two languages of each participant and determining its origin; either Dutch, Frisian, regional dialect (Gronings or Drents), Germanic, Roman or 'Other' (more categories would make the dataset too fragmented). These combinations (e.g., Dutch-Frisian, or Regional dialect-Dutch) were subsequently given a number (1 to 9) and entered as a 'factor' variable into R. Early versus late bilingualism was calculated by considering the age of onset of acquisition of the second language of each participant. The cut-off point for a classification into the 'early' category was 12 years old, the age at which children in the Netherlands attend high school and structurally receive English, German and French language classes.

Intensity of language usage was regarded through the amount with which each language was used in different social domains (the family domain, friends, neighbours and acquaintances), measured on a 5-point scale variable (never to always). A composite score was calculated for each language (up to language three), in which the ratings for each language over the different domains are averaged to create one 'usage' score per language across different domains. A maximum score of 5 indicated that this language is always used across domains. Participants could give a maximum score of 5 ('I always use this language in this domain'), hence the index variable is a score between 1 and 5.

Attitude towards the participant's first three languages was measured by asking whether the participant liked to speak the language and deemed it important, on a 5 point scale. Finally, the five personality traits were calculated by adhering to the scoring procedures of the TIPI (Gosling et al., 2003), whereby participants list to which degree (1–7 scale) they find certain traits applicable to themselves.

These variables were added to a dataframe in R, together with the results of the three cognitive tasks, resulting in 387 rows with data for all participants, with some missing values when participants did not complete (one of the) cognitive tasks. The dataset is available in DataverseNL under Pot (2018).

2.2.4 Cognitive tasks

Participants completed three cognitive tests, administered via the freely online available program Psytoolkit (Stoet, 2010), with which users can create their own reaction-time experiments using a simple scripting language. The advantage of using Psytoolkit over other digital programmes is mostly that Psytoolkit allows the user to distribute a task online (contrary to Eprime or Pebl). The downside of using Psytoolkit is that the key-logged response may be slightly delayed depending on a participant's network strength, and participants may abort the task before finishing, which results in data loss (Psytoolkit only stores data from completed tasks).

Data from each participant were stored in separate .txt files (one per task) on a secure server. The data from the text files were subsequently imported into the statistical programming software RStudio Team (2016). From the raw datafiles, the desired measurements were calculated per participant and these were combined based on the participant's ID number, so that each participant was a row in a dataframe with a Flanker effect score, a WCST persistent error score and a Corsi span score. Table 2.4 below gives an overview of the cognitive tests that were used.

For this study, we only focus on performance on the Flanker and the WCST, as these two are most relevant for the questions asked in this paper.

Table 2.4: *Overview of cognitive tests.*

Cognitive Test	Reference	Cognitive Process	Outcome Measure
Flanker	Eriksen and Eriksen (1974)	Attention, inhibition	Flanker effect score in ms
WCST	Grant and Berg (1948)	Switching, set-shifting	Total number of persistent errors
Corsi blocks	Corsi (1972)	Working memory	Total forward span

2.2.4.1 Flanker Task

The Flanker arrow task was taken from the experiment repository of Psytoolkit, based upon the original Flanker task by Eriksen, which uses letters as stimuli instead of arrows, as is the case here. Slight modifications to this experiment were made in the form of a more detailed set of instructions beforehand (in Dutch) and the use of bigger arrows (white arrows against a black background). The tasks

consisted of in total 50 trials. Participants pressed a key on the left (Q) or right (P) of their keyboard depending on the direction the middle arrow (flanked by two on either side) is pointing in. The flanking arrows may point in the same direction as the middle arrow (congruent) or in the opposite direction (incongruent). Items were presented one by one in the middle of the screen and preceded by a fixation cross (300 ms). After participants completed 50 trials their reaction time per item, accuracy and congruency was saved. From these data a Flanker effect score was calculated by subtracting the mean reaction time on the congruent trials from the mean reaction time on the incongruent trials. A lower score is an indication of a lower cost in responding to the incongruent trials as opposed to congruent trials, reflecting either faster processing speed, enhanced attention or better inhibition.

Data-cleansing procedures may skew the data. In a brief report, Zhou and Krott (2016) review the appearance of a bilingual advantage in reaction time experiments and demonstrate that those studies that do not apply data-cleansing procedures more often report a bilingual advantage than studies that trim the reaction time data to fall in between an accepted range. For this study we decided not to trim the data, yet the dataset reveals that the maximum response on the flanker task was below 1700 ms.

2.2.4.2 Wisconsin Card Sorting Task

The Wisconsin Card sorting task requires participants to sort a set of cards (160 in total) according to a (changing) rule. Participants were presented with a screen with 4 cards, representing the sorting stacks. Each card showed a number of symbols (1 to 4 circles, triangles, stars or squares) in a particular color, and participants sorted each new card that appeared below these four stacks onto one of the stacks based on a rule: sort by color, shape or number. The rule changed with every ten sorted cards. Participants did not know the sorting rule beforehand, but received feedback after every card (correct or incorrectly sorted according to the rule). Through trial and error participants figure out the rule and sort each following card according to this rule. Until the rule changes. The positive feedback (Correct!) then suddenly changes to negative (Incorrect!), signaling that participants have to change the sorting rule. The WCST logged the number of times participants sorted a card correctly and, more importantly, whether they persis-

tently sorted correctly (which indicates that they apply a rule). When participants persisted with applying the old rule, their number of persistent errors increased. A larger number of persistent errors reflects more difficulty in switching to a new rule (which may increase when participants have had to switch a number of times), reflecting the degree of prolonged attention and switching ability.

2.2.4.3 Statistical analyses

To answer the first research question regarding the underlying mechanisms of multilingualism, we fitted two multiple linear regression models with the same fixed variables—one for each cognitive task—using the R function ‘lm’. The dependent variable in each model was the outcome of the cognitive task. We computed a regression model first with only the ‘knowledge’ factors:

- Number of languages
- Language proficiency
- Early vs. late onset of acquisition of language 1 and 2
- Language combinations (structural, not measured in distance)

Next, we fitted a regression analysis with only the ‘usage’ variables of multilingualism, and observed whether the model improved when we included an interaction of the two variables:

- Across-domain usage of languages 1, 2 and 3
- Contextual language switching

The outcomes of these two measures were subsequently compared.

To examine the second question, namely which (combination of) variables contribute to enhanced cognitive performance as measured by shorter Flanker effects (incongruent – congruent RTs) and fewer persistent errors on the WCST, we analysed the data using a multivariate partial least squares (PLS) regression model (with the package ‘pls’ in R).

PLS regression is especially useful in examining which combinations of variables (that might be correlated) explain the most percentage of variance, in our

case in a model with Flanker RTs or WCST error scores as the predicted variable. Given our hypothesis that multilingualism is a contextually embedded variable—an experience—it is perhaps likely that there are other factors that covary with (aspects of) multilingualism. Rather than building a linear regression model, which typically assumes that all variables are independent and seeks which factor(s) in isolation explain part of the variance (as we did with the predictors of multilingualism above), PLS regression is a well-suited technique in instances where factors may be correlated to some degree.

We built two models, one with the Flanker effect scores as the predicted variable, and one with the WCST error scores as predictor. Our independent variables are the scores derived from the extensive background questionnaire (cf. Table 2.3), which included measures of health, quality of life, multilingualism and personality. A list of the factors that were included is presented below:

- Age
- Gender
- Education
- Income
- Self-reported health
- Quality of Life
- Playing a musical instrument
- Sports/being active
- Number of languages
- Proficiency in L1/L2/L3
- Age of onset of acquisition
L1/L2/L3
- Early vs. late language acquisition
- Attitude towards L1/L2/L3
- Degree of contextual switching
- The Big Five personality traits
- Across-domain usage of L1 (see Section 2.2.3.1)
- Across-domain usage of L2
- Across-domain usage of L3
- Language combinations (as factor with 9 levels (combinations of first two languages))

A PLS regression model tries to maximise the covariance between the dependent variable (Y) and the predictor variables (X). Hence, PLS selects components of X (similar to a principal component analysis) and computes the optimum number of predictors that are relevant in explaining Y (and thus explain the maximum

covariance between X and Y) (see Abdi, 2003; Mevik and Wehrens, 2007, for more information).

Our PLS regression models were first computed with the default 10 components, after which the output was examined and the minimum number of components was retained (when the CV value does not increase but levels off or decreases). By means of a Variable Importance in Projection (VIP) score for each variable we assess which variables provide a meaningful contribution to the model (greater than 1). A bar graph of the VIP scores was subsequently used to view each variable's importance. With such a procedure, we prevented 'gold-digging' in the data (i.e., selecting significant variables by a degree of randomness). This is something we will return to in the discussion

2.3 Results

2.3.1 Descriptives

The statistical summary of the cognitive test scores in Table 2.5 lists mean performance on the two cognitive measures.

Table 2.5: *Overview of cognitive task performance.*

Statistic	N	Mean	St. Dev.	Min	Max
Flanker effect score	276	95.62	174.36	-550.6	895.85
WCST error score	258	12.79	4.93	4	29

The Flanker effect score (the difference between congruent and incongruent trials) ranged from positive to negative results, indicating that whereas the majority of the participants were faster on the congruent trials (hence the positive mean score), some participants responded faster to the incongruent trials. This is striking, as there is apparently a negative Flanker effect, something that is not often explicitly mentioned in the literature on multilingualism (but see Blom et al., 2017). A histogram (Figure 2.1) shows the distribution of Flanker effect scores.

The mean number of persistent errors (how many times a participant continues applying the old rule when s/he has to switch to a new rule) in the WCST

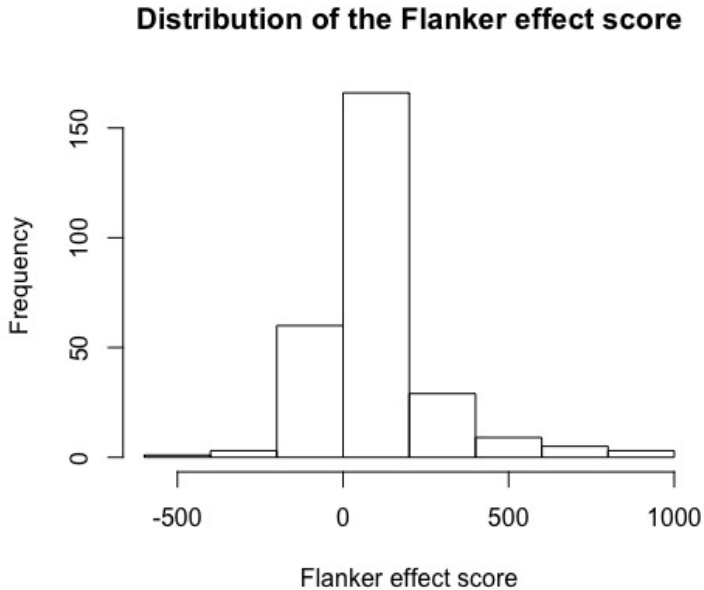


Figure 2.1: *Distribution of the Flanker effect score.*

was similar to the average mean population score of 11 errors reported elsewhere in the literature (Heaton et al., 1993), yet should be interpreted with caution. After the experiment, a number of participants reported that they experienced difficulty with the WCST. The task is relatively complex in comparison to the Flanker task, and when participants are not clear on the instructions they may just guess the correct rule most of the time. Therefore, the results obtained from the online WCST may be less reliable than the results for the Flanker task.

2.3.2 Static variables of multilingualism

We first ran two linear mixed effects regression models on the outcomes of the two cognitive tasks (Flanker effect score, WCST error score) with the static ‘knowledge’ factors of multilingualism as predictor variables: number of languages, early

vs. late bilingualism, proficiency in language 1, 2 and 3, and the different language combinations (Dutch-Frisian, or dialect-Dutch, etc). The output summary is presented in Table 2.6 and shows two non-significant models (one model for each cognitive measure).

Table 2.6: Summary statistics of the two linear mixed effects regression models on the outcomes of the two cognitive tasks with a static interpretation of multilingualism

	Dependent variable:	
	Flanker effect score <i>(Beta weights and SEs)</i>	Persistent errors <i>(Beta weights and SEs)</i>
Observations	244	231
R ²	0.043	0.057
Adjusted R ²	−0.006	0.005
Residual Std. Error	165.608 (df = 231)	4.945 (df = 218)
F Statistic	0.875 (df = 12; 231)	1.103 (df = 12; 218)

The table above demonstrates that the static operationalisations of multilingualism— as number of languages spoken, degree of proficiency in the first three languages (for the last two no information is available), early or late onset of bilingualism (before or after age 12) and different language combinations—does not significantly contribute to better performance on measures of cognitive control.

2.3.3 Language usage in different social contexts

Following the same procedures as for the static measures above, a linear mixed effects regression models was then fitted for each cognitive measure with the following dynamic ‘usage’ operationalisations of multilingualism: The usage intensity of the first three reported languages across different social domains (family, friends, neighbours and acquaintances) and the degree of contextual switching (whether participants consciously switch languages in a particular context). Because the degree of contextual switching may differ per language per context, we also calculated interaction effects between usage-intensity and contextual switching. Significant results and model summary statistics are presented in Table 2.7.

Table 2.7: Multiple linear regression models of cognitive performance related to dynamic operationalisations of multilingualism

	Dependent variable:	
	Flanker effect score (Beta weights and SEs)	Persistent errors (Beta weights and SEs)
Across-domain use L1	-25.673 (47.527)	2.693* (1.612)
Across-domain use L2	119.110*** (40.512)	2.342* (1.330)
Contextual switching	-15.704 (109.204)	6.723* (3.655)
Use L2:CS	-36.873** (15.869)	-0.755 (0.521)
Constant	-42.054 (287.928)	-7.482 (9.715)
Observations	246	234
R ²	0.106	0.028
Adjusted R ²	0.080	-0.002
Residual Std. Error	152.415 (df = 238)	4.947 (df = 226)
F Statistic	4.041*** (df = 7; 238)	0.937 (df = 7; 226)

Note: *p<0.1; **p<0.05; ***p<0.01

The linear regression for the Flanker effect score yielded a significant model with usage intensity of the L2 in different social domains (frequent use of the L2 across different social contexts = slower performance on the Flanker task) and the interaction between L2 usage and contextual switching as significant predictors. This suggests that, when the L2 is used frequently across different social contexts, performance on the Flanker task is in general slower than when the L2 is used less in different contexts. However, in combination with deliberate switching between languages according to specific contextual demands, performance on

the Flanker task was significantly faster. AIC model comparisons on the Flanker model with and without the interaction reveals that the model with the interaction performs slightly better (a lower AIC criterion of 3181.1). The interaction effect is plotted in Figure 2.2 below.

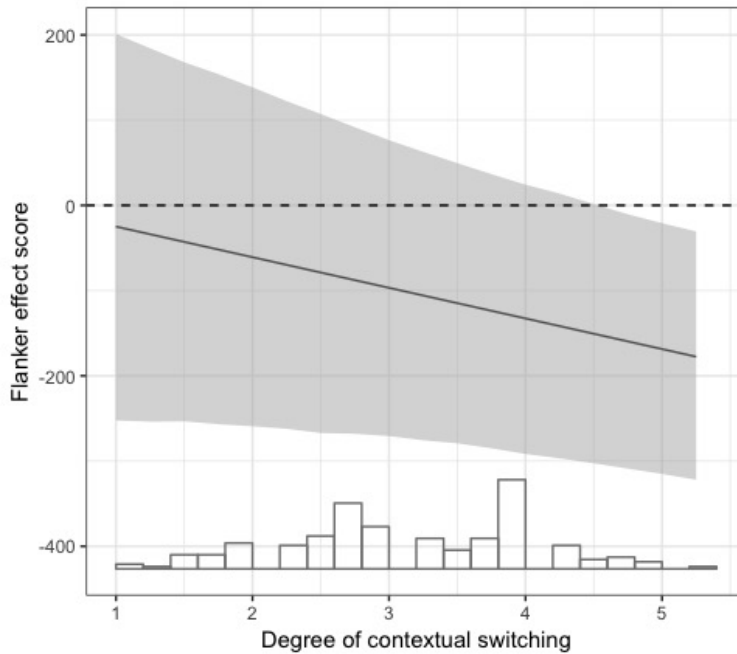


Figure 2.2: *Estimated coefficient of the Flanker effect score versus degree of contextual switching by cross-domain usage of the L2.*

The line in Figure 2.2 shows that the Flanker effect score decreases (and is negative) with more contextual switching. The bar-graph below shows the distribution of degree of contextual switching across the participant sample.

Performance on the WCST was not significantly enhanced (a reduction in number of persistent errors) for the second language and code-switching in interaction. As the total model did not reach significance, the moderate significance of cross-domain usage of the L2 and contextual switching in isolation can be dis-

carded. The AIC of the model for the WCST without the interaction was actually slightly lower, yielding a slightly better model (but not significant either: AIC = 1420.2, $R^2 = 0.011$).

2.3.4 PLS regression model

We ran a PLS regression model on the variables as outlined in Section 2.2.4.3. The Flanker model is built with 232 observations, and the WCST model with 220 observations. The cross-validation results (the root means squared error of prediction, RMSEP, which roughly means the spread of the y values around the regression average) in Table 2.8 show that retaining 6 components in both models (Flanker and WCST) is enough, but indicate a poor overall fit.

Table 2.8: Multiple linear regression models with only significant effects reported for demographic, health, language and personality factors.

	Dependent Variable:	
	Flanker Effect Score (6 Components)	WCST Persistent Errors (6 Components)
CV value	169.8	5.429
% of explained variance	12.83	19.46

From Table 2.8 it becomes clear that both PLS regression models have low predictive value.

To examine which variables contribute most meaningfully we examined the loading weights of each variable, which gives an overview of which variables load most heavily onto the components and explain most of the variance in the two models (see Tables 2.9 and 2.10). To make this process more insightful, we plot a bar graph of the Variable Importance in Prediction scores (VIP) of all variables for each model. Variables with a score above 1 can be considered important. Figures 3.2 and 2.4 show how much each variable contributes to the two models.

The two VIP plots show that a number of variables importantly contribute to the model. It is thus interesting to examine those variables.

Because of the overall poor fit, the majority of the loading values are low. Considering the VIP plots and the loading scores, we report the variables that load on component 1 and component 2 above or close to $(-)$ 0.2 (rounded), as these seem to be the peaks in the plots.

Table 2.9: Loading values above $(-)$ 0.2 of Flanker PLS regression model.

	Flanker Effect Score	
	Component 1 (6.5% Variance)	Component 2 (7.1% Variance)
Education	-0.365	
Income	-0.200	
QoL	0.228	
Contextual switching	0.330	
Open to experiences	0.368	
Across-domain L1	-0.211	
Across-domain L2	0.495	
Across-domain L3	0.280	
Proficiency L2		-0.373
Proficiency L3		-.252
AoA L1		-0.247
Extravertness		-0.283
Agreeableness		-0.303
Province of residence		0.229

Table 2.10: Loading values above $(-)$ 0.3 of WCST PLS regression model.

	WCST Error Score	
	Component 1 (7.4% Variance)	Component 2 (6.5% Variance)
Age	0.391	
Education	-0.538	
Income	-0.295	
Proficiency L1	-0.283	
Open to experiences	-0.258	
QoL		0.437
Attitude L3		0.436
Emotional stability		0.280

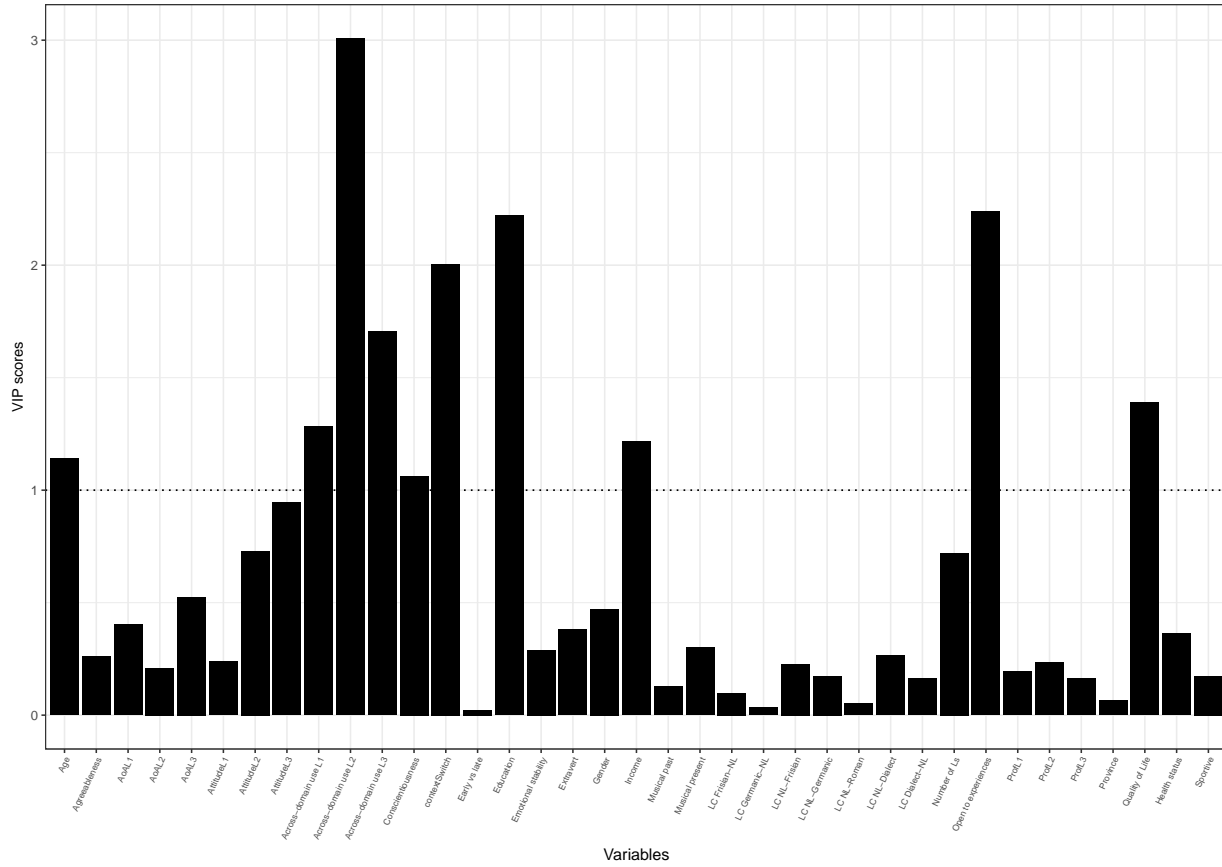


Figure 2.3: VIP plot of Flanker PLS model.

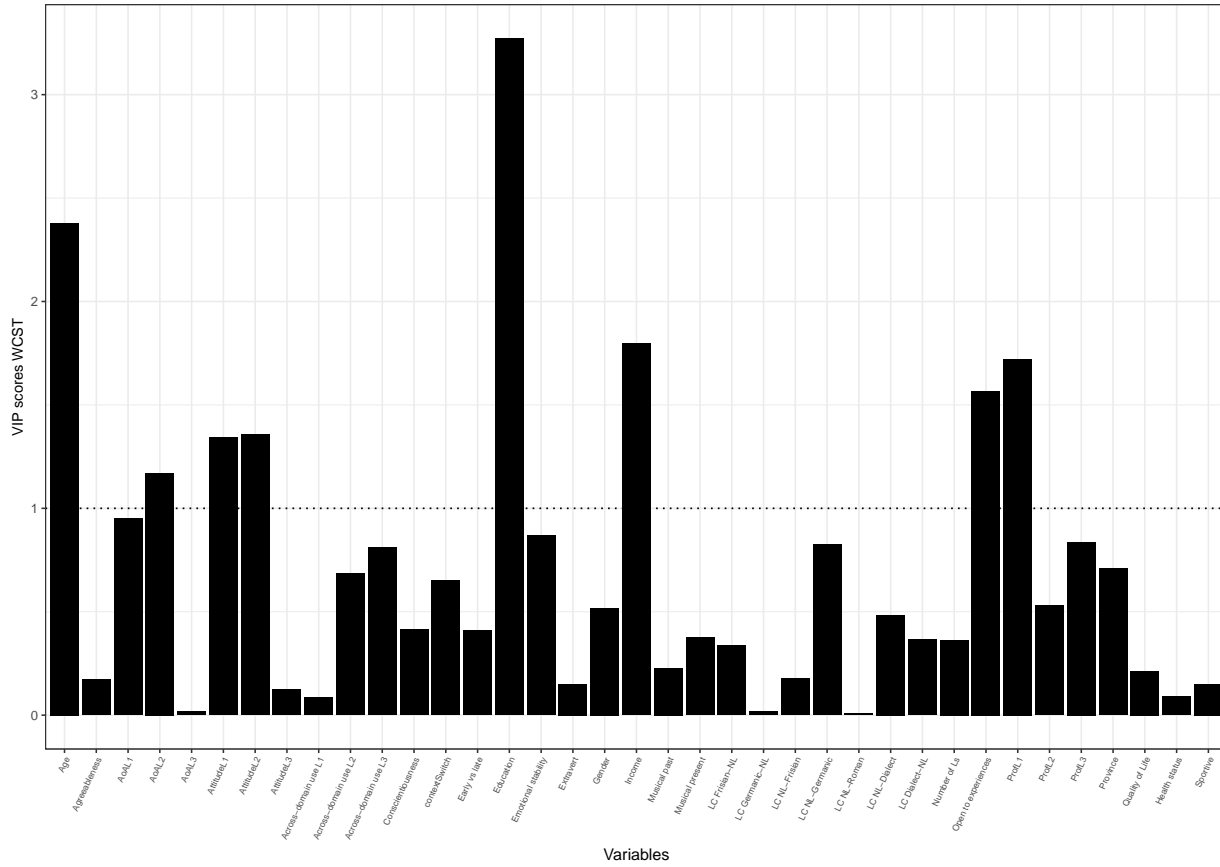


Figure 2.4: VIP plot of WCST PLS model.

Considering the loadings of the variables on the individual components in the models, it becomes apparent that variables relevant in the the first two components cannot be neatly categorised into a specific dimension (e.g., health, or language use). However, those factors in the first component of the Flanker model that are above 0.2 demonstrate that a smaller flanker effect score is positively related to those individuals who are open to new experiences and who use particularly their L2 in different social domains, which explains the most of the variance above all other factors in this component. Why these variables are clustered together is explored in the discussion section. Contrastively, being less extravert and a limited proficiency in the L2 and L3 are negatively related to flanker performance in the second component.

Similarly, for the WCST model, more errors are related to lower educational and income levels, as well as being less open to new experiences as a character trait. Higher quality of life and a positive attitude to the L3 reflect fewer errors. The question can, however, be asked to which degree these observations hold.

Nonetheless, it is interesting that beside descriptive predictors such as education and income, outlook on life, either in terms of wellbeing or personality traits, as well as language usage to a small degree influences cognitive performance. We will return to these observations in the discussion.

In the next section, we interpret the findings of the different models in relation to the questions asked in the background section.

2.4 Discussion

The current study analysed the performance of a diverse group of older adults with varying levels of multilingualism (meaning either levels of proficiency, number of languages and, most importantly, usage intensities of different languages) on two cognitive tasks relating to (most strongly) inhibition and attention (Flanker) and set-shifting (WCST). The novelty in this analysis lies in the fact that we assessed multilingualism along a continuum and with a dynamic ‘language usage’ operationalisation of multilingualism. In combination with information of factors that are known to enhance cognitive performance from previous studies (such as level of education, and playing a musical instrument) but also other health and lifestyle factors, we built a linear regression model in which we found

that degree of contextual second language (L2) usage significantly impacted cognitive performance, but only in one cognitive task and not in another. Purely knowing different languages did not relate to enhanced performance, suggesting that it is not the ability to speak multiple languages, but the use of these different languages that may show small positive effects on cognition. A subsequent multivariate PLS regression model including background variables, language variables from the LEAP-Q, and personality questionnaire factors yielded a two-component solution where proficiency in the second and third language and the usage of especially the second and third language across different social domains were predictive of Flanker performance. This underscores the earlier linear regression model mentioned above on the operationalisation of multilingualism, in which language usage variables are more predictive of cognitive advantages than merely 'knowing' different languages. We suggest that simply asking a person whether or not they are multilingual is not sufficient, but probing this more carefully and taking into account proficiency and social language usage patterns does appear to contribute to performance above and beyond the contribution of age, gender, education and income. In the following paragraphs, we critically review our results and answer the two questions that were asked in the beginning of this paper, thereby highlighting possible caveats and misinterpretations of the data, and listing the limitations of our research.

In line with our hypothesis, yet contrary to previous research by Ihle et al. (2016); Kave et al. (2008); Schroeder and Marian (2017), the regression models in Table 2.6 demonstrated that a traditional knowledge-based operationalisation of multilingualism (as number of languages, early vs. late onset of acquisition, language proficiency and type of language combinations) does not unequivocally lead to enhanced cognitive performance. As individuals differ on many levels, finding an effect of number of languages or degree of cognitive performance would have been strong evidence in favour of a general bilingual advantage. However, given the diverse nature of the study population, plus the unstable evidence of a BA reported in the literature, it would have been highly unlikely that in such a heterogeneous population effects for such general observations of multilingualism would be found. As such, our findings are in line with a meta-analysis by Paap et al. (2014) of the positive effects of bilingualism on EF (which mostly emerge from small, underpowered studies), where the authors conclude that there are

no systematic differences between bi- and monolinguals when regarding these generic factors (early/late, balanced/unbalanced). Indeed, as becomes evident in the PLS regression, there are other, individually distinct factors that covary with measures of multilingualism, such as certain personality traits and higher levels of education.

It may be that so-called ‘confounding variables’ mask the effect of bilingualism on EF (see Bak, 2016b), or, rather more likely when observing the small effect sizes, help in detecting an effect of language. Perhaps, as some authors suggest, it is by virtue of a number of factors which covary with bilingualism that enhanced EF for multilinguals may be observed. Previous research has attested that factors such as level of education or immigrant status (the ‘healthy migrant effect’) enhance bilingual performance, especially when set-off against a lower-educated or non-immigrant monolingual group. Our PLS regression model demonstrated that multilingualism indeed covaries with a number of other experiential factors in explaining enhanced cognitive performance.

When considering the first two components of the Flanker PLS regression, a high quality of life, character traits relating to being open to new experiences and degree of switching languages according to the context covary with the degree of usage of the L2 across different social domains. Proficiency in the second and third language co-occur with extravertness and agreeableness. Together they explain almost 10% of the variance in the Flanker model, which is marginal but noteworthy in a model with such a diverse collection of variables. Although we cannot speculate on the size of the social network of the individuals, scoring high on openness to new experiences might well be an indication of the presence and positive values of social relationships and engaging in social networks. Perhaps those people who use their L2 also in different social domains display a more diverse social network, established in part by their personality traits and positive outlook on life. Higher quality of life might imply that people are relatively mobile and/or can more easily maintain their social network. Moreover, the high score of education might reflect a better cognitive disposition from the outset, as enhanced executive functions are often found to be related to educational level.

This is related to the second component, where we observe covariance of L2 proficiency level, age of onset of acquisition of the L1 and extravertness. The contrast between the two components explains different mechanisms of enhanced

cognitive performance. Individuals may use their experiences with monitoring language cues, which enhances their attentional control system, through using languages across different social domains. Alternatively, their extensive training in developing language proficiency aids the degree of inhibiting the non-target language. Contrastively, the number of languages one speaks has very low predictive power. This underscores the contextual nature of multilingualism; language use and proficiency, in relation to quality of life and personality variables predicts cognitive performance. This lines up with the argument that other experiential factors may in combination with bilingualism collectively contribute to enhanced cognitive performance (Baum and Titone, 2014), but differently in different circumstances.

Of course there are constraints on the extent to which these variables do actually contribute to enhanced cognitive performance. Moreover, we have presumably tapped into a very specific population sample. The descriptive statistics display that the group was on average highly educated, had a relatively high income, experienced high qualities of life and many of them were early bilinguals. This underscores Bak (2016a)'s argument that taking note of the environment in which experiments are conducted is vital. As participation was voluntary, we have perhaps attracted mostly those people who already find this type of research topic interesting. (We will come back to the issue of self-selection bias below).

Although our sample consisted of non-immigrant, native-born northern Dutch multilingual older adults, the relative homogeneity of the sample at face-value is distorted when looking more closely at the characteristics of not only health status, wellbeing or personality, but especially degree, type and intensity of multilingualism.

In such a vein, we find differences in the dynamic operationalisation of multilingualism, as degree and intensity of multilingual language usage. What is more, these differences do highlight enhanced performance for some multilinguals on one cognitive task (the Flanker). This result points to the notion that multilingualism is an individually distinct/varying concept, and converges with the observation of those studies that find advantages only for specific populations of bi-/multilinguals or under specific conditions. In our study, especially for the Flanker effect score, those participants who report to use more than one language across different social contexts (with family, friends, neighbours and

acquaintances) and especially the L2, and who furthermore switch between languages depending on the social context, show smaller Flanker effect scores. This suggests faster performance on the incongruent trials in comparison to those participants who have a clear usage-preference for one language and/or do not switch in different contexts.

This observation aligns with the research on language balance (for bimodal bilinguals in Macnamara and Conway (2014), Yow and Li (2015) in younger populations and Houtzager (2015) in older populations) and may be explained by the adaptive control hypothesis in that more intense usage of different languages, especially in a dual-language context where bilinguals constantly monitor language cues (and thus focus attention), confers cognitive benefits. It is especially this dual-language context, rather than a dense code-switching context, that incurs benefits in our sample. After all, it is only in interaction with contextual switching that the use of the second language in different social domains leads to faster Flanker performance (in our linear regression model). Without this interaction, the use of the second language across domains yields higher Flanker effect scores, suggesting that there needs to be some element of control/monitoring of attention to language cues that is present in this dual-language mode and which carries over into more general cognitive processes. That the linear model on the WCST error score with the same factors does not reach significance, may give us some insight into the cognitive processes that are at work for this group of multilinguals.

In the WCST, participants have to actively inhibit the old rule in favour of the new one. This switching and inhibition mechanism would, in our understanding of the EF involved in a BA, elicit more accurate performance for those bilinguals who frequently use different languages in different contexts. The absence of an effect here is extra evidence that it is not inhibition per se that drives a potential bilingual advantage, but rather more general attention-orienting behaviour, in line with a recent argument put forward by Bialystok and Grundy (2018). Bilinguals who use their languages frequently across different social contexts are thus not necessarily better switchers or inhibitors, but may demonstrate an enhanced attention-orienting mechanism.

Evidence for this comes from a study towards the mechanisms underlying the Flanker task, conducted by Ong et al. (2017), using diffusion modeling. With this

technique, they calculated whether faster response times on the Flanker items are the result of suppressing conflicting information or enhanced attentional control. They found that the bilingual group of older adults showed shorter non-decision times than the monolingual group on incongruent Flanker items, which suggests an enhanced processing efficiency when faced with distracting information. Both groups performed on a par on the other diffusion modeling measures which relate to inhibition, which led the authors to conclude that a BA on the Flanker task is the result of an enhanced attentional control.

Recent theoretical re-evaluations of the processes at work during bilingual decision-making too suggest that the advantage for bilinguals may be in the more general domain of attention selection (Bialystok and Grundy, 2018). Underlying the selection of the appropriate language is the constant monitoring of conflict, which may be part of a more general, non-verbal attention or selection system, Bialystok argues (Bialystok and Grundy, 2018, p. 235). Nonetheless, the WCST also involves focusing attention, yet not in the immediate presence of ‘noise’ or distracting information. Cautious interpretation of the found results is thus warranted as long as we are unclear on what the cognitive tasks actually tap into (also see below).

Moreover, the interaction effect may also be observed as a result of the specific linguistic environment. Recall the study on bilinguals in French-dominant Quebec and English-French bilingual Ottawa, where the linguistic environment proved to be a more robust explanation for enhanced executive control than bilingualism in itself (Kousaie et al., 2014). As exposure to different languages in our group is also relatively high—the Frisian language and Groninger and Drents dialects are omnipresent in the provinces—it may well be that we observe not an effect of social language switching, but simply an effect that culminates from the ability to use the different languages in the immediate environment. This observation underscores the importance of reporting on the social norms and status of different languages in populations, as pointed out by Surrain and Luk (2017).

The PLS regression that we computed to answer the question of whether multilingualism could have any explanatory power regarding better cognitive performance iterates the linear model on the operationalisation of multilingualism in that more crude measures such as number of languages do not predict much. Rather, more sensitive measures relating to language usage and proficiency com-

bine with wellbeing and personality traits, and are together informative of cognitive performance. The PLS regression technique limits the degree of ‘gold-digging’ in the data to find patterns that in hindsight can be explained by existing theories, something that Hartsuiker rightfully warns for (Hartsuiker, 2015). Nonetheless, even with such a diverse sample of variables the overall explanatory power of both models is pretty low. This underscores the importance to establish a clear theory of the relation between language and cognitive performance. Our findings regarding the operationalisations of multilingualism above may be especially enlightening for this purpose when considering how language control modulates cognitive control.

Beyond this finding, however, there are still gaps in the knowledge pertaining to exactly how language engages executive functions. In line with De Bruin and Della-Sala de Bruin and Della Sala (2016), we advocate that comparing groups of bi- and monolinguals should not form the foundation of such a framework, but rather the characteristics of bilingualism, especially language usage patterns, following the adaptive control hypothesis. However, we are still unsure as to how this task-specific executive control (either inhibition, attention direction, or some other mechanism) transfers to more broader domains of cognitive control, and whether a Flanker task and a WCST aptly measure these control processes (also see de Bruin et al. (2015)). Nonetheless, the observation that multilinguals who use their languages often and in different contexts demonstrate slightly enhanced performance on the Flanker task, but not the WCST suggests that language use, or the multilingual linguistic environment are contributing factors in enhanced attention-direction. Whether this transfers to other executive functions or cognitive domains cannot be ascertained, given the overall low significance of the linear regression models.

2.4.1 Limitations

There are a number of other explanations for the found (absence of) effects of multilingualism on EF that warrant a cautious interpretation of the found results. The absence of an effect of the ‘knowledge’ variables associated with multilingualism may have emerged because the majority of the participants report the maximum number of five languages they could list. These are not only the

languages and/or dialects (which were frequently reported) they use frequently, but also the languages that they have learned in school but which they do not use as productively. This results in a population that is already highly multilingual in terms of number of languages. Self-reported proficiency may also have biased the data. In addition, it is likely that proficiency in language 2 and 3 is higher in general than in an average population, as those people who responded to the questionnaire may well be 'advanced' speakers of multiple languages, resulting in a self-selection bias (also see below).

Given the subjectivity with which we measure proficiency we do not rule out an effect of proficiency found in other studies. However, measuring proficiency is notoriously difficult and interpretation in degree of bi- or multilingualism is inherently flawed (Carter and Dunning, 2008). Can there be a 'cut off' point at which someone with a certain level of proficiency is considered more multilingual than others? The absence of an effect of proficiency in this study, we therefore argue, can most solidly be explained by the lack of variation/differentiation in proficiency scores, in particular when these levels are high.

Self-reports come with inherent shortcomings. Participants may be more or less optimistic in judging their language abilities, also depending on their personal motivation to participate in the study. A self-selected test population is always biased. The majority of the participants likely participated because they consider themselves multilingual language users and have a positive attitude towards using their languages (which we explicitly asked in the questionnaire). They may be proud speakers of minority languages and/or dialects. By approaching multilingualism from an 'inclusive' perspective, meaning that it is more important whether someone speaks/uses multiple languages than their relative degree of proficiency in these languages, some participants may have listed their knowledge of languages in which they have a very basic proficiency and which they sparsely use, whereas others have listed only those languages which they frequently use. These differential interpretations we have tried to keep in check by being as detailed as possible in our questionnaire and asking not only questions on knowledge of languages but also usage patterns. Furthermore, as referenced in the materials section, participants completed the questionnaire in an online environment, which already selects those participants with computer skills. A small minority of the participants completed the questionnaire by means of a face-to-face inter-

view. Because we have tried to match the conditions of the interview procedure as closely as possible with the online questionnaire, and because the ‘interview participant’ sample was so small, we do not expect any qualitative differences in the results to occur because of these different modes of data collection. Nonetheless, the reliability of the data can only be warranted by performing replication studies with different populations.

2.5 Conclusions

Multilingualism is a life-experience that, when different languages are used frequently in different contexts, can contribute to enhanced attention control. In a larger model with multiple experiences added, not the number of languages but the degree of proficiency in especially the L2 and L3 and the use of the L2 across different social contexts are predictive of cognitive effects. This strengthens the argument that multilingualism may be one of the contributing factors to enhanced cognitive performance, but the strength of contribution varies per individual and covaries with personality and wellbeing measures, as well as with education. We observed these effects in a very specific population of (motivated) older multilinguals with diverse language/dialect backgrounds. Future research should replicate this study with other bilingual populations.

This study crucially contributes to the debate on BA's, by highlighting that we should move away from knowledge-based operationalisations of multilingualism and conduct more fine-grained, individual analyses based on language usage. After all, language is first and foremost a vehicle for communication, something which always happens in context and in interaction. Singling out language effects in carefully controlled experiments is therefore likely to yield artificial results that cannot be translated to real-life language use contexts.

CHAPTER 3

Multilingual social relationships

Abstract | This chapter builds on the research on multilingualism and cognitive aging reported on in the previous chapter by investigating more specifically the settings under which positive cognitive effects of bilingualism emerge. The study reported on here assesses under which circumstances language use and linguistic diversity of social relations contributes to enhanced cognitive performance, and how this is connected to cognitive reserve. This is done by assessing demographics, health, quality of life, personality characteristics, language knowledge and use, and details on social relations in a subset of the diverse group of multilingual older adults (n=244) in the Netherlands reported on in chapter 2. A partial least squares regression analysis is employed to help determine more precisely why some individuals do show enhanced cognitive performance and others do not, despite all being multilingual.¹

¹This chapter has been slightly adapted for this dissertation and has been accepted pending major/minor revisions in: Pot, A., Keijzer, M.C.J. and de Bot, K. (submitted). The contribution of multilingual close social relationships to cognitive reserve. *Bilingualism: Language and Cognition*.

3.1 Introduction

As people age, cognitive performance gradually declines. Not all individuals show decline at the same rate, however, and certain life experiences such as musical training and engaging in physical exercise can significantly improve cognitive performance. Multilingualism has been positively (but controversially) put forward as one such cognitively enriching life experience, due to the cognitively complex skill of managing two languages in one mind (Bialystok, 2017; Prior and MacWhinney, 2010; Valian, 2015).

Recently, the field of bilingualism and cognition has directed its attention to the circumstances and settings under which positive cognitive effects of bilingualism emerge (Bialystok and Sullivan, 2017). Marked differences are, for example, observed regarding cognitive control mechanisms for different bilingual populations and for a variety of interactional contexts (Ooi et al., 2018; Timmer et al., 2018). These differences relate to variation in the environment of multilinguals, calling for the importance to situate and investigate language use in a broader context of life-experiences (Pot et al., 2018c).

Executive control performance is at its peak in young adulthood, where bilingual effects are rarely observed. In children and older adults, however, there is greater variability in executive functions, making differences in cognitive performance easier to detect in very young or older populations (Park et al., 2002). Most notably in relation to older age, this diversification in executive functions is generally attributed to individual rates of gradual cognitive decline, affecting the capacity to speedily process information. An alternative view on aging, however, argues that aging is not a process of decline over time but rather an accumulation of relevant experiences. Slower processing is explained as heavier memory search demands, as individuals need to filter through more knowledge and experiences than younger adults (Ramscar et al., 2014). Perhaps multilingualism may in this sense contribute to greater mental flexibility, through which the memory search process is optimised.

A recent analysis on the operationalization of bilingualism in different studies attested that information on the sociolinguistic context of bilingual populations is only taken into account in 30% of the studies investigating bilingual advantages (Surrain and Luk, 2017). Moreover, forms of (bilingual) language use,

such as dialect usage, are hardly ever mentioned in studies and language questionnaires. The current study addresses precisely these issues by being one of the first to investigate how a large set of individual variables, of which language use is one, may together explain enhanced cognitive performance. As part of this aim, special attention is paid to the close social relationships of a diverse group of older multilinguals, as we assess whether and how social relationships (i.e., the interactional context of language) modify a bilingual cognitive effect.

A socially engaged lifestyle as well as multilingualism have separately been associated with the build-up of a cognitive reserve in old age (a reserve capacity that allows the brain to better adapt to cognitive changes as a result of aging, brain damage or disease) (Chauvin et al., 2017; Scarmeas and Stern, 2003). When we consider how the diversity of social relationships modulates multilingualism in older individuals, this may shed additional light on how and when multilingualism can be an asset in building cognitive reserve.

3.2 Background

3.2.1 Cognitive reserve

Cognitive reserve becomes visible when two individuals with similar levels and types of brain pathology/ atrophy perform differently on effortful cognitive tasks. In the literature on reserve a distinction is generally made between cognitive reserve and brain reserve. Yet it is still unclear how these two forms of reserve interact (Stern, 2012). Brain reserve is generally regarded as brain ‘hardware’, relating to actual anatomic differences between individuals. This is manifested as more synapses or denser neuronal networks and can be regarded as a passive form of reserve (Satz, 1993).

Cognitive reserve, on the other hand, can be regarded as brain ‘software’ with which the brain can efficiently execute tasks. Specifically pertaining to cognitive reserve, a further distinction is made between either more efficient processing of information or compensation (i.e., the recruitment of neural pathways not normally employed in the execution of a given task). The latter in turn is said to be induced by brain damage and nudges the brain to call upon alternate brain areas (Stern, 2002). These definitions also reveal the connectedness of brain versus

cognitive reserve, as calling upon alternate brain areas likely induces a form of structural changes in the brain (brain reserve).

Environmental enrichment, such as education and mental stimulation, but also life experiences like musical training or navigation skills may induce structural but not necessarily permanent brain changes (Herholz and Zatorre, 2012; Maguire et al., 2000). Barulli and Stern (2013) note that cognitive training activities or interventions, as well as long-term cognitive stimulation promote brain plasticity. These structural brain changes in turn enhance mental flexibility, either in the sense of more efficient processing of information along existing neural pathways, or through a flexibility to recruit additional pathways to perform a cognitive task.

3.2.2 Bilingualism and cognitive reserve

Bilingualism is an all-encompassing life-experience that engages a large brain network. Neuroanatomical research has observed that the brain regions recruited for executive functions partly overlap with brain regions handling language control (Abutalebi and Green, 2016). Therefore, speaking multiple languages relies on executive control and attention, it is argued, through which these brain systems are better developed, ultimately resulting in greater grey and white matter density that buffers the early onset of dementia (Perani and Abutalebi, 2015). Studies have demonstrated that some bilinguals with high brain atrophy perform behaviourally on a par with monolinguals with better-intact brains, suggesting an increased ability of bilinguals to recruit alternate brain networks when regular pathways are obstructed (Kowoll et al., 2016).

As such, bilingualism may induce cognitive reserve either by increasing grey matter density (brain reserve) and/or by enhancing global mental flexibility, a combination of the two, or in interaction with related variables such as education or SES (Chauvin et al., 2017). However, as bilingual experiences differ, it is difficult to attribute bilingual cognitive advantages to one isolated mechanism of control, such as inhibition (Bialystok, 2017). Rather, it is argued that individual bilinguals exercise a multitude of strategies to regulate processing of different languages. Which strategies individuals employ and to what extent depends on (interactions between) e.g. working memory, speed of processing, inhibitory

functioning and language experience. The inter-individual language processing variation suggests a plastic view on bilingual language processing (Fricke et al., 2018).

Although brain data provide compelling evidence of cognitive differences between bilinguals and monolinguals, in isolation this cannot lead to insights as to what those differences mean or how they come about. In a reply to commentaries on a recent review of neuroanatomical data in relation to bilingual cognition, García-Pentón et al. (2016), argue that without context (behavioural data), it is impossible to determine the cause for observed brain differences. In other words, although brain data may be a compelling argument for demonstrating cognitive effects for bilingualism, only when paired with behavioural data can such an effect be demonstrated (cf. de Bot, 2008).

3.2.3 How does bilingualism modulate cognitive control?

Pairing neuroanatomical data from bilingual speakers to their behavioural data itself is highly problematic: there is substantial uncertainty over the mechanisms by which bilingualism influences cognitive control. There is a lack of clear theoretical models that outline how bilingualism functions in relation to cognition and how it can modulate it; which factors play a role and to what extent (see Hart-suiker, 2015; Marzecová et al., 2013). As a response to a paper by Valian (2015), who reviews the inconsistent results reported regarding a bilingual cognitive advantage, Luk (2015) advocates a more fine-grained look at 'bilingualism'. This call is underscored by a recent analysis on the operationalisations of bilingualism across the literature by Surrain and Luk (2017), which demonstrated the variability in sampling bilinguals. Differences in intensity, balance or the duration of bilingualism (i.e., age of acquisition) between and within groups may obscure null-results when these groups are subsequently compared.

Even in studies where the label bilingualism is more carefully treated, mixed results are obtained. Yow and Li (2015), for example, assessed language balance in young English-Mandarin adults as a composite measure of language proficiency, frequency of use of two languages and age of acquisition. They found that only highly proficient balanced bilinguals (in proficiency and frequency of use of both languages) performed better on measures of controlling attention. The number

of languages spoken by a bilingual has also been linked to the magnitude of a cognitive effect, although this factor, too, seems to be integrated in and related to other factors rather than being able to explain cognitive outcomes by itself. Ihle et al. (2016), for instance, conclude that in old age, having a command of multiple languages may contribute to cognitive reserve, yet not in all participants and dependent on other cognitively stimulating activities the participants engaged in and their verbal abilities and basic cognitive processing speed.

There thus seems to be no systematic/consistent difference between bilingual and monolingual groups, especially not among young adults and in small samples (these studies typically have small *ns*), as Paap et al. (2014) empirically assessed. Differences in self-ratings of bilingual proficiency lead to unstable outcomes for different bilingual populations, underscoring the difficulty of comparing bilingual groups with different language combinations (Tomoschuk et al., 2018). Moreover, Bak (2016a) argues that advantages may only show up under specific circumstances, in specific groups, and crucially depending on the interactional context (see also Ooi et al., 2018).

The effect of the interactional context on language use is at the core of the Adaptive Control Hypothesis (Green and Abutalebi, 2013), which postulates that bilinguals situated in interactional contexts in which language switching intensity is high show less of a cognitive control advantage than bilinguals who mostly reside in strictly separate language contexts (e.g., at work and at home they use different languages). This is because precisely this latter group has to continuously suppress the activation of one of their languages depending on the context, thus needing a greater degree of mental flexibility. Notably, it is not switching itself that would account for enhanced cognitive control, but the requirement of particular interactional contexts (or perhaps social domains) to keep two (or more) languages apart. This culminates in enhanced attention control, as especially in this dual-language context individuals need to continuously monitor the environment for language cues to adapt to the linguistic context. In other words, through the adaptive control hypothesis, we can perhaps better get at the mechanisms that underlie the cognitive flexibility effect in bilingualism and with that perhaps also the nature of cognitive reserve.

Indeed, when looking more closely at the control mechanisms involved in a typical measure of executive control – a Flanker task – Ong et al. (2017) demon-

strated that bilingual elderly were better able to filter out the distracting flankers, and that this reflects an enhanced attention-control mechanism. With a sophisticated statistical technique, the researchers calculated the non-decision time for mono- and bilingual elders on response to congruent items (whereby the flanking arrows correspond to the direction of the middle arrow) and incongruent items (whereby the flanking arrows are in the opposite direction of the middle arrow). Bilingual elderly already focus their attention and ignore the distracting flankers, before inhibiting a response. This suggests not only that the Flanker task provides information of attention-control processes, rather than tapping inhibitory control which it is often claimed to do, but also that it reflects advantages in precisely the attention aspect of cognition.

A recent study by Pot et al. (2018c), too, demonstrated that some multilinguals show enhanced attention control on a Flanker task. Most notably, however, they found that it is the usage of multiple languages, rather than ‘being’ multilingual which demonstrates enhanced attention effects, and it is only in interaction with other factors such as education, personality and quality of life that the influence of bilingualism emerges. This echoes the position of Baum and Titone (2014), who point out that a particular factor such as musical training or bilingualism will not have an equally large impact for people who may or may not already benefit from other sources of enrichment, such as the advantages that come with a high socioeconomic status (2014, p. 877).

3.2.4 The social context

As becomes evident from the studies above, much more than a factor in isolation, multilingualism is a complex, social variable. Language usage changes depending on the social domain in which it is used, and is influenced by the degree of switching between languages, or the monolingual or bilingual social context the individual is in (Grosjean, 1998). Therefore, knowledge in relation to the language environment in which individuals use their language(s), and how this may interact with other lifestyle factors (in other words, awareness of a bilingual’s needs, as Grosjean argues) is equally important when studying multilingualism in relation to cognitive control or the building up of cognitive reserve.

In an overview of the impact of lifestyle on cognitive reserve, Scarmeas and

Stern (2003) postulate that a socially engaged lifestyle – in a broad sense engaging in social contact, not being isolated and a socially enriched environment – may contribute to the build-up of cognitive reserve. It is said to increase the synaptic density in the neocortical association cortex, through which more unaffected neurons can compensate for loss of brain functions. Alternatively, subjects may develop more efficient circuits of synaptic connectivity when engaging in leisure activities or having an active lifestyle. A third possibility is that lifelong experience with a certain lifestyle variable (for example multilingualism) and the continued practice of this may lead to more flexibility in recruiting alternate brain networks. Modifications to one's environment and lifestyle changes could thus influence the rate of cognitive decline. This has been demonstrated before for sustained physical exercise (Blankevoort et al., 2013), playing a musical instrument (Hanna-Pladdy and Gajewski, 2012) and engaging in social relationships (Engelhardt et al., 2010).

A comprehensive review in *The Lancet* (Fratiglioni et al., 2004) assessed the results of studies looking into the effects of an active and/or socially integrated lifestyle on cognitive health in later life. They found that, across the different domains of aging (social, psychological and biological), maintaining activity (e.g., engaging in sports activities or clubs, musical activity, or other engaging hobbies) and having a large and diverse social network was positively associated with better cognitive functioning. Similar findings are reported in Crooks et al. (2008), who assessed the cognitive capacities of a group of elderly women and mapped the size of their social network. They demonstrated in a four-year longitudinal follow-up that a larger social network and daily social contact was positively associated with cognitive performance and fewer indices of dementia in their participant sample.

Especially in older adulthood, the size and function of one's social network changes (e.g., Caplan, 1974; Tilburg and Groenou, 2002). A meta-study towards the relation between social relationships and cognitive decline in older adults revealed that having poor social relationships (in terms of size and function) is related to cognitive decline, although the robustness of this finding is likely mediated by other lifestyle factors, such as diet or exercise, that are not always taken into account (Kuiper et al., 2016).

Especially the diversity, rather than the size of a social network is associated with cognitive health, as demonstrated in a six-year longitudinal study incorpo-

rating 2959 Dutch older adults by Ellwardt et al. (2015). They conclude that although complexity of one's social network is related to cognitive performance, this is neither directly explained by the number nor specific types of relationships (relations in different social domains: family, neighbourhood, clubs) in one's individual network. Rather, diversified social relationships contribute to enriched environments, which require more intense switching between context and in this way facilitate brain training. Similarly, in a study towards the interaction between language, cognitive skills and social networks in two residential communities of the 'oldest-old' (classified here as individuals aged 85 or older), Keller-Cohen et al. (2006) observed that a high degree of interaction with friends and diverse relationships in an individual's social network was related to better performance on a lexical decision task.

The social aspect in the study towards cognitive effects for multilingualism has up until now received relatively little attention, even though language is inherently a social phenomenon and it is hence likely that the social environment in which individuals reside has an impact on the language that they use. In the domain of language shift or maintenance studies have indeed exemplified that the presence or absence of social L1 or L2 networks play an integral part in the study of language change (De Bot and Stoessel, 2002).

The relevance of the social context in bilingualism studies has recently taken a turn to investigating the social flexibility rather than mental flexibility of bilinguals versus monolinguals. A recent study towards bilingual and monolingual's social skills argued that bilinguals have greater social flexibility (Ikizer and Ramírez-Esparza, 2017). The authors claim that because bilinguals alternate between two languages, they may also alternate with more ease between different social environments. However, as Vives et al. (2018) point out in a commentary, the foundations for this claim are somewhat shaky, especially because the bilingual group was half the size of the monolingual group and included bicultural participants (from a wide variety of backgrounds), which were absent from the monolingual group. Vives et al. (2018) propose that using different languages may broaden the interactional horizon through which individuals can look at the world in different ways. Then perhaps the increase in variability in social experiences may foster cognitive flexibility, although this remains up until now speculative.

3.2.5 This study

The current study focusses on the concerns that have been raised in relation to the issues regarding multilingualism research, and its associated cognitive reserve and lifestyle variables. It is embedded within current approaches that detail the precise circumstances under which a multilingual effect emerges. Most specifically, it looks at the role of bilingualism within social networks as this appears to be most neglected so far and most in need of exploration.

Our research question is whether and how having more linguistically diverse social relationships contributes to cognitive performance in a diverse group of multilingual older adults. Isolating factors when searching for a cognitive reserve is virtually impossible, and attempts to do so may partly account for the mixed findings in life-experiences that are said to enhance cognitive performance.

Rather than dismissing the search for cognitive advantages altogether on the basis of the complexity of interacting variables, it makes it all the more intriguing and necessary to investigate whether we can pinpoint certain life-experiences to play a role in cognitive performance, and under which precise circumstances these 'advantages' may take effect. This helps us to situate the role of language as a social phenomenon in cognitive control in a more detailed context and aids in uncovering more about how language control influences cognition.

We hypothesise that, in light of enhanced mental flexibility, having linguistically diverse social networks co-varies with the usage of different languages across social domains and as such contributes to cognitive control. Individual language usage patterns and social relationships may elucidate the role of speaking different languages in cognitive performance. Moreover, as we approach multilingualism as something that is connected to other lifestyle factors, we believe that also social diversity co-varies with other dimensions of aging, such as health factors, quality of life or personality.

Departing again from the objective that multilingualism is a contextually situated variable, we do not distinguish groups of participants, but consider a diverse group of multilinguals, thereby paying more attention to individual differences within this group. Moreover, this also means that we do not consider confounding factors as 'masking' the effect of multilingualism on cognitive performance, but as an asset in helping to determine under which circumstances multilingualism

may be beneficial to cognitive health.

Answering the question of how diverse social relations relate to other language measures and cognitive performance in a model with a wide variety of individual background variables requires an alternative, individual approach to data analysis. This is why we propose the use of a multivariate statistic in the form of partial least squares regression.

3.3 Method

3.3.1 Participants

To study the effect of social relationships on language use and cognitive performance, we used the data on social relationships from a total of 244 older adults (65-95 years old, mean age 71.5, 119 males) living in the northern part of the Netherlands. These seniors completed an extensive background questionnaire tapping demographic, health, personality and language information (in which we also regarded dialect as a language) and performed three cognitive tasks measuring inhibition/attention, set-shifting and working memory. Crucially, a number of items on the questionnaire tapped social networks of the speakers, whereby participants listed details on their 5 closest social relations.

Participants were generally well-educated (mean of 5 on a scale of 1-6), and felt they had a high quality of life (mean of 8 out of 10). The majority was physically active (67%) and almost half of the sample played or had played a musical instrument (48%). On average, the sample reported to speak four languages, with a high level of proficiency in at least their first two languages, which were mostly Dutch, Frisian, a local dialect (Gronings or Drents) or German (mean L1 = 4.9, mean L2 = 4.6 and mean L3 = 3.9 on a scale of 1-5). The majority acquired their first two languages before the age of 12 (64%) although the age range increased for the L2 and L3 (standard deviation L2 = 9.3 and L3 = 10.4). All participants in general had a positive attitude towards their first three languages but used their first, second and third listed languages to varying degrees across different social domains. In other words, this presented a relatively homogeneous subset of speakers in terms of SES but at the same time they were quite varied in their reported multilingual use.

3.3.2 Materials

We asked participants to complete a comprehensive background questionnaire which elicited information on demographics, health status, quality of life, the ‘big five’ personality domains (Gosling et al., 2003), language proficiency, age of onset of acquisition, language use in different social settings, amount of switching between languages (never to always on a five-point scale), attitude towards the first three languages and the five persons with which participants were in frequent contact (type of relationship and in which language). For the operationalization of language, we also included dialect usage. A full summary of the background questionnaire is provided in Table 2.3 in chapter 2. Here, we report on the type of social relationships the participants listed.

Participants could list a maximum of five close social relations, of which summary statistics are presented in Table 3.3.2 below. Participants provided information on the type of relationship (in the first column: mostly family members and friends), the languages in which they interact (in the second column: mostly Dutch and Frisian) and the contact frequency with their relations (the final column: weekly contact is most frequent).

Table 3.1: *Frequency of occurrence of 5 closest social relationships (n = 244)*

Relationships	Languages	Contact frequency
Family 538	Dutch 545	Weekly 508
Friend 207	Frisian 300	Daily 284
Partner 164	Dialect Gronings 73	3-5xpw 142
Neighbour 107	Dialect Drents 55	Monthly 114
Hobby/sport 85	Dutch-Frisian 43	Often 78
Work 82	English 31	Biweekly 75
Other 37	Other 173	Other 19

In addition, Table 3.3.2 shows the statistics on social language usage, listing the degree of use of the first, second and third language across the social domains of family, friends, neighbours and acquaintances on a scale of 1 (never) to 5 (always), the degree of switching according to a specific context (again on a 5-point

scale), as well as the mean diversity in types of social relationships and languages for the participant sample.

Table 3.2: *Social variables of participant sample*

Variable	N	Mean	St.d	Min	Max
Contextual switching	240	2.45	0.77	1	4.67
Across-domain use of L1	244	4.15	0.80	1.50	5
Across-domain use of L2	241	3.17	0.96	1	5
Across-domain use of L3	222	1.91	0.73	0.25	4.50
Number of different languages in network	244	2.14	0.85	1	4
Number of different relations	244	3.11	0.94	1	5

In addition to the background questionnaire, participants completed three cognitive tasks. A Flanker task, whereby participants need to react as fast as possible to the direction of the middle arrow, flanked by arrows pointing in the same or the opposite direction – measuring inhibition/attention regulation. A Wisconsin Card Sorting Task, whereby participants sort cards according to a changing rule to which they need to adapt, and not persist using the old rule – measuring shifting between mental sets. And lastly a non-verbal working memory assessment using a Corsi Blocks Tapping Task, whereby participants tap an increasing sequence of blocks in a particular order. We calculated a Flanker effect score, which reflects the difference between the reaction times on incongruent items versus congruent items. A smaller Flanker effect score suggests overall faster performance. The WCST error score reflects the number of persistent errors participants make when they have to sort the cards based on a new rule (and they instead persist sorting according to the old rule). The Corsi span score reflects the maximum number of items in a sequence that participants can successfully recall. Summary statistics are provided in Table 3.3.2 below.

Some individuals obtained a negative flanker effect score, suggesting faster performance on the incongruent items than on the congruent (also see the previous chapter). A negative effect score might be a reflection of hyper-focus on the task, and we have thus decided to retain these negative scores in the calculations as they may reflect enhanced attention processes.

Table 3.3: *Descriptive statistics for the three cognitive tests*

Cognitive test	N	Mean	St.d	Min	Max
Flanker effect score	187	89.56	167.41	-362.80	895.85
WCST error score	174	12.49	4.84	4	28
Corsi span	116	4.66	0.95	2	7

3.3.3 Procedure

In order to see whether a more diverse use of different languages (having multilingual contacts) or more different types of relationships co-varies with the degree of multilingual language usage in explaining cognitive performance we fitted a partial least squares (PLS) regression model to the data. In contrast to linear regression models, PLS regression does not require variables to be uncorrelated with each other and rather calculates whether certain variables may cluster together and in such compounds may be responsible for explaining part of the variance in a regression model.

Also, variables do not need to be selected beforehand for inclusion, thereby limiting the risk of cherry-picking in the data and building a model based on only those variables that show a significant contribution to the total explained variance, as may happen in explorative linear regression modelling. Using the ‘pls’ package in R (Mevik and Wehrens, 2007), we built two models, one with the Flanker effect score as dependent variable, and the other with the WCST error score. The working memory score obtained with the Corsi task was added as a factor to both models.

Beside the scores on either the Flanker or WCST task as dependent variables, we included the following factors in the models. For demographics and health status we tapped age, gender, education, income, the province of residence, self-reported health status, quality of life, being physically active and whether individuals play(ed) a musical instrument. In terms of language use we included the number of languages, proficiency and age of onset of acquisition in L1, L2 and L3, across-domain usage of L1/2/3, attitude towards L1/2/3, early versus late acquisition and degree of contextual switching. For the social relationship measures

we included the diversity of languages in social relations and the number of diverse relationships. Personality was measured with the ‘big five’: extraversion, agreeableness, conscientiousness, emotional stability and openness to new experiences.

To determine which variables in both PLS models contribute to the percentage of explained variance we calculated each variable’s importance in prediction (VIP, cf. Mehmood et al., 2012). The weight of each variable is a measure of its contribution to the model according to the total variance explained by each component of the PLS regression. A threshold of ‘importance’ of > 0.83 thereby yields the most relevant variables, which is what we therefore used in the study.

We calculated the mean VIP score for each variable by aggregating each variable’s scores per component and calculating the range (lowest and highest VIP scores). Through examining the mean, standard deviation and minimum and maximum scores we could decide which variables are overall important in prediction. The output of the VIP analysis was subsequently presented in a VIP plot.

3.4 Results

The first PLS regression model was fitted to the Flanker effect scores of the participants. The output yielded a 10-component solution, explained overall 24.6% of the variance of the Flanker effect score. We aggregated the VIP scores of each variable for each component into a mean score for each variable (VIP scores generally show low standard deviations across components. The full results are presented in appendix A. Here, in Table 3.4, we present only the contributing variables with mean (or max) VIP scores above 0.89.

Table 3.4: *Contributing mean and max VIP scores (above 0.89) of PLS regression on Flanker data*

Variable	Components	Mean	St.d	Min	Max
Age	10	1.586	0.899	0.224	2.353
AoA L1	10	1.709	0.147	1.349	1.918
AoA L2	10	1.585	0.391	2.233	3.434
AoA L3	10	2.601	0.613	2.055	3.971
Extravert	10	1.011	0.364	0.516	1.420
Conscientiousness	10	0.904	0.145	0.601	1.107
Emotional stability	10	1.454	0.171	1.22	1.846
Open to experiences	10	1.613	0.124	1.359	1.851
Language combinations	10	1.196	0.148	0.92	1.393
Across-domain L1	10	0.447	0.332	0.121	0.927
Across-domain L2	10	1.260	0.17	0.84	1.462
Across-domain L3	10	0.964	0.094	0.873	1.181
Number unique Ls	10	0.817	0.072	0.748	0.970

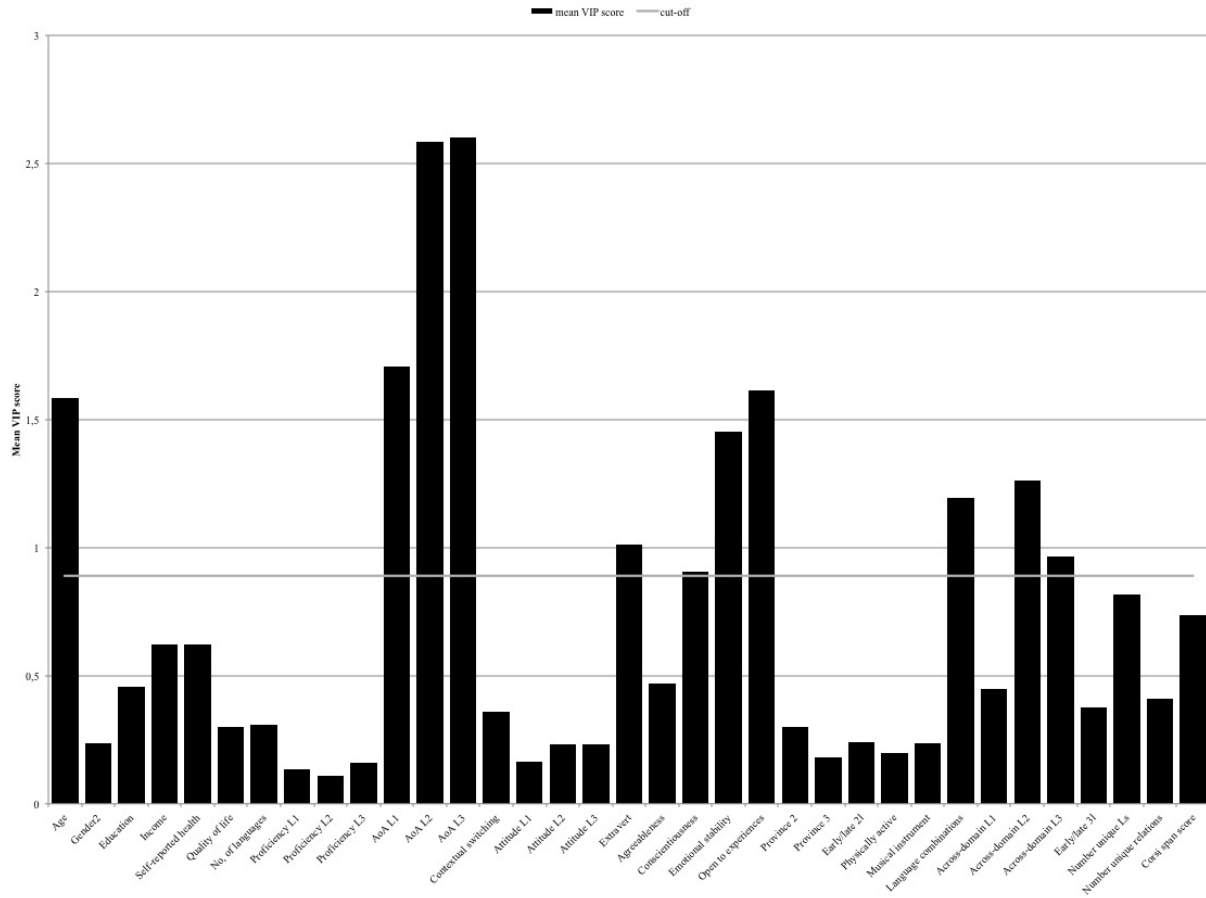


Figure 3.1: VIP plot of mean VIP scores Flanker PLS model.

The variables that make a relevant contribution to the explained variance in the PLS Flanker effect score model are combinations of different variable categories: the demographic variable age co-varies with age of language acquisition and language use patterns (across-domain use of mainly the L2 and L3) and the personality traits of being extravert, conscientious, emotionally stable and open to new experiences. When considering the maximum VIP scores in the final column of Table 3.4, we can also add across-domain use of the L1 and having more diverse languages with close social relations. In other words, it is through a combination of different categories that enhanced Flanker performance can be observed, uniquely revealed through the PLS analysis.

The PLS model built for the WCST error scores yielded a 5-component solution with an overall explained variance of 37.2%. Table 3.4 below lists again the mean VIP scores above 0.89, and the full table can be found in appendix B. We see again that different variable categories together explain part of the model variation. More specifically, education, age of onset of acquisition of the L2 and L3 and extroversion contribute to the model. When considering the maximum VIP scores, we can also include income, age of onset of acquisition of the L1, conscientiousness and being open to new experiences. Strikingly, no other language measures contribute to the explained variance.

Table 3.5: *Contributing mean and max VIP scores (above 0.83) of PLS regression on WCST data*

Variables	Components	Mean	St.d	Min	Max
Age	5	3.266	0.33	2.769	3.569
Education	5	0.894	0.17	0.631	1.052
Income	5	0.734	0.113	0.592	0.881
AoA L1	5	0.568	0.39	0.334	1.261
AoA L2	5	3.341	0.299	2.878	3.67
AoAL3	5	2.369	0.215	2.196	2.724
Extravert	5	1.321	0.255	1.087	1.74
Conscientiousness	5	0.8	0.223	0.603	1.182
Open to experiences	5	0.783	0.237	0.626	1.2

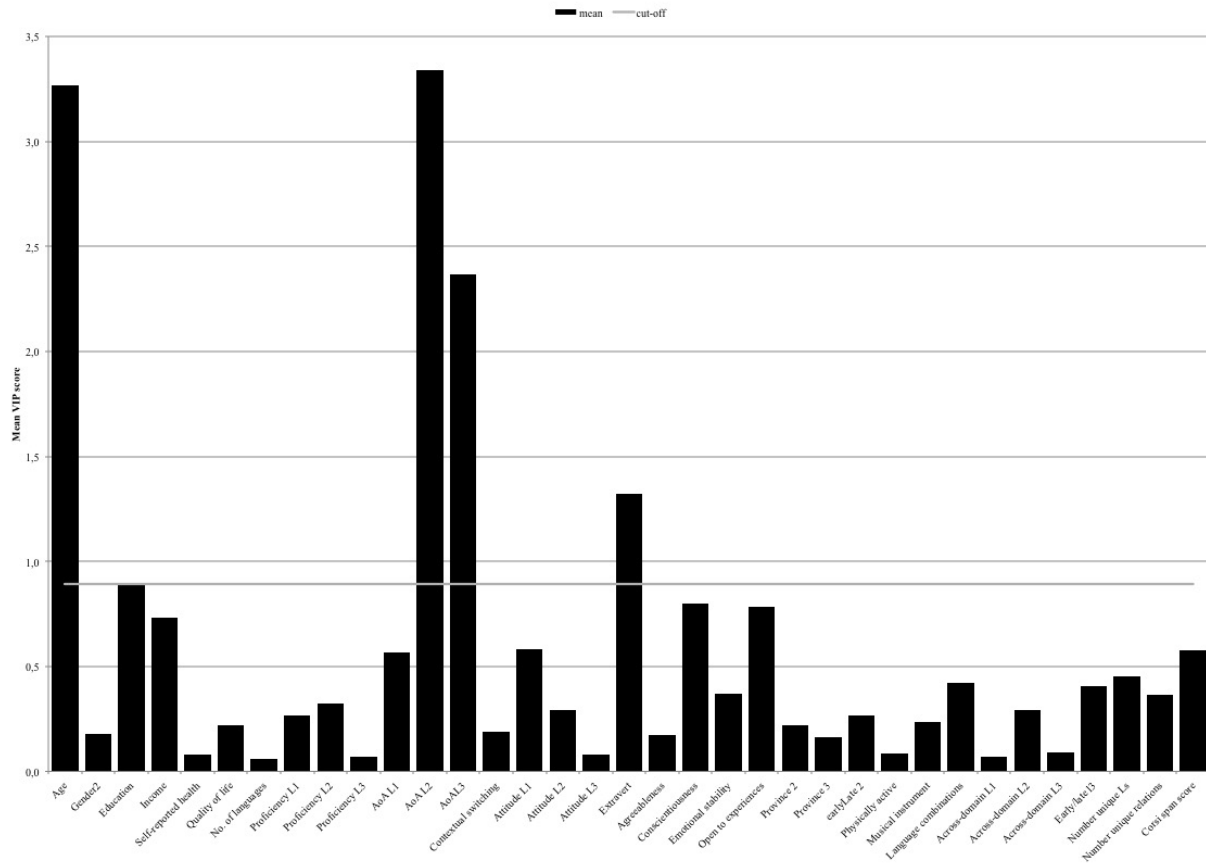


Figure 3.2: VIP plot of mean scores WCST PLS model.

3.5 Discussion

The present study aimed to shed more light on the closest social relationships of multilingual older adults, to see whether the type of relationship or degree of differential language use is connected to the use of languages in different social domains, and in this way mediates cognitive performance. And if so, what this could tell us about the role of multilingualism in modulating cognitive reserve. To assess linguistic and relational diversity in close social relationships, we asked participants to list five people with whom they are in frequent contact, thereby providing information on the relationship as well as the language in which this contact takes place. A statistical technique that has to our knowledge until now never been used in this setting was applied (a partial least squares regression model (PLS), that uniquely allowed us to view how different variables cluster together. We therefore fitted two PLS regression models to the data on the two cognitive tests, thereby including the factors listed in the background questionnaire as well as information on the diversity of languages and relationships in those five contacts listed. The results demonstrate two structurally different models, whereby some predictors of cognitive effects overlap, such as age and education, but where language knowledge and social language usage predictors show up differentially.

Both models feature age as a robust predictor, as well as educational level. For the 24.6% explained variance in Flanker effect scores, the age of onset of acquisition of all three languages are robust predictors, as well as the use of especially the L2 and L3 across different social domains. For the 37.2% explained variance in the WCST error scores, only age of acquisition of the L2 and L3 as language measures are predictors. Personality scores reflecting openness to new experiences and being conscientious make a significant contribution to the explained variance in both models.

To first of all answer the research question on what the close social relationships of individuals tell us about cognitive performance, we note that only the number of different languages in one's closest social relationships contributes just above the threshold of 0.83 to the Flanker model. For the degree of WCST errors neither a more diverse network in terms of relationships, nor in terms of languages makes a significant contribution to the model, and here degree of L1/2/3

usage across different social domains does not contribute to the explained variance either. These results demonstrate the intricacies of the circumstances under which cognitive effects are observed, and underscore the need for studies looking into how and why certain variables cluster together. In interaction with demographic and personality variables, language use and social relationships do present a significant contribution to enhanced cognitive performance. When interpreting how this contribution may come about, it is worthwhile to consider what the two cognitive tasks measure.

As argued in the previous chapter and studied using sophisticated statistical analyses in Ong et al. (2017), the Flanker task likely measures in a large part an attention-orienting process, rather than inhibitory control. Individuals who perform faster on the incongruent flanker items exercise enhanced attention control. When we consider the use of different languages in different social domains, it makes sense to argue that individuals who need to continuously monitor their environment for language cues and regularly switch from one language to the other depending on the social context, exercise enhanced attentional control.

This may, however, also be present in individuals speaking one language, who switch between registers and stylistically adapt their language according to the context. A more fine-grained analysis of individuals' language usage patterns, thereby also taking note of stylistic variation, should explore whether register switching also significantly requires enhanced attention control. If an enhanced effect for multilinguals then still shows up, it could speculatively be because a multilingual individual has to engage in 'double attention': gauging the language as well as the stylistic context. Alternatively, enhanced attention control has to do with being sensitive to variations in the linguistic context (hence the interaction of language use with conscientiousness and emotional stability). This would make only those multilinguals (or monolinguals) with these personality characteristics more attentive to change.

Whether this makes bilinguals more socially flexible, as Ikizer and Ramírez-Esparza (2017) argue, however, would still be a step too far. We see that language use is positively related to cognitive performance, and usage relates to having more diverse languages in close relations, but based on our data it is too big a step to conclude that having multiple languages at your disposal makes you by nature more socially flexible. One explanation for the diversity of languages in

relation to cognitive performance is that those individuals with linguistically diverse social relations are more attuned to language cues than people with less linguistic network diversity, when using different languages with their close social relations. However, as shown in the VIP plots, other factors influence this relationship, most notably personality. Individuals with higher scores on extraversion, for example, may be quicker or more flexible in forging social relationships, which underscores the relevance of models that can take a wide variety of individual variables into account in uncovering the specifics of how language modulates cognitive flexibility.

The interaction of language diversity with the age of onset of acquisition of all three languages, which explains a large portion of the Flanker's model, is interesting. It could be that a network is more linguistically diverse when older adults use different languages with different connections they formed over the lifespan. Earlier acquisition of an additional language means extra years of opportunities to forge network connections in that language, and perhaps also having more domains to use that language in.

The WCST error score is said to provide an indication of the ability to switch between mental sets, and thereby inhibiting an old rule in favour of a new rule. Considering the absence of any language measures beyond age of onset of acquisition in this model, it can be argued that multilingualism, as the use of different languages in context, does not necessarily train inhibitory control and the ability to shift and suppress old information. This is in line with what Kroll and Bialystok (2013) postulate: bilingualism likely trains a more global construct of mental flexibility, rather than inhibitory control. This mental flexibility could come better to the fore in attention selection processes, something that the WCST (allegedly, given the results) does not measure. Only the age of onset of acquisition of the first three languages contributes to the explained variance in terms of multilingualism. The relatively high contribution of these variables, observed in the Flanker model as well, might to some extent tie in with the social relationships of the study's subjects.

The more we know about the environment and language history of participants, the better we are able to investigate how factors work together and why one factor may be stronger in one population than in another, as Baum and Titone (2014) rightly point out. The complex interaction of variables, whereby the num-

ber of different languages used trumps the relational diversity of contacts, is in line with findings by Ellwardt et al. (2015). It strengthens the arguments to approach multilingualism as a multidimensional and dynamic variable, for which in experiments knowledge on the language environment of the participants is of pivotal importance when assessing certain ‘consequences’ of multilingualism for the mind.

This ties into the argument proposed by Fricke et al. (2018), who note that also in monolingual language use, multiple studies have investigated how individual language processing skills lead to fundamental variation in language processing, showing its malleability. It is unthinkable that this inter-individual variation should not also exist in bilingual language processing, and that investigations between and within bilinguals may unmask some of the differences found between studies on bilingualism and cognitive performance. This can be applied more broadly to research investigating differences in native and non-native speakers, or early and late L2 learners that shows that even among native speakers (or L1ers) there is considerable individual variation (cf. Hulstijn, 2019).

Therefore, referring back to the research on bilingualism and cognitive reserve, it becomes more and more evident that the build-up of a reserve varies per individual. Brain imaging studies are a promising means to pinpoint which individuals show instances of cognitive reserve, either by recruiting alternate brain networks or by more efficiently using existing pathways. However, even though we can compare brain density or functioning among different groups, we know nothing about what might cause certain brain differences unless we also obtain behavioural and background information of participants (cf. García-Pentón et al., 2016).

Alternatively, it can be asked whether the construct of cognitive reserve actually exists within the brain, ready to be used, or whether it arises from an interplay between a number of factors in a given context at a given time within an individual. In that case, is what we are observing in brains and behaviours among individuals a reflection of an independent work force that can be called upon by any brain area when needed, or a localised additional capacity of the language production and perception system. In that sense, CR perhaps only persists when it is continuously practised through cognitive stimulation. Given the interplay of different variables, which is unique for every individual, it makes sense to ar-

gue that cognitive benefits are individually distinct outcomes of a unique and time/context-bound interaction between variables. This study, using a cluster-based analysis, provides a promising first step into the co-occurrence of different variables in uncovering when cognitive benefits in the context of bilingualism occur. Future studies should take this individual variability, and the importance of context into account more (cf. Surrain and Luk, 2017).

3.5.1 Limitations

Our conclusions are built on a large dataset that we obtained through asking participants to fill in a questionnaire and conduct experiments online. The size and multifaceted nature of the dataset strengthens the power of the results, and self-reports enabled us to obtain important information regarding individuals' social backgrounds. Having said that, it needs to be noted that the population was self-selected and that the language measures, too, relied on self-reports. Although we could have used a more objective measure of proficiency, the strength of self-reports is that it is quick to assess, enabling a larger sample size. Our aim is not to generalise our results to a wider multilingual population. On the contrary, our results indicate that certain multilingual factors that have a large impact on cognitive performance in one participant sample may be entirely absent in another and we advocate for studies that consider multilingualism in a wider social environment. Nonetheless, the ultimate participant sample may constitute a rather special group in the Netherlands, with a high education and SES, and who are proud to speak different languages and regional dialects. Perhaps those people who do not consider themselves 'multilingual enough' have refrained from participating in the first place.

Another limitation pertains to the method of data collection. To effectively measure an individual's language abilities, objective measures should be collected in addition to self-reports. Also, the measurement accuracies of the cognitive tasks are more difficult to control via an online environment as was used in our study. Our aim with this dataset however was to investigate inter-group differences in a diverse multilingual population, to illuminate the complex interactions of different aspects of language knowledge and use with health, personality and social data. Despite the lack of objective accounts of language ability and experi-

mental control, we managed to shed light on why some multilingual individuals show enhanced cognitive performance and others do not. This initial exploration opens up the field for studies investigating individual differences in multilingual language use with more rigour.

3.6 Conclusion

The results of this study show that multilingualism contributes to enhanced cognitive performance in some multilingual individuals but not in others. The presence of enhanced attention control depends on the use of the different languages across different social domains and the number of different languages used with close social relations, in combination with an early age of onset of acquisition of these languages, certain personality traits and a high level of education. Inhibition or set-shifting is less strongly associated with multilingualism and social relations, but more with age, level of education and the age of onset of acquisition of the second and third language.

By means of an analysis that clusters contributing variables, we were able to shed light on why some individuals do show enhanced cognitive performance and others do not, despite all being multilingual. We also argue that the mechanisms of cognitive reserve are still not clear, but that, given the individual interplay of variables, reserve is a phenomenon that emerges from this interactional context. Future studies should explore this claim in more detail. From this study it most of all becomes clear that enhanced cognitive performance emerges from an interplay of multilingual language use in a particular environment, and inter-individual differences relating to education and personality. We therefore advocate for a move away from dichotomous group studies and more focus on the complex interplay of factors within multilingual populations.

PART II

Language and aging as a migrant in the Netherlands

CHAPTER 4

Second language abilities of older Turkish adults

Abstract | Research towards aging of migrant populations has so far mostly focused on (bio)medical and psychological aspects. This short chapter explores to what extent second language ability is a factor influencing the healthy aging process of older Turkish migrants in the Netherlands. To gain a first understanding of the linguistic situation of older migrants within this setting, this chapter reports interviews with ten healthcare consultants, who are appointed to provide information on elderly care and assistance in their local environments. Ten such consultants, with insight into their local Turkish community, are interviewed regarding the language and healthcare practices of their Turkish clientèle. The consultants' information forms the basis of a needs-analysis of the linguistic and health situation of Turkish older adults.¹

¹This chapter has been slightly adapted for this dissertation and is published as a paper in: Pot. A., Keijzer, M.C.J. and de Bot, K. (2018). Do low L2 abilities impede healthy aging for migrant older adults in the Netherlands? *Dutch Journal of Applied Linguistics* 7(1), 109-120.

4.1 Introduction

Today, migrant elderly make up 11% of all older adults (65+) in the Netherlands, a number that is said to increase to 26% by 2060 (van Duin and Stoeldraijer, 2014). So far, research on migration and aging in the Netherlands reports an overall worse health condition (with physical and psychosomatic illnesses and (mild) cognitive impairments being prevalent) for especially ‘first-generation’ older adults of Turkish and Moroccan descent, compared to their autochthonous peers (van der Wurff et al., 2004; Parlevliet et al., 2016). Crucially, it is not the case that ‘being a migrant’ by definition equals a poorer health status. Kotwal (2010) in Germany and Verhagen et al. (2013) in the Netherlands report no difference in health status between different social groups when looking solely at ethnicity (native-born versus immigrants from different social groups) as a factor. However, the migrant ‘experience’ is often associated with factors that impact health status, such as a lower socio-economic status (Verhagen et al., 2013), poorer health literacy levels (Kristiansen et al., 2016), and loneliness (Kotwal, 2010). These factors are prevalent across migrant groups, through which, indirectly, migrants may be at a greater risk of developing poor health outcomes (Uysal-Bozkir, 2016). Indeed, previous studies have noted a higher prevalence of cardiovascular diseases and psychological mood disorders, including depression, for older migrants of especially Turkish and Moroccan descent (van der Wurff et al., 2004; Solé-Auró and Crimmins, 2008).

One factor unique to being a migrant, as opposed to their native-born age-peers, is the fact that aging takes place in a second language (L2) environment. Even though older migrants may mostly venture in social environments where the use of the L1 is high and the L2 is hardly spoken (in local communities), they are more confined to particular (and fewer) social contexts (in which this L1 maintenance is high) than their peers in their country of origin. Access to healthcare may be more challenging in an L2 environment. This poses extra cultural, social and health-related challenges when mastery of the L2 is low. Statistics show that 50% of the older Turkish population in the Netherlands have a poor proficiency in Dutch (Dagevos and Gijsberts, 2007). Importantly, for other regions, a relation has been found between better health and second language (L2) proficiency. Being able to speak the target language was found to positively impact migrants’

(perception of) health (Wengler, 2011) in Germany. Moreover, a recent investigation into bilingualism in an immigrant context revealed that, among the Turkish population in the Netherlands, language shift (from socioemotional maintenance of the heritage language (Turkish) to the practical importance of the target language (Dutch)) induces intergenerational language tensions (Sevinç and Dewaele, 2016). For older (first-generation) Turkish migrants, the inability to use Dutch may induce linguistic anxiety, defined as an effect of language tensions within and outside the family and pressure to adopt the majority language, which may result in a decline of confidence in linguistic competence (Sevinç and Dewaele, 2016; Sevinç and Backus, 2017).

In a recent study, Sevinç and Backus (2017) note that limited L2 practices induce language anxiety, which may heavily impact daily communicative situations for the Turkish immigrant community. They draw on Wei (1994)'s observation of a vicious circle in immigrant communities: interacting with the mainstream (British) community promotes the development of English proficiency for Chinese immigrants, and their subsequently higher L2 proficiency strengthens the formation of L2 social network ties.

Similarly, Sevinç and Backus (2017) argue that linguistic and sociocultural obstacles prevent Turkish migrants from establishing social connections with the Dutch mainstream community. This is indicated to be especially true for the first-generation, who are now aging, and for females who, under their husband's authority, may be isolated at home and have little opportunities to practise Dutch (Sevinç and Dewaele, 2016). Low (self-perceived) proficiency induces anxiety and avoidance of L2 situations. This means fewer opportunities to interact and practise the language, through which L2 proficiency remains low and anxiety is triggered (2017, p.4). We know that anxiety in old age in general is detrimental to wellbeing, regardless of whether it is clinically diagnosed as a disorder or a symptom. Anxious individuals over-utilise healthcare services, yet only few receive adequate care or treatment (De Beurs et al., 1999).

In addition, from research conducted specifically in the Dutch context, we know that limited (L1) health literacy, which typically is also low for (especially female) migrants (Verhagen et al., 2013), proves detrimental for wellbeing (Jagt et al., 2015). In turn, limited L2 proficiency and literacy may affect wellbeing. Not being able to communicate effectively in the target language does not only put up

barriers in accessing (health)care, it also detrimentally affects the type and degree of interaction. Decreased or lower quality interaction can fuel withdrawal from communicative situations. This decreases the number of opportunities to practise the language and increases susceptibility to loneliness and depressive symptoms (De Bot and Van der Hoeven, 2011).

Here we therefore argue that language ability is an important modulating factor on older Turkish migrants' social wellbeing as well as cognitive, and perhaps even physical health. We base this argument first and foremost on the observation of the need for special 'healthcare consultants' for older migrants in the Netherlands. These healthcare consultants form a bridge between the individual who seeks help or assistance, and the relevant governmental institutions (such as tax services). In areas with large numbers of immigrant elderly, healthcare consultants with a migrant background often speak the language of the community and provide tailored services, mainly involving translating and navigating the tax system (Rijksoverheid 'Ouderenadviseur', 2016). Two recent investigations into the healthcare utilisation by older migrants revealed that many older migrants experience difficulties with voicing their healthcare needs, both because of low health-literacy as well as a low command of Dutch (Suurmond et al., 2016; van Wieringen, 2014).

This study aimed to explore the linguistic situation of older Turkish adults in the Netherlands with regard to accessing and communicating about health and care, a so-called 'needs-analysis'. To do so, information was gathered from ten healthcare consultants across the Netherlands, who have a good understanding of their local older Turkish clientèle. The question to be answered was how the (lack of) proficiency in the L2 may influence negative aspects of the aging process of older Turkish immigrants in the Netherlands.

4.2 Method

Ten consultants (2 males) shared their observations and insights regarding the health and wellbeing situation of their clients, for this study focusing solely on Turkish older adults.

Through semi-guided interviews, consisting of 30 questions and taking approximately 90 minutes, the main underlying question targeted was whether (and

to what extent) the mastery of Dutch plays a role in the older adults' aging process and particularly their health and wellbeing. The interviews were recorded and holistically transcribed using oTranscribe (Bentley, 2013), and subsequently coded with ATLAS.ti (Version 1.0.16; 2016). The coding procedure followed the steps for conducting a thematic analysis (Braun and Clarke, 2006), with the aim of arriving at a 'needs-analysis' of the Turkish group of migrants as observed by the consultants. First, interesting features across the dataset were assigned codes. Next, codes were collated into potential themes and checked against the coded extract (reviewing themes). The themes that emerged from this procedure can be found in Table 4.1, where they are illustrated with exemplar quotes from consultants (in brackets).

Table 4.1: *Extrapolated themes from the interviews with 10 consultants, with exemplar quotes to illustrate each theme.*

Theme	Data excerpt
Limited L2 use/abilities	<ul style="list-style-type: none"> ● ‘Many Turks are illiterate, through which they are oblivious to a lot of health and financially important information’ (HG, also in other 9 interviews). ● ‘Limited language abilities reduce mobility. Asking for directions is problematic, as is calling a taxi. Use of public transport requires navigating a complex ticketing system, which can be off-putting’ (HM; also SB, SA). ● ‘The older migrants rely heavily on their children. On the one hand this originates from cultural values, but on the other hand is borne out of necessity: children assist when communication in Dutch is needed. This may lead to increased pressure on the children and family tensions’ (SK; all others note this, too).
Extensive L2 needs	<ul style="list-style-type: none"> ● ‘Much information about health issues and healthcare provisions, such as information evenings, does not reach the older migrants. Immigrant elderly are not aware of the provisions and care rights because of a lack of knowledge of Dutch’ (SA; also HM, ND, HG, BT). ● ‘It is expected that people organise their care independently. Without the necessary language skills, older migrants are at a loss of not knowing where they can ask for help or assistance. They require, already in a very early stage, assistance from their family and friends, which induces an early and heavy dependence on others’ (LA).

Table 4.1: *Extrapolated themes (cont.)*

Theme	Data excerpt
Cultural-sensitive care, values and traditions	<ul style="list-style-type: none"> ● 'Out of tradition, older Turkish migrants want to organise care within their family and decline assistance from outside. This is no longer a realistic situation; generational tensions and changing lifestyles prevent their children to care for them. On the other hand, outside home care cannot always provide tailored and culturally sensitive care' (HG, corroborated by all consultants). ● 'If it is available, older migrants make use of household care provided by someone from their own ethnic background. Others, however, decline such assistance, afraid that they may know the carer from 'their community' and he or she will start gossiping' (SK, HI).
Physical and mental status of older migrants and language-related stress	<ul style="list-style-type: none"> ● 'A large number of migrants have physical and mental complaints through which they lack the concentration to participate in language classes. They already need to monitor their health status and take care of their finances, so learning Dutch in addition to this often fails' (SB). ● 'Inability to speak the target language leads to loneliness and stress. In addition, a large number of older adults show symptoms of depression. People live in-between two cultures; they feel they do not quite belong in the Netherlands, but can also no longer root in Turkey.' (ND; also HI, BT, HM, SK, SA).

Table 4.1: *Extrapolated themes (cont.)*

Theme	Data excerpt
Role of the consultant	<ul style="list-style-type: none"> ● ‘Sometimes people just need someone to listen to them, and then I am there. They cannot address certain issues among their family or friends for fear of losing face’ (BT also SA, SK, BT). ● ‘Most people need help with administrative issues. They receive for example a tax letter and panic, because they don’t understand what is required of them’ (LA, MS).

Note: these themes are broadly defined and the data excerpts can, for reasons of space, only give a limited insight into the data.

The ten consultants were contacted through some of the major care facilities in the Netherlands and referrals from their colleagues elsewhere in the Netherlands. They represent the larger cities of Den Haag (West), Leiden (W), Arnhem (S), Nijmegen (S) and Zwolle (N), and the smaller towns of Leerdam (W), Goor (E), Hengelo (E), Almelo (E), and Hoogezand (N). Although self-selection may have been an issue, the fact that the informants represent different parts of the Netherlands allows for a holistic insight into the linguistic situation of older Turkish migrants in various parts of the country.

4.3 Results and discussion

The central theme emerging from the interviews is the clear discrepancy between the overall minimal L2 use of the Turkish adults on the one hand, and their extensive and increasing L2 needs on the other hand, which the consultants claim becomes even greater as they age (see Table 4.1).

4.3.1 Limited L2 proficiency

The Turkish migrants seem to have had a ‘false start’ linguistically, as from the outset of their stay in the Netherlands, the intention was to return to Turkey. This idea of temporality, combined with the physically intense factory work and grouped housing facilities created a situation in which the need and opportunity to learn Dutch was low (Schellingerhout, 2004). When much later the Dutch government intensified the language requirements, subsidised language courses failed to reach the desired effect, as work proved difficult to combine with language learning. Together with the close-knit ethnic communities within which there was no need and few opportunities to interact in Dutch, L2 proficiency for the first-generation adults remained low (Yerden, 2000).

The continued notion of temporality fuelled the use of Turkish in the home. However, the question of return was continually postponed. When a large majority of the second-generation started family life in the Netherlands, the emotional losses when returning to Turkey increased even further for the first generation. Nonetheless, many still struggle with the issue of return (Percival, 2013). Rather

than purely belonging (feeling most at home) in Turkey or in the Netherlands, the first generation belongs ‘transnationally’ (Klok et al., 2017).

Because of this initially Turkish and later transnational perspective, the first generation is, as indicated by the consultants, at a disadvantage linguistically. Figure 1 below is an illustration of the observations of the consultants on the dependencies stemming from a low L2 proficiency for this group (cf. Table 4.1).

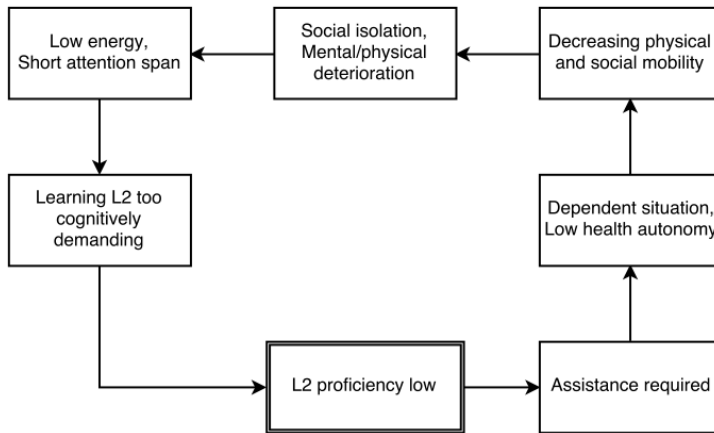


Figure 4.1: Schematic illustration of the observed effects of a limited L2 proficiency on health and wellbeing

The limited opportunities to interact in Dutch combined with their transnational form of aging, means that the older migrants have difficulty navigating Dutch society and participating independently in the Dutch healthcare system (phase 2 and 3 of Figure 4.1). The consultants hint at language anxiety as playing a role in this process too, with their clients experiencing stress in situations where they have to speak Dutch (cf. Table 4.1). Considering Figure 4.1, low L2 proficiency appears to induce a situation in older age that is characterised by dependence. Dynamic models on frailty and resilience in old age associate dependence with increased frailty (cf. Rockwood et al., 1994, 2005). Small changes to an older adult’s status (a new drug, surgery) may have a disproportionate impact on an individual’s health status, such as from independent to dependent; so-called

'dependency oscillations' (Clegg et al., 2013). The consultants thus suggest that the L2 environment may also contribute to dependency oscillations: largely through this physical and linguistic dependence, a vast number of older Turkish adults are at risk of becoming isolated or depressed (phase 5). The consultants attribute these detrimental effects to the migrants' increasing L2 needs.

4.3.2 Extensive L2 needs

The healthcare policy in the Netherlands requires citizens to take a proactive stance toward obtaining healthcare assistance. Individuals need to voice their care needs in the immediate environment and call upon their own social network to provide assistance where possible. All consultants noted that this proactive policy can be detrimental for older adults with a limited social network, and can be further impeded by a lack of language skills and the relevant knowledge of the healthcare system. Additionally, through recent societal budget cuts special facilities, such as an interpreter telephone, disappeared, making people more reliant upon their own personal networks, primarily their children, who assist and interpret. This may invoke family tensions (cf. Yerden, 2000). For low-proficient migrants, day-to-day tasks, such as taking the bus to maintain mobility, prove difficult (the consultants indicated this to be especially true for older Turkish females). More urgently, these simple tasks are a locus for more pressing problems, such as loneliness and depression (see Table 4.1 and phase 4 and 5 of Figure 4.1).

In line with Uysal-Bozkir (2016)'s dissertation on the health status of older migrants, the consultants echoed that psychosomatic illnesses widely exist within the Turkish community, but are often not recognized accordingly or acted upon. The elderly who frequent the consultants' offices often report psychosomatic complaints. Lack of knowledge on psychosomatic illnesses, however, block an adequate diagnosis and desired treatment. Stress only appears to intensify these feelings, as observed by the consultants (cf. Table 4.1).

The perceived stress is closely linked to limited L2 proficiency and low literacy levels in general. Stress may ensue from the inability to independently manage finance and living issues due to low levels of literacy among this group (cf. Table 4.1). Low literacy skills in general have been found to contribute to social exclusion in older adults, which increases their vulnerability (de Greef et al., 2014). For

the older migrants, not being able to sort important mail from 'junk mail', or the inability to manage finances because of limited literacy abilities, enhances stress levels and induces L2 anxiety, the consultants anecdotally observe.

4.4 Limitations and implications

The observations above reveal the importance of mastering the language of the environment in the aging process of individuals, and, indirectly, the niche that these consultants fill in forming a bridge between the elderly immigrant and health-care information. Of course, these notes are merely a snapshot and information is one-sided, reflecting only the views of a selection of healthcare consultants, and generalising over this particular migrant group. The notes do not cover individual cases either. Nonetheless, it is striking that, across the different consultants in different areas, similar issues surface.

Despite the limited generalizability of the observations to other migrant communities, the conclusions reached in these notes open up a theoretical opportunity to study L2 proficiency in relation to health and wellbeing also in other countries and situations, with other migrant groups and language communities. Migration, and factors resulting from it, is highly variable across contexts: different immigrant communities in different contexts may experience different migration trajectories, and it would be interesting to explore to what extent similar or different patterns may be observed regarding language usage, well-being, health and migration.

The point that we have aimed to make is that research into aging and migration features a strong linguistic component that, so far, has not been investigated systematically. The dependencies stemming from a limited L2 proficiency indirectly impacts an individual's health and wellbeing. This ties in, to some extent, with the interplay between (mental) health and acculturative stress. Acculturation, or the degree to which an individual has adapted to the dominant culture, relates to better mental health (Escobar and Vega, 2000). It is suggested that low levels of acculturation induce more acculturative stress, which negatively impacts psychological wellbeing (also see phase 6 and 7 of Figure 4.1).

Acculturative stress may arise as a result of language barriers (task-oriented stress) and/or feelings of alienation (emotion-oriented stress) (Jang and Chiri-

boga, 2010). Taking into account the dependencies stemming from a limited L2 proficiency, future research might explore to what extent a low L2 proficiency fuels acculturative stress, and how this in turn impacts on wellbeing. Notably, the consultants can already alleviate some of the acculturative task-oriented stress, by providing linguistic assistance in communicating with healthcare or financial institutions.

This needs-analysis provides a rough understanding of the complex interplay between L2 proficiency and health behaviour. To strengthen the conclusions reached, future research may double-check the statements against first-party data. These outcomes allow us to establish a more systematic insight into the health issues that older Turkish females encounter in relation to their limited Dutch proficiency by interviewing these older adults. Even though there may not be a direct link between language proficiency and health, the needs-analysis suggests that language is a strong mediating factor in gaining access to healthcare and maintain a degree of wellbeing.

CHAPTER 5

A language barrier

Abstract | Studies on aging and migration often note a ‘language barrier’ for older migrants when communicating in a (medical) second language (L2) context. Yet how a limited L2 proficiency impacts the aging process of migrant adults has, so far, not been systematically investigated. This question is important given that having limited L2 proficiency may pose immediate drawbacks on one’s ability to maintain independence. The previous chapter explored the linguistic needs of Turkish older adults through the lens of a sample of healthcare consultants. This chapter uses the observations from the previous chapter and reports on a systematic investigation, using a mixed-methods approach (interviews and language and cognitive measures) of the language and aging situation of a group of older Turkish females in the Netherlands. It is investigated if and under which circumstances a language barrier may be detrimental for the aging process of this group of older migrants.¹

¹This chapter has been slightly adapted for this dissertation and is published as a paper in: Pot. A., Keijzer, M.C.J. and de Bot, K. (2018). The language barrier in migrant aging. *International Journal of Bilingual Education and Bilingualism*.

5.1 Introduction

The rapidly aging population in modern societies is becoming more and more ethnically diverse. Increased mobilisation over the last few decades has resulted in large portions of migrants - who settled in western countries for economic, political, personal or other reasons - to age in an environment that differs culturally, socially, but also linguistically from their home environment. In the Netherlands alone, it is estimated that older migrant adults will make up 21% of the aging population by 2060, compared to 11% in 2015 (van Duin and Stoeldraijer, 2014).

The research on aging and migration in Europe to date spans studies looking into living situations of older migrants, mobility patterns, access to social services and care practices (e.g. Forssel and Torres, 2011; Bolzman, 2011, 2013; Karl and Torres, 2015). In addition, there is a substantial body of research on the health status of older 'first-generation' migrants in Europe, which reports a generally worse health condition, a higher prevalence of cardiovascular diseases and mental health problems and depression for some migrant groups, in comparison to the native population (Solé-Auró and Crimmins, 2008; Uitewaal et al., 2004; Carballo et al., 1998).

Little research has been conducted on one of the most salient social aspects of aging for older migrant populations: the linguistic environment. So far, there are only a handful of studies noting language barriers in access to healthcare services (see Lai and Chau (2007); Asanin and Wilson (2008) in Canada and Dias et al. (2008) in Portugal), usually as part of larger processes relating to ethnicity (in the Netherlands, see Stronk et al., 2001) or acculturation (degree of participation in the host culture) (Ince et al., 2014). Lack of proficiency in the target language may, as the few studies above indicate, mediate access to and utilisation of services. With linguistic environment being one of the main differences between native and migrant populations, it seems counter-intuitive that past studies have not taken this factor into account more.

In a recent research notes article reporting on perceptions of health, well-being and linguistic barriers of older Turkish adults by healthcare workers with insights into their local Turkish communities (Pot et al., 2018a), it was suggested that language is a mediating factor for migrant older adults in gaining access to healthcare services, but also to maintain a degree of wellbeing (also see Priebe

et al., 2011). Limited L2 proficiency leads to a circle of dependencies that limits interactional opportunities, the construction of social networks and limited abilities to express and communicate healthcare needs, akin to the more robust body of health sciences research that has found health determiners to interact (see below). Language thus plays an intricate role in the aging process, yet because of these interactions with social, cognitive and physical factors it is a methodologically difficult factor to extract from other social aging processes.

This chapter builds on the scantily available evidence about the mediating role of language in the aging process of older migrants and specifically elaborates on the earlier research notes article, by expanding the investigation into the linguistic component in the older Turkish migrants' aging trajectories. The central question that guides this investigation is under which circumstances this previously reported language barrier does steer the aging process of older migrants in a detrimental direction and perhaps increases vulnerability. More specifically, we consider how the L2 environment and L2 competence impact wellbeing levels for a specific group of older migrants in the Netherlands: female Turkish migrants.

5.2 Background

5.2.1 Migrant aging

Research in the interdisciplinary field of aging (social gerontology) and migration (migration studies) typically distinguishes two 'core' groups of migrants: retirement migrants (i.e. older adults settling into another environment post retirement, typically Europe's older population labelled 'baby boomers', similar to 'snow birds' in the USA) and labour migrants who settled in the destination countries as (young) adults (Warnes and Williams, 2006; Warnes et al., 2004). The first group includes some of the more affluent older adults, whereas the latter group is very heterogeneous in terms of origins, cultural characteristics, and the diversity of social networks. Although the group of older migrants by itself should not be regarded as a group with special/distinct needs from the outset (White, 2006), the group does include 'some of the most disadvantaged and socially-excluded of western Europe's older people' (Warnes and Williams, 2006, p. 7).

This paper reflects on one particular migrant population in the second 'core'

migrant group: Turkish ‘first generation’ labour migrants in the Netherlands. The Turkish migrants constitute the largest migrant group in the Netherlands; together with Moroccan, Surinamese, Antilles and Moluccan migrants they make up 6% of the total Dutch elderly (55+) population (Schellingerhout, 2004). Health-wise, there is considerable variation among the different migrant groups. (Inter-)individual variation aside, older adults from Turkish and Moroccan descent are generally found to be in worse health compared to their native Dutch peers (van der Wurff et al., 2004; Parlevliet et al., 2016).

This is not to say that ‘being a migrant’ automatically results in detrimental health. Rather, a lower health status is often an accumulation of factors that relate to the migrant experience, including age, sex and level of education (Verhagen et al., 2013; Schellingerhout, 2004). Different indicators of health have furthermore been found to interact: chronic and physical limitations lead to a lower psychological wellbeing and decreased perception of health (Blankevoort et al., 2013; Christopher, 2014). In a similar vein, environmental factors contribute to the (perception of) health status, and the ability to seek help or assistance (Birren and Schaie, 2001). Moreover, the outlook on aging as a process of decline versus an accumulation of experiences, see Ramscar et al. (2014), contributes to a positive or negative view on aging and may influence cognitive and social behaviour (see section 5.2.4).

5.2.2 The L2 environment

The L2 environment is one such factor that interacts with health outcomes in complex ways. Immediate effects are observed in communicative settings, whereby a limited L2 proficiency restricts communication in especially medical settings. Clients in L2-dominant institutional care are less satisfied with the care they receive and are prone to social isolation (Ramos and Karl, 2016). Contrastively, better L2 communication has been directly associated with increased use of health facilities and use of care by Turkish older adults both in the Netherlands and in Germany (Fassaert et al., 2009; Wengler, 2011). Below the communicative surface, however, the L2 environment also plays a role in migrant wellbeing. Language is closely tied to identity formation and acculturation.

Among Turkish immigrants in Europe, the Turkish language is the strongest

marker of identity (Yagmur and Vijver, 2012). As such, the Turkish immigrant community in the Netherlands is considered a high vitality group according to the concept of ethnolinguistic vitality (EVT) (Giles et al., 1977; Yagmur, 2009). The degree of linguistic shift to the host language or home-language maintenance is an indicator of a minority group's EVT. Low vitality groups assimilate to the host language and culture, as they lack distinctiveness as a group, whereas high vitality groups retain much of their language in a multilingual setting. The high L1 language maintenance of the Turkish group is largely because of the well-organised group they form in Dutch society (e.g. high birth rates, densely concentrated living areas) and their extensive ethnic support network.

This high L1 maintenance may come at a cost regarding L2 proficiency. Statistics on Dutch language proficiency in the Netherlands show that, in general, the older Turkish population (age 55+) often report to have significant problems with understanding/speaking Dutch (Huijnk and Andriessen, 2016). In his review on the health status of older migrants in the Netherlands, Schellingerhout (2004) reports that 61% of Turkish older adults require linguistic assistance at medical appointments. These limited L2 skills are a direct result of the migration policies in the 1950s/60s in the Netherlands, whereby the migrant workers were attracted on a temporary premise; the idea was that after a few years they would return to Turkey (some migrants still hold on to this idea: Liversage and Mirdal (2017) explore the strength of this 'myth of return' in a longitudinal study of two Turkish immigrants in Denmark, whose wish to return turns into a myth as time goes by). Therefore, both the Turkish immigrants and the Dutch government did not feel the initial need to invest in the Dutch language. Grouped housing and long working hours at factories with colleagues from the same nationality fostered the establishment of dense ethnic networks (Ciobanu et al., 2017; Yagmur, 2011).

For a large majority of the Turkish immigrants, these conditions mark their degree of cultural integration. Integration, or other acculturative strategies (assimilation, separation and marginalisation), in turn, also determine (mental) health status. Acculturation has been defined as the (group and individual) changes that occur when different cultural groups are in continuous contact (Redfield et al., 1936). Research among Turkish adults in the Netherlands and Germany has noted higher indices of psychological distress and depression for those individuals with a low degree of acculturation. For Turkish first- and second gen-

eration migrants, a higher degree of integration is associated with lower rates of depression, whereas the opposite is found for higher degrees of marginalisation and separation (Ince et al., 2014; Janssen-Kallenberg et al., 2017).

5.2.3 Social network formation

In social interaction, Wei (1994) observes a reciprocal relationship between L2 proficiency and establishing social network ties with the host community by Chinese immigrants in Britain, whereby a better proficiency enables network formation that, in turn, reinforces language skills. This circular movement also operates in reverse, in that those with limited L2 skills are less able to connect with the host community, thus creating fewer opportunities to practise the language. For Turkish migrants, the frequent absence of L2 social network ties may also be fueled by the initial idea of ‘temporality’ of their stay in the Netherlands.

Moreover, high L1 maintenance and low L2 skills may invoke linguistic insecurity or (second) language anxiety. For first-generation immigrants (Turks in the Netherlands), Sevinç and Dewaele (2016) and Sevinç and Backus (2017) find that majority language anxiety (MLA) is more prevalent than heritage language anxiety, and add MLA to Wei’s (1994) vicious circle linking language proficiency to social network formation. MLA ensues from a (perceived) negative evaluation of L2 use by native speakers and may lead to avoidance of using that language, which leads to reduced proficiency and conflicted identities, in which a sense of belonging is distorted. The sense of belonging and attachment to an identity is vital to involvement in social networks and building social capital (Haslam et al., 2009). Rejection on linguistic grounds may fuel insecurity and decreased social interaction, which is a locus for more pressing problems such as loneliness and depression.

In a qualitative study on social embeddedness of older Turkish labour migrants in Vienna, Palmberger (2017) argues that those migrants with access to cultural, political and religious associations are generally socially well-embedded. Despite adverse conditions relating to their socio-economic and migration background, migrants with well-embedded social ties manage within their everyday lives. However, accessibility and social engagement may be limited when older migrants are physically or psychologically compromised, or when these voluntary

associations are not present in the direct environment.

Indeed, research on social networks of older adults reveals that adults who are embedded in diverse networks indicate to have higher subjective wellbeing levels (and lower levels of loneliness and anxiety). A wider range of social ties contributes to wellbeing, independent of health status and demographic confounds (Litwin and Shiovitz-Ezra, 2010).

Clearly, the social environment shapes language development and influences health status and psychological wellbeing at various levels, from the degree of integration to the degree and quality of interaction. Language development is further determined by other, individual factors such as low educational levels, limited literacy abilities and cognitive dispositions, which constrain the ability or willingness of migrants to take up Dutch language courses or, in the case of literacy, limit access to health care facilities (Kristiansen et al., 2016).

5.2.4 Language use and aging

In their book on aging in multilingual contexts, de Bot and Makoni (2005) propose a dynamic model of language use in aging, in which aging is regarded as a system, that develops under the influence of changes within the individual (physical and psychological) and external changes relating to attitudes towards aging in society, and an individual's perception of this. This means that age-related psychological changes may impact language use: changes in cognitive resources, such as declining memory or attention hamper the maintenance or development of language skills. Similarly, fewer language skills may trigger low quality interaction or 'elderspeak' (Kemper and Harden, 1999), as a result of changing perceptions or stereotypes associated with old age.

Although a full treatment of the cognitive processes at work in language development and the impact of aging on this is beyond the scope of this paper, highlighting this issue here is important as it is likely that different cognitive dispositions influence language usage outcomes (Burke and Shafto, 2008; Wingfield and Grossman, 2006). This may lead to more or less social engagement or increased susceptibility to loneliness and the development of depressive symptoms, for example.

In addition, mindset and (aging) stereotypes influence cognitive behaviour. An individual's perception of her cognitive abilities (whether these are 'fixed' or flexible across the lifespan) has direct repercussions on the ability to learn and adopt a positive mindset (Dweck, 2000; Dweck and Molden, 2017). Ramscar et al. (2014) argue that aging as a process of decline is based on false beliefs. They rather consider aging as an accumulation of experience, and as such explain slower performance on psychometric tasks as a reflection of increased knowledge rather than cognitive decline. In line with Dweck's observations, Ramscar et al. (2014, p. 35) note that '[...] the [prevailing stereotypical] ideas about 'cognitive decline' [...] are likely to be exerting a strong, negative influence on the lives of many millions of older adults'.

From a socio-cultural perspective, language and cognition are intertwined: language is an important tool to mediate complex cognitive processes such as attention and memory (Vygotsky, 1978). The process of mediating higher mental processes using language is called 'linguaging', and investigated in relation to age-related cognitive decline in the work of Swain and Lapkin (Swain et al., 2013; Swain and Lapkin, 2011; Lapkin et al., 2010). To study the effect of linguaging on cognition, the authors conducted a number of qualitative studies involving mildly cognitively impaired and socially isolated long-term-care residents in Canada. They asserted that engaging in linguaging activities, which are effortful and go beyond simple communication (e.g. solving crossword puzzles, discussing an article or writing a poem), improves cognitive functioning. When considering language as a mediating cognitive tool, stereotypical language use such as elderspeak may be harmful to cognition. Swain (2013) remarks that elderspeak inhibits the ability of the recipient 'to language', through which self-esteem is lowered and cognitive decline fueled (Swain, 2013).

Moreover, in communicative settings, limited L2 proficiency may put up a barrier in accessing institutions or receiving desired care. A study towards doctor-migrant patient (with low L2 skills) communication in a hospital in Ghent, Belgium revealed that those migrants who do not bring along an informal interpreter, often a family or community member, to consults - as their L2 proficiency is just sufficient enough to warrant the absence of an interpreter - are restricted in expressing their emotions and complaints. As a result, they are more vulnerable than those migrants with no L2 proficiency, who can still voice their emotions

through the interpreter (De Maesschalck et al., 2011).

It is thus not simply the presence or absence of language skills that puts older migrants at an advantage or disadvantage with regard to managing their aging process, but the way in which individuals handle communicative situations in the L2 environment. Moreover, cognitive abilities, issues of identity formation and environmental opportunities to interact are pivotal in advancing L2 development and increasing L2 usage. The interaction of all of these factors may lead some individuals to avoid L2 social interaction and invest in their L1 social networks. However, when social opportunities are limited and a social network is lacking, some migrants may indeed be, as Warnes et al. (2004) note in section 5.2.1 above, among the most vulnerable older adults in society.

The current study aims to identify whether, and when, older migrants are linguistically compromised and whether limited psychological wellbeing for these older adults may be heightened by the L2 context. The focus here is in particular on female Turkish migrants, as it has been noted that for this group, L2 proficiency is lowest. They often have had fewer opportunities to practise the language and tend to have a lower educational level (Palmberger, 2017), and may experience risks relating to L2 proficiency, e.g. after becoming widowed.

In studying this issue, we adopt a mixed-methods approach, as we believe that solely studying group processes can only reveal limited information on language usage. As language and aging processes are highly individually distinct, a qualitative approach allows for a more fine-grained insight into the interaction between L2 proficiency, usage and mental, physical and social aging processes. Although a mixed-methods approach increases the risk of wrongly generalising individual results to larger groups, such a methodology is an insightful addition to the usually larger group studies on migrants in the medical and behavioural sciences. Individual experiences are important in highlighting differential (linguistic) experiences and subsequently targeting interventions, which may be broader in nature.

By means of semi-structured interviews and language, literacy and cognitive tasks, we seek to answer the question of whether (and when) language forms a barrier in maintaining independence and a high sense of wellbeing in the aging process of older female Turkish adults in the Netherlands. Our hypothesis is that a low level of proficiency in Dutch constrains individuals in building resources to ward off dependence and increase the risk of social isolation and depression.

5.3 Method

5.3.1 Participants

A total of 42 ‘first-generation’ Turkish women were interviewed (of whom 39 complete datasets (interview + tasks) were obtained). Following Seviç and Backus (2017), we regard ‘first generation’ Turkish immigrants as either migrants who arrived in the Netherlands through labour migration or family reunification in the 1960s/70s, as well as those migrants who migrated after marrying a second-generation Turkish spouse. Informants ranged in age from 52-84 (mean age = 61). Table 5.1 provides an overview of informant’s age, education, and length of residence in the Netherlands.

	N	Minimum	Maximum	Mean	St. dev
Age	42	52	84	62.0	8.1
LoR in years	42	18	47	23.4	7.9
Education in years	40	0	13	5.0	3.5

Table 5.1: Demographic information of the informants. Age at testing, Length of residence in years, and education in years.

The informants were recruited through the network of the consultants interviewed in chapter 4 and through a self-constructed network by a Turkish-speaking assistant (male) based on a snowball effect via family and professional acquaintances. Before the interview, informants received full information about the study (in Turkish) and informal informed consent was obtained. Informants did not receive financial reimbursement, but were offered a small gift at the end of the interview session.

The study did not include a native-Dutch control group. The current informant sample varied on a number of important dimensions such as age, length of residence but also educational level and, very importantly, proficiency levels of Dutch. Through this inter-group variation, and because the migrant experience has unique factors associated with it (see 5.2.1 above), the group is analysed

on a continuum; as we deemed this more informative than setting off their data against a group of Dutch native speakers matched in terms of age and education level.

5.3.2 **Materials**

A questionnaire² served as the basis for a semi-structured interview. Included in the questionnaire were questions on migration history, language usage, belonging, (language) attitudes, social relationships and health and healthcare use. These questions were adapted from the sociolinguistic questionnaire by Keijzer (2007).

A subjective measure of wellbeing (CASP-12, shortened version of CASP-19) spanning the life domains of older adults; ‘control and autonomy’, ‘self-realisation’ and ‘pleasure’, was taken from Wiggins et al. (2007). Questions included one’s ability to carry out daily activities, satisfaction with life, feeling that life has meaning and is purposeful, feeling left-out, and experiencing economical or physical constraints. Wellbeing scores were calculated on a scale of one to four with a maximum total score of 48.

In addition, respondents completed a picture-naming task in Dutch, with a descriptive picture of a vegetable stall and an action-driven picture of a man in a tree (Nicholas and Brookshire, 1993). This served as a rough measure of L2 proficiency. The picture-descriptions were assessed on lexical density and verb usage (cf. Gordon, 2006). The final score reflects the ratio of verbs relative to the lexical density of the description, which provides a rough but adequate measurement of the complexity (sentence formation abilities) of Dutch language proficiency of individuals.

L2 literacy level was assessed using a measure of functional literacy based on a literacy framework for Dutch as an L2 (‘Raamwerk alfabetisering NT2’) (CITO, 2008). Informants were asked to indicate whether they were able to read certain short passages of text, medicine prescriptions, opening hours, and could distinguish important mail from junk mail. A three point scale was used: 3 = can do this with ease, 2 = can do this but with difficulty, 1 = cannot do this.

Lastly, a working memory score was obtained from a quick-to-administer, visuo-spatial, non-verbal measurement of working memory: a Corsi Blocks Tap-

²The questionnaire can be obtained by contacting the first author

ping Task (Corsi, 1972). A working memory score provided insight into the cognitive abilities of individuals, which could be related to (and partly explain) performance on the language and literacy measures. Due to time restrictions and fatigue of the informants, more fine-grained measures of proficiency, literacy and cognition were not feasible.

5.3.3 Procedure

Each interview and set of tasks lasted between 90 and 120 minutes. Informants were interviewed in Turkish by either a female, Dutch-speaking interviewer joined by an informal interpreter who translated into Turkish ($n=20$), or a male, Turkish-speaking interviewer ($n=22$). All interviews were recorded and, for the interpreted interviews, a Turkish native speaker checked the interviews to account for the accuracy in the translations. Informants were interviewed either in their own homes ($n=17$, where in three instances a husband actively participated in the interview), at a cultural meeting centre ($n=14$) or the mosque ($n=11$).

5.3.4 Analysis

Correlation analyses were applied to note relationships between the language, cognitive, literacy and background measures, using SPSS and R to plot the data and these relationships (using a Loess smoothing curve to quickly view general trends). One-way ANOVAs and a Tukey post-hoc analysis with the CASP measure as the dependent variable were conducted to see whether a subscale of the CASP measure was related to any of the other measures.

In other words, whether wellbeing was directly associated with the informants' degree of L2 mastery. Lastly we checked with an ANOVA whether informants' place of residence (urban vs rural) significantly impacted any of the other measures.

All interviews were fully transcribed³. The transcriptions were coded following the procedure of a thematic analysis to find repeated patterns of meaning (Braun and Clarke, 2006).

³In Dutch for the interpreted interviews, and in Turkish for the Turkish interviews. The interviewer who interviewed in Turkish did not master Dutch. Therefore, the transcriptions were subsequently translated from Turkish into English.

The dataset was thus coded into different categories, relating to language competence, usage and learning, cultural factors, socio-emotional factors, social relationships, day-to-day activities and health and health-care use/communication. The categories were subsequently collapsed into four distinct themes: L2 competence, belonging, social relationships and opportunities/anxiety to interact, and health status. The themes provided insight into the causes for the different scores on the wellbeing questionnaire.

5.4 Results

To detail the role of L2 competence in this group's aging processes and wellbeing levels, this section first presents a statistical overview of the language, cognitive and background measures that were found to interact. Subsequently, the themes emerging from the interview data give insight into individual strategies and motives for higher and lower wellbeing levels related to L2 competence.

5.4.1 Statistical analyses

In Table 5.2 below, descriptive results are reported for all informants on the different measures (literacy, wellbeing and working memory). The picture-descriptions were analysed using a number of lexical measures, which are reported separately in Table 5.3.

Table 5.2: Literacy measure (max 39), CASP-12 wellbeing (max 48), Corsi forward and backward span (FWS/BWS, max 8), Corsi total number of trials correctly reproduced (FWC/BWC, max 16).

	N	Minimum	Maximum	Mean	Std. dev.
Literacy	39	19	39	35.6	5.9
CASP	42	27	48	39.1	5.5
Corsi FWS	40	2	6	4.02	1.1
Corsi FWC	40	3	10	6.4	1.9
Corsi BWS	37	1	6	3.4	1.3
Corsi BWC	37	2	10	4.9	2.2

Table 5.3: Total number of narrative words, Type/token ratio (TTR), number of sentences produced on the narrative task, proportion of correct inflected verbs, number of verbs relative to the total amount of narrative words (V/Tnarr) and number of verbs and nouns relative to the total amount of narrative words (V+N/Tnarr).

	N	Minimum	Maximum	Mean	Std. dev.
Total narrative words	39	6	29	16.7	5.6
TTR	39	.18	.83	.39	.17
Sentences	39	0	9	3.3	2.4
Verbs inflected	39	0	8	1.9	2.2
V/Tnarr	39	0	48	23.2	13.1
V+N/Tnarr	39	64	100	88.9	9.8

Correlation analyses revealed that age at testing negatively correlated with education in years, working memory scores and literacy (Table 5.4). In other

words, ‘oldest old’ individuals are more often low-literate and lower educated than their ‘younger old’ peers. Furthermore, the higher an informant’s age, the fewer verbs she uses in her L2, and the fewer sentences she can construct (Table 5.5).

Table 5.4: Age at testing in relation to education, working memory, literacy and wellbeing.

LoR	Education	CorsiFWS	Corsi BWS	Literacy	CASP
$r = .113^*$	$r = -.598^{**}$	$r = -.565^{**}$	$r = -.493^{**}$	$r = -.657^{**}$	$r = -.224$
$p = .010$	$p = .000$	$p = .000$	$p = .002$	$p = .000$	$p = .154$

Table 5.5: Age at testing in relation to the different language measures.

Tnarr	TTR	Sentences	Inflected verbs	V/Tnarr	V+N/Tnarr
$r = -.439^{**}$	$r = .286$	$r = -.445^{**}$	$r = -.262$	$r = -.349^*$	$r = .105$
$p = .005$	$p = .078$	$p = .005$	$p = .107$	$p = .030$	$p = .525$

Literacy level correlated positively with years of education and working memory scores (Table 5.6). Furthermore, those informants with higher literacy skills perform better on the lexical measures related to sentence formation (Table 5.7).

Table 5.6: Correlations between literacy level and education, language measures and working memory.

Educa- tion	Sen- tences	Tnarr	Inflected verbs	V/Tnarr	Corsi FWS	Corsi BWS
$r = .656^{**}$	$r = .498^{**}$	$r = .399^*$	$r = .350^*$	$r = .550^{**}$	$r = .361^*$	$r = .323$
$p = .000$	$p = .001$	$p = .013$	$p = .031$	$p = .000$	$p = .044$	$p = .059$

Table 5.7: Correlations between V/Tnarr and education, number of sentences, total narrative words, proportion of inflected verbs, literacy and age.

Education	Sentences	Tnarr	Inflected verbs	Literacy	Age
$r=.455^{**}$	$r=.761^{**}$	$r=.488^{**}$	$r=.713^{**}$	$r=.550^{**}$	$r=-.349^*$
$p=.004$	$p=.000$	$p=.002$	$p=.000$	$p=.000$	$p=.030$

The correlation plots with Loess smoothing curve for working memory and literacy level and education and literacy level are provided in Figure 5.1. In addition, the wellbeing measure (CASP) did not correlate with any of the other measures, suggesting the absence of a relationship between L2 competence and wellbeing. The variation in wellbeing scores in relation to L2 proficiency is plotted in Figure 5.2 below.

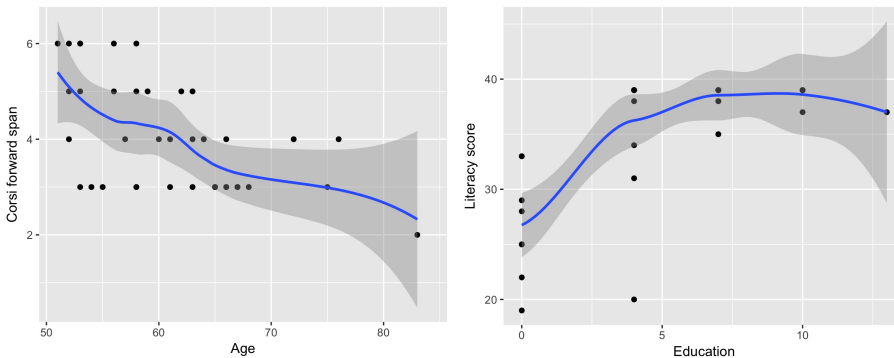


Figure 5.1: Correlation plots with Loess smoothing curve for working memory and age (1) and literacy level and education (2).

A one-way ANOVA analysis on the different wellbeing levels revealed again no relationship of any of the variables with the CASP measure. A Tukey post-hoc analysis showed a relational trend for V+N/Tnarr where the difference between the very low/low and moderate group in relation to the CASP measure approached significance (standard error=4.909, $p=.038$).

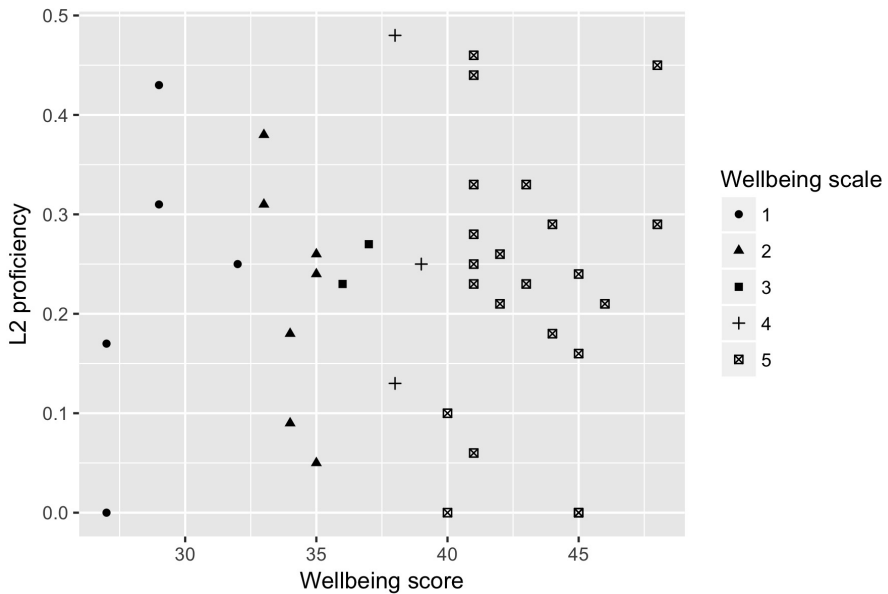


Figure 5.2: Variation in wellbeing scores in relation to L2 competence, operationalised as total amount of verbs relative to the number of total narrative words.

As the informants were selected from both urban and rural settings, we checked whether the environment made a difference in the analyses. To this end, we coded the different cities and towns with regard to the density of the Turkish population in that area (taken from the CBS (2013) data), thereby excluding Leeuwarden and Almelo because the data included only one informant from these cities.

An ANOVA on the place of residence revealed a negative significant difference between the places for years of education only ($f=4.935, p=.001$). Tukey post-hoc analyses revealed that this difference was significant or near-significant for the towns with a smaller Turkish population, Goor and Rijssen, as compared to the cities of Nijmegen and Groningen.

Power issues due to the small sample size require these analyses to be interpreted with great caution. They serve as an exploratory analysis to view potential

trends in the data and the significant interactions are used as indicators for the interpretation of the interview data below.

5.4.2 Interview data

The quantitative data revealed no direct effect of L2 competence on wellbeing levels. The analyses did not detect an indirect relationship. To this end, we analysed the content of the interviews quantitatively. A few patterns in the quantitative data can be detected with regard to stressors for wellbeing levels. Some older adults report low wellbeing levels because of a poor health status, which may hypothetically limit their opportunities to engage in social interaction and makes them prone to feelings of loneliness. Other informants, however, may be content with their lives due to the presence of a strong social support network, even though their health situation is relatively low. Below, in Table 5.8, stressors for wellbeing levels at the lower and higher end of the spectrum are listed (omitting factors that, at the group level, have been shown above to correlate with wellbeing). These may act as resilience resources and below are illustrated with excerpts from the interviews (limited in number for reasons of space).

Lower wellbeing	Higher wellbeing
Poor health status	(Generally) better health status
Feelings of L2 anxiety/ incompetence	Absence of L2 anxiety
Absence of a social support network	Social support network in L1 and/or L2
Absence of feelings of belonging	Presence of feelings of belonging

Table 5.8: *Individual stressors for differential wellbeing levels from the interview data.*

5.4.3 Health status

All informants who show low wellbeing levels note physical constraints as a main influencing factor. These constraints in turn limit individuals to participate in

activities and keep up social relationships (1). A limited level of L2 proficiency in combination with a low health status further reduces mobility and interaction opportunities (2).

1. 03RO17 (56): “I divorced my husband and things got moving. I started a language course. I found a job. I took driving lessons and went to swimming lessons. But my health problems forced me to stop”.
2. 05R16 (72): “I cannot go anywhere. I do not go anywhere. I just sit here. I sometimes go grocery shopping; that is easy. Then I just take what I need and check out at the register”.

5.4.4 L2 anxiety

A low L2 competence may lead in some cases to shame and avoidance of speaking Dutch (3). Strategies for lowering this anxiety relate to group formation (4) or determination/motivation to improve L2 competence (5).

3. 07GR17 (58): “I feel inferior when I’m talking to a Dutch person. I avoid communication. The less I speak, the better. That is how I feel”.
4. 02R16 (62): “The people I worked with at the factory were all Turkish as well[...]. Things that I did not know or was unsure about, we could ask each other. What one person did not know, the other knew”.
5. 01L17 (61): “If you don’t know the language, you’ll look at people’s faces and you would not understand anything. I experienced this myself, so I told myself that I’ll learn it no matter what”.
6. 04V16 (translated): “In the 1990s, there was a Dutch course at the Turkish society. There I noticed that I did not speak correctly. I use the wrong language forms and sentence constructions. After this, I was ashamed to visit the doctor and to engage in activities. So I quit doing that. I could express myself, but felt ashamed and anxious to speak, still.”.

5.4.5 Social network

Higher levels of wellbeing are observed when informants note the presence of a social support network. The importance of a social support network in the absence of L2 competence is illustrated in (7), and is especially true for accessing healthcare services (8).

7. 03H17 (61): “When there’s something important, I would like to have someone with a strong language knowledge with me, because I am afraid of telling the wrong things. Sometimes I take a friend with me in these situations, but not all the time.
8. 04GR17 (55): “We were going to the doctor with someone else in our first years in the Netherlands, but now we have the courage to go on our own. Now I’m going and if I don’t understand I simply ask my doctor for clarification. [...] I have to, because my children are working night and day. They cannot follow me around to supermarkets or doctors”.

A social network is typically formed through family connections, connections in the immediate neighbourhood or work contacts. Yet, as (8) shows, social support cannot always be provided.

5.4.6 Belonging

Experiencing positive emotions with social relationships makes informants experience a high sense of wellbeing, regardless of proficiency level. The ability to form social connections may relate to a sense of belonging (9). Nonetheless, many informants note living in-between two cultures (10) and some express the wish to return to Turkey (11). In turn, and in line with ethnolinguistic vitality theories, feelings of belonging impact L2 investment (12).

9. 02GR17 (58): “I have a Turkish speaking network. What can I talk about with the Dutch anyway? I say ‘moi’ when I see them around the door. There are a lot of differences between our culture and theirs”.
10. 04N17 (60): “We’re foreigners here and ‘Almanci’ there. We’re not Dutch or Turkish”

11. 01GR17 (52): “I would like to take my kids on my wings and fly to Turkey. I dream about being a bird sometimes so I could fly to my home, see my neighbours and friends”.
12. 04GR17(55): “I don’t watch [television] in Dutch at all these days. I feel like I’m living in Turkey because I always watch Turkish channels”.

5.5 Discussion

The present study explored new terrain in migrant and aging research by examining the often reported language barrier in migrant (health-related) aging processes through a set of quantitative language and cognitive measures and qualitative interview data. The quantitative measures revealed the heterogeneity of the group of female older Turkish informants. Overall, working memory performance declines with advancing age, and the informants at the older end of the spectrum show lower levels of education and literacy skills. In combination with insights from the qualitative interviews, individual differences with regard to the maintenance and (potential) detrimental impact of a limited L2 proficiency on aging and wellbeing are observed.

The quantitative data reveal that the population under scrutiny markedly differs in cognitive, physical and social/life-style factors. Age of individuals correlates with education, working memory score and literacy level, meaning that the ‘oldest old’ adults show lower working memory performance, lower levels of education and generally have underdeveloped literacy skills. These relations are not surprising, as clear links between education and literacy level have been established by studies in the past (Howard et al., 2006; van der Heide et al., 2013).

Considering the language measures in this study, there is a visible trend towards less complex sentence constructions by older individuals. Moreover, lower educated and low-literate individuals use fewer (inflected) verbs, which corresponds to findings from other low L2-literate populations (Tarone et al., 2009). We know from studies on language learning by low-literate individuals that they typically lack metacognitive and metalinguistic awareness (knowledge about language), which may hamper their language learning in traditional classroom settings (Kurvers et al., 2015; Tarone et al., 2009). It is necessary to point out, how-

ever, that some individuals are low-literate in general, whereas others have literacy skills in their L1, but lack L2 literacy skills.

As becomes apparent in the interview data, often the lower educated and low-literate individuals have had limited opportunities to interact and practice Dutch. Taking care of the household, sometimes in combination with factory work with other Turkish colleagues, prevented the adults from attending language classes and investing time in learning (see quotations 4 and 9). In addition, the initial living conditions (see section 5.2.1) promoted the formation of dense L1 networks, through which the need to learn the L2 was low and, currently, these older adults rely heavily on their family and/or L1 support network for linguistic assistance. If this network/support is absent, as in quotation 8, linguistic insecurities need to be overcome to be able to manage (health) communication in the L2. Otherwise, L2 anxiety may promote isolation (see quotation 2). Moreover, limited learning skills – as a result of limited educational experience and literacy – in general may have contributed to negative experiences with and subsequent avoidance of language learning classes and L2 interaction. Quotation 6 is in this regard of particular interest.

Linguistic insecurities are specifically heightened in medical settings, where communicating important information can make the difference between an adequate or inadequate treatment. Whereas (informal) interpreters at important meetings are preferred (recall the Ghent study by De Maesschalck et al. (2011)), the interview data show that informal interpreters are not always available or may not fully disclose all information (see quotation 7). There seems to be a linguistic trade-off between either involving an interpreter in healthcare communication and not disclosing or communicating all information (correctly), or communicating without an interpreter through which expressing complaints and emotions is limited, and L2 insecurities may be heightened.

The quantitative data also show marked differences in wellbeing levels within the group of older Turkish adults. Although these are not directly related to L2 proficiency (see Figure 5.2) the interview data, in line with Palmberger's (2017) observations, reveal that stressors that mark a change in wellbeing levels are related to social aspects of aging, attitudes towards the L2 environment and a sense of belonging. In other words, L2 proficiency may modify social behaviour, and, by consequence, indirectly influence wellbeing levels. Although in communicative

L2 settings this leads to the language barrier reported in the (health) literature, not in all cases does this barrier increase the likelihood of becoming vulnerable or prevent access to healthcare and -information. Those older adults with a lower level of L2 proficiency are not necessarily worse off healthwise, or feel less well, as long as they are firmly embedded in a social network (see quotation 9).

L2 interaction through work or neighbourhood contacts fuels the creation of social relationships in the L2 and, in turn, promotes situational belonging (reminiscent of Wei's (1994) vicious circle). Contrastively, the dominantly Turkish-speaking network of most of the informants (see the quotations in section 5.4.6) typically supports attachment to Turkish culture and the maintenance of the Turkish language, reinforced by TV input and contact with family members in Turkey. This links back to the high ethnolinguistic vitality of Turkish in the Netherlands (see section 5.2.2). A meta-analysis on acculturation and mental health suggests that being oriented towards both cultures is associated with the lowest (mental) health issues and low risk for depression (Yoon et al., 2013).

Nonetheless, a firm embedding in a social L1 network, where dependency on family is high but L2 insecurity low also allows older migrants with a low L2 competence to age 'well' in a linguistically familiar environment where they feel at home. Based on the interview data, we have tried to capture this relationship between language, wellbeing and social network in Figure 5.3.

The triangle in Figure 5.3 illustrates three of four distinguishable positions relating to language, social support and wellbeing within this group. On one side of the triangle there are the older adults who have a relatively high L2 proficiency and a high sense of wellbeing, but perhaps a weaker social support network (or have stressed this less in the interviews as for them social support (relating to language) is less necessary). They are often independent and demonstrate low levels of L2 anxiety.

On the opposite side are those individuals who have a strong support network and a high level of L2 proficiency, but low wellbeing levels. These older adults also exhibit low levels of L2 anxiety, but often have physical or mental health problems that markedly lowers their sense of wellbeing. On the third side of the triangle are those older adults with a firm embedding in an L1 support network, who can get by without much L2 knowledge because of a heavy reliance on others. These older adults are dependent, but, when in L2 situations, often show higher levels

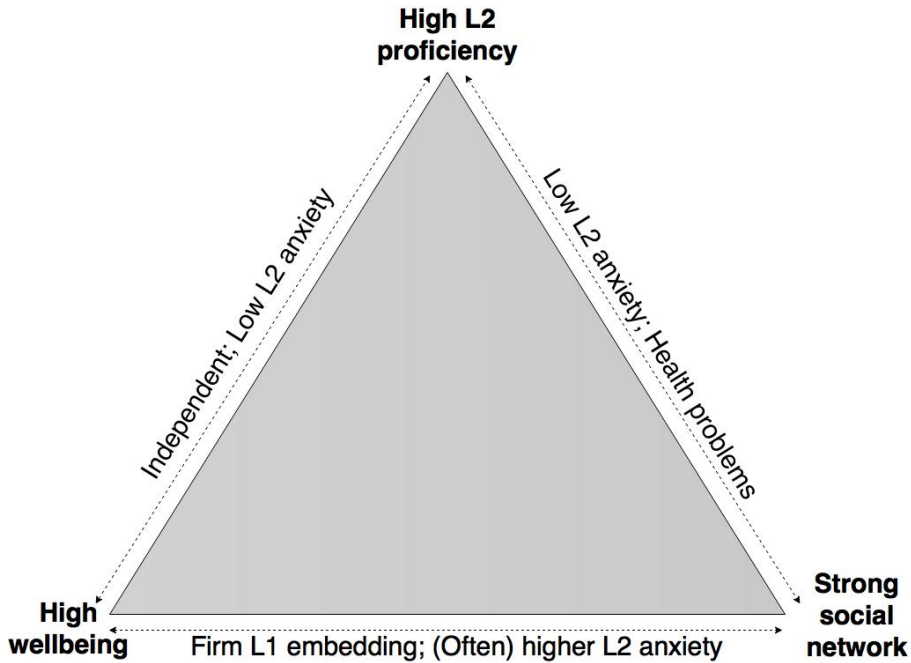


Figure 5.3: Schematic representation of the interaction between language, wellbeing and social network.

of L2 anxiety.

There is a fourth position, that falls outside these boundaries and is thus not pictured in the triangle, whereby individuals have both a low sense of wellbeing, low social support and low L2 proficiency. These older adults, of which there are three in the current dataset, spend most of their time indoors and often report physical or mental health problems. Quotation 2 is an example of this fourth, detrimental scenario.

These four scenarios are not rigid and individuals may move between corners of the triangle depending on changing social, linguistic or health-related circumstances. As such, this model does not constitute a typology of language use and wellbeing by which all individuals fit neatly into different corners of the triangle, but rather serves as an illustration of the individual variations regarding

language behaviour and sense of wellbeing that are present in the interview data. A small group of individuals in the sample has invested in language courses at a later age (see quote 1 and 5) or overcome their linguistic insecurities and gained more independence (see quote 8). Other individuals see their (neighbourhood) network crumbling as result of old age or remigration of neighbours/friends. For this group, an acute loss of social support may result in withdrawal from social interaction and heightened linguistic insecurity. Loss of linguistic resources to maintain independence can be compensated for by the presence of a family support network, but this may also work the other way around.

As such, the triangle also highlights to some extent the dynamic role that language occupies in studying migrant aging. As becomes evident from the interviews, individual migration trajectories, but also notions of acculturation and ethnolinguistic vitality, as well as a deficit or experience-oriented perspective on aging (see section 5.2.4) shape language and social experiences that in one individual culminate in high linguistic insecurity and low social interaction, and in others a willingness to master the L2 and strengthen L2 social network ties. In combination with an individual's initial conditions, such as educational level, literacy skills, place of residence, and life-experiences (e.g. heavy factory work, household duties, and the idea of 'temporality', which may have culminated in a form of pendular migration whereby individuals divide their time between their country of origin and the host country), the impact of language on aging trajectories is highly individually distinct.

This subsequently makes the 'language barrier' difficult to study from a methodological point of view. Here, we have highlighted only the most foregrounded factors in this particular sample of informants relating to the linguistic influence on aging processes, as there are many more (e.g. acculturative stress in acculturation processes, see Jang and Chiriboga (2010)). Language is a contextually-embedded variable and as such cannot be studied in isolation from other 'confounding' factors. Of course, it is important to consider demographic, lifestyle, health and cognitive characteristics when assessing the impact of a social variable such as language on the aging process, yet controlling for all of these factors creates a distorted picture of reality.

A combination of both quantitative measures, background measures and interviews to distinguish individual life trajectories, allows to gauge the differential

impact of these confounding factors on L2 development and language usage. We stress, therefore, that the outcomes of this study are only to a certain extent generalisable to a wider population of older migrants. Nonetheless, this study is, to our knowledge, the first to systematically investigate the effects of the often-reported ‘language barrier’ on migrant aging. Sometimes, a limited L2 proficiency does result in a language barrier and steer the aging process in a detrimental direction, but this may be circumvented through an older migrant’s firm embedding in an L1 support network.

5.5.1 Limitations

One could ask whether issues of language are related not to competence in the L2 but rather result from overall lower linguistic abilities. The correlation of literacy level and education with L2 competence in this study does suggest that a lower degree of literacy restricts linguistic abilities, something that is also highlighted in the literature on language learning and literacy (lower meta-linguistic awareness, see Kurvers et al. (2015)). For these older adults, the absence of literacy is also problematic in an L1 environment. To this end, insight into their L1 abilities would have been useful, yet for the understanding of the influence of the L2 environment and L2 competence on the larger picture of aging this added information is not a necessity.

In addition, the study raises some methodological issues. Informants were interviewed in different settings that likely have influenced their ability or willingness to share information. Sevinç and Backus (2017), who used a similar methodological approach (interviews), note that in their responses, majority language anxiety levels were generally higher for self-reports when the interlocutor was a native speaker. It could well be that individuals showed a heightened level of anxiety when confronted with questions in Dutch. The informal interpreter who was present, however, acted as a mediator, also on an emotional level, because he or she had a bond of trust with the informant, which allowed the informants to open up and share their emotions. For those interviews directly administered in Turkish, speaking one’s mind may have been easier, yet has similar drawbacks. The male gender of the interviewer, first of all, may have limited the female informants to talk about personal issues and emotions and, secondly, there was no

established trust-relationship between the interviewer and informant, which may have made some individuals refrain from extensively discussing certain subjects.

This is connected to the likely biased informant sample. We have tried to obtain a heterogeneous informant sample by recruiting informants from different parts of the Netherlands, smaller towns as well as larger cities, and from a variety of socio-economic backgrounds (most pronounced in the differential level of education). Nonetheless, participation depends on availability and it is likely that we have not reached the most vulnerable individuals in the population. Despite these limitations, however, the group shows a large degree of individual variation.

To be able to tease apart low literacy and L2 proficiency from socio-economic status or ‘the migrant experience’, we have tried to include an equal number of native Dutch low-educated, low-literate adults. We obtained five datasets (interviews + tasks) from L1 native Dutch adults from a variety of backgrounds, which is not enough to contrast with the Turkish informants. The common denominator of these five interviews was the *shame* that is associated with limited literacy skills and which leads to avoiding certain social situations. This is markedly different from the factors resulting in social avoidance for the Turkish group, for whom low literacy is much more readily accepted by the native Dutch interlocutors. This finding underscores our decision to analyse the Turkish informants on a continuum (see section 5.3.1).

5.6 Implications and conclusion

In a society of which its older population is expanding, health-care policies are geared towards providing efficient care with limited financial and professional means (also see the previous chapter). In the Netherlands, this meant a transition in the organisation of the health-care system towards a more liberal model that was realised in early 2015 (van de Schroot and de Jong, 2014). Individuals are encouraged to remain (living) independent with the help of their own social network. Encouraging individuals to invest in developing L2 skills may significantly lower L2 anxiety and increase health-related independence.

An interesting avenue for an intervention study to promote L2 use among this older migrant group may be through the concept of languaging addressed in section 5.2.4. From the interviews it becomes apparent that most older adults

with a low proficiency tend to avoid L2 communicative situations, yet can get by with some rudimentary Dutch phrases (at the supermarket, at the doctor) that they acquired during their extensive stay in the Netherlands (see e.g. quote 8). As it has been proven that meaningful and effortful communication in the L1 can significantly boost an individual's cognition (and self-worth), engaging in communication in the L2, by building on what the participant already possesses of L2 knowledge and extensive scaffolding, L2 anxiety can be lowered and cognition may be enhanced (see Pot et al., 2018b).

This study has contributed to our understanding of the differential impact of a limited L2 proficiency on the aging process and, moreover, has highlighted the embedded nature of language in (social) aging processes. Some individuals avoid L2 interactions and build a strong L1 support network, which allows them to age relatively well in an L2 environment. When social opportunities are limited, however, older migrants may need to overcome linguistic insecurities to avoid isolation and loneliness, with differential rates of success.

CHAPTER 6

Enhancing language awareness to promote wellbeing

Abstract | This chapter concerns the abilities and resources that exist for older adult migrants to take up second/foreign language learning in their so-called ‘Third Age’ in the Netherlands. The previous chapters (4 and 5) have outlined the language barrier that exist for some older individuals with a limited L2 proficiency in accessing healthcare and information. Learning the language of the environment, however, has proven to be challenging, especially for low-literate individuals. Other than for other third age groups, such as retirees who spend their holidays in Spain and learn the language for pleasure, for the group of older Turkish adults in society, and in particular their older women, foreign language learning is more of a necessity to enable healthy aging, as we have seen in the previous chapters. This chapter provides an extensive overview of the materials available for older, low literate language learners in the Netherlands, and reviews the best practises in this regard. The aim of the chapter is to provide an illustration of possible undertakings to set up language interventions to stimulate L2 proficiency and lower L2 anxiety among low-literate adults.¹

¹This chapter has been slightly adapted and is published in: Pot, A., Keijzer, M.C.J. and de Bot, K. (2017). Enhancing language awareness in migrants’ third age to promote well-being. In D. Gabryś-Barker (ed.), *Third Age Learners of Foreign Languages*. (176-200). Multilingual Matters.

6.1 Introduction

Because of increased life expectancies combined with increased international mobility, many people in Western societies grow old in an environment where their mother tongue is not the dominant language. For a majority of these 'Third Age' migrant second language (L2) learners, mastery of the dominant language is a necessity in obtaining, or maintaining control of their aging process: increased physical and mental frailty intensifies healthcare needs within this group, for which, in order to obtain the desired form of care or assistance, linguistic knowledge is pivotal (see the previous two chapters). Without the necessary language skills and a weak social support network part of the group of older migrants are at risk of becoming isolated from society (see Warnes and Williams, 2006; Gardner, 2002; Treas and Mazumdar, 2002). Paradoxically, not everyone in this group possesses the necessary skills (literacy, educational experience) and motivation to take up and succeed in language learning. This poses a unique challenge for older adult second language acquisition (SLA) research.

One of the countries that witnessed a considerable increase in migration after WWII, and that will be the focus of this study, is the Netherlands, whose 'first generation' of migrants - mainly labour migrants from Turkey and Morocco- are approaching the age of retirement (age 65) and are thus now growing old in an L2 environment (van Duin and Stoeldraijer, 2014). From the outset, a substantial number of these older migrants in the Netherlands have failed to reach a sufficient level of Dutch to communicate meaningfully and independently with other members in society (Yagmur, 2011). This is especially the case for migrants with a Turkish background and lower-educated and/or female migrants (Kotwal, 2010). Whereas for the largest parts of their lives communication in Dutch was hardly necessary, as this group ages and their social circle closes in, they need access to healthcare and other social facilities, and thus need the Dutch language in order to communicate more than ever before.

In addition to the social necessity of language learning for this group, research in the field of cognitive aging attests that certain lifestyle variables, such as engaging in physical activity, but also partaking in learning activities may boost cognition and may perhaps even slow down neuropathological damage (Antonou et al., 2013; Duñabeitia et al., 2014). If, therefore, the use of language and

L2 learning can be promoted or stimulated in older, low-literate adults, we might observe beneficial effects in the social domain (gaining more independence), cognitive domain (potential transfer effects) and perhaps even physical domain of aging.

The focus of this chapter is on the special group of third age migrant language learners who may benefit from L2 learning on two levels: the practical, interactional level; to access healthcare and improve quality of life, and the internal, brain level, where language learning may be a stimulating cognitive event that transfers to other cognitive domains. However, this group requires a different approach than most other third age language learners because their learning skills are less well developed as a result of a limited education and often low literacy skills.

We know that language learning at a later stage in life is met with cognitive and motivational/social challenges that differ from early language learning (Singleton and Ryan, 2004)). Also, education seems to be a predictor of SLA success at a later age (Li et al., 2014). Moreover, based on the studies that show that L1 and L2 acquisition are fundamentally different processes (Saville-Troike, 2012), it is likely that, specifically, low-educated, often illiterate language learners may be constrained by a lack of explicit learning skills and strategies and a lack of metalinguistic knowledge. In order to engage this group in language learning, knowledge on specific low-literate learning and teaching strategies is crucial in order to guide the L2 learning process and observe cognitive and social benefits. To this end, the chapter builds up to a discussion of the currently available teaching methods and materials of Dutch as a second language for low-literate (older) migrants in the Netherlands.

Before delving deeper into the workings and effectiveness of the available learning materials with regard to social L2 enhancement and possible cognitive benefits, the next part of this chapter presents an overview of the literature on cognitive aging, with a particular attention to the relationship between foreign language learning and cognitive and social wellbeing.

What follows is an investigation into the workings and effectiveness of those L2 (Dutch) methods that have been designed and implemented over recent years in the adult L2 learning classrooms in the Netherlands. The chapter then finishes with an assessment of those materials or teaching elements that display the

most potential in engaging low-literate older L2 learners in language learning, and whether, in reference to the literature on cognitive aging, L2 learning for this special third age group could indeed be beneficial to their social and cognitive health.

6.2 Background

6.2.1 Defining aging

Although this chapter focuses on ‘Third Age’ language learners, this label is, in this particular case, not entirely accurate. In the definition of Laslett (1987), the Third Age denotes an era of ‘personal achievement and fulfilment’, after a period of ‘maturity, responsibility and earning’ (the Second Age) and before the era of ‘final dependence’ (the Fourth Age) (1987, pp. 134-135). When viewing age as a chronological variable, the older migrants in this study (roughly between 50-70 years of age) have indeed reached their Third Age – when the responsibilities of a working life are a concern of the past and they can enjoy their retirement.

However, for the majority of this group, their daily lives more closely resemble the ‘Fourth Age’. They do not have the physical strength or social/financial means to live as a Third Ager and have generally, perhaps already when they would still be categorised as Second Ager, reached a stage of great physical deterioration and are largely dependent; van der Wurff et al. (2004) note a higher degree of physical limitations among older migrants compared to Dutch natives, which in turn were found to be related to symptoms of depression, and (Uitewaal et al., 2004) indicate a higher prevalence of type-2 diabetes for Turkish immigrants. Therefore, although these labels may provide a crude categorisation of age, for the study of aging these definitions fall short.

In order to objectively define age, it is much more useful to consider aging as an integrated individual process of biological/physical, psychological and social factors that interact and foster change over time. In this way, changes in the physical domain, such as for example stiff joints or hearing loss, may foster psychological changes and influence one’s social life: a declining confidence to perform daily activities, decreasing mobility and retreating from communicating in noisy environments, for example (Christopher, 2014; de Bot and Makoni,

2005).

6.2.2 Cognitive aging

Finding the underlying causes of and means for optimal (cognitive) aging are currently hot topics in aging research, with a great emphasis on countering cognitive impairments and degenerative diseases such as Alzheimer's disease. With increasing age, aspects of cognition decline, roughly explained as resulting from a loss of functional brain connectivity (Damoiseaux et al., 2008). This may be observed in a slowing of information processing speed (Salthouse, 2000), reduced working memory capacity (Engle and Kane, 2004), and deficits in inhibitory control (Verhaeghen and Cerella, 2008), but also speech production, and perception (Burke and Shafto, 2008; Wingfield and Grossman, 2006).

Cognition research more or less consistently reports that certain lifestyle variables, such as physical activity, occupational status, and also partaking in educational activities may have a positive effect on cognition, and may even slow down or delay neuropathological damage and associated mild cognitive impairment (MCI). Termed 'cognitive reserve', these lifestyle benefits may functionally alter neural pathways and connections and as such induce either a higher threshold for brain injury to take effect (Satz, 1993) or help sustain brain plasticity through calling upon alternative neural networks to perform a cognitive task (Stern, 2002). If cognitive decline can indeed be slowed down by being actively engaged in cognitively stimulating activities (Hall et al., 2009; Wilson et al., 2003) – both studying the effect of cognitive stimulation on delayed cognitive impairment and dementia, then learning may be an important asset in advancing optimal aging (see Kliesch et al., 2018).

What is more, it has been claimed that speaking multiple languages boosts cognitive activity and helps delay the onset of cognitive impairment (most widely cited and critiqued is the 4-year delay in the onset of dementia as found by Bialystok et al. (2007), see also Woumans et al. (2015)). As bilinguals constantly need to juggle both languages, and have to inhibit one when speaking the other, they allegedly have an increased inhibitory control mechanism, which, in turn, allows them to regulate and control their attention in a host of other (non-linguistic) cognitive tasks.

Over the last decade, this so-called ‘bilingual advantage’ has been extensively debated (e.g., Paap et al., 2015) and, mostly because of methodological inconsistencies, been downscaled to a possible positive contributor to cognition for only a small set of balanced bilinguals and active but not inactive bilinguals (see a recent publication by Keijzer and Schmid (2016), who call for an individual differences approach in bilingual effect studies, and de Bruin and Della Sala (2016)).

Yet, foreign language learning might be beneficial to cognition. Antoniou et al. (2013) review the neurological and behavioural underpinnings of cognitive reserve, bilingualism, and language learning, and hypothesise that neurologically, FL learning requires ‘long distance neural connections’ for which it recruits ‘a larger brain network than other forms of cognitive training’, especially since the neural network involved in language learning shows considerable overlap with the network of age-related cognitive decline (2013, p. 2693). Thus, learning a new language qualifies as a cognitively stimulating activity and may be a fruitful asset in maintaining cognitive functioning (also see Kliesch et al., 2018).

Of course, it is doubtful whether, when training one cognitive aspect, this benefit transfers to other cognitive domains (Grant et al., 2014). Willis et al. (2006), for example, found that cognitive training resulted in improved cognition only for the abilities that were targeted. General transfer effects were also noted for the bilingual advantage – inhibitory effects could be a general boost of executive functions – but this is not always consistently found (e.g., de Bruin et al., 2015). Moreover, in reference to Kliesch et al. (2018), it can be questioned whether language training generally boosts cognitive performance, independent of other individual contributing factors such as physical fitness, SES, level of education, and so forth.

A recent study by Ramos et al. (2017) is one of the first experiments to test whether L2 training at an old age may enhance domain-general executive control. They trained 26 Spanish monolingual elderly speakers in Basque for a year, and recorded their performance on a colour-shape switching paradigm before and after the training. Hypothesising that foreign language training may boost switching between mental sets and increase inhibition ability, they failed to find a significant difference in switch costs between their experiment and control group (Spanish monolinguals who received no L2 instruction). Although the participants acquired basic knowledge of Basque, their executive functions, opera-

tionalised as switching and inhibiting, did not improve significantly.

This finding is interesting in light of the research on brain changes following cognitive exercise. In an overview on structural brain changes and cognitive exercise, Li et al. (2014) note that although learning other skills at an older age, such as juggling, shows cognitive effects as soon as a couple of weeks into training, for language it takes much longer, with the shortest term effects having been observed after three months of intensive training. The year-long Basque language training is a substantial time period which, in line with Li et al. (2014)'s review and Antoniou et al. (2013)'s proposal, would expectantly have yielded some cognitive effects. Absence of any significant difference could perhaps be due to the measure of cognitive control performed. Ramos et al. (2017) looked at improved switching ability, as supposedly it is better in demonstrating transfer-effects emerging from bilingualism, as opposed to e.g. inhibitory control (as switching is regarded to reflect a broader spectrum of processes, of which inhibition is only a part) (Paap et al., 2014). For lifelong bilinguals, sustained switching and inhibiting abilities have been inconsistently reported (cf. Prior and MacWhinney (2010) but see Paap and Greenberg (2013)) and thus also for late L2 learners, switching ability proves to be a problematic measure.

6.2.3 Social benefits

Cognitive abilities stretch further than executive functions, and benefits of (language) learning may indirectly be observed in remoter, subjective areas related to (social) wellbeing: Shapira et al. (2007), for example, observed enhanced cognitive abilities that subsequently increased wellbeing for older adults after completion of a computer course. This social aspect of aging is, however, still greatly overlooked as most emphasis is placed on cognitive aging. Also Ramos et al. (2017) make no provision about social engagement benefits, even though cognitive engagement and stimulation, especially through language learning, may have reciprocal effects in the social or biological domain of aging (recalling aging as a process in which these three domains interact and change over time; de Bot and Makoni (2005)). It is not only a meaningful activity; it also stimulates social participation and interaction and increases independence for this group (see Antoniou et al., 2013). Very practically, being able to communicate independently with the

doctor, the household help, or the taxi driver literally broadens an individual's horizon and strengthens his or her self-worth and wellbeing. Research on these experiential effects remains, however, scarce.

6.2.4 Age and second language learning

In his chapter on 'really late learners' Singleton (2018) discusses the age factor in language learning and notes that research is not conclusive on the earlier=better point of view. Although older L2 learners may face learning difficulties pertaining to either their (differentially) deteriorating cognitive disposition or what Singleton terms 'age-related defeatism', there are certain areas in which older learners do very well, such as vocabulary learning. Moreover, in line with Li et al. (2014) and what is said above, Singleton hints at the beneficial value of FL learning for cognition, brain plasticity and memory. But although the brain does remain plastic enough to learn new skills, there is evidence that older adults learn in different ways. Antoniou et al. (2013) note motivation as a crucial component, which can be enhanced through making sure that the learning material has immediate practical value and is rewarding. This resonates with previous research on meaningfulness or having a purpose in life, which contributes to healthy aging (Boyle et al., 2009). The section on language learning below explores this in more detail.

6.2.5 Language learning in a dynamic, usage-based framework

From the above discussion on cognition it has become clear that it is still possible to learn new skills at a later age and that this might possibly be beneficial to cognition in general, but also transfers to social and biological aspects of aging. Still, the notion that older people struggle more with learning persists. As Marinova-Todd et al. (2000) suggest, these struggles are much more likely due to the social and psychological environment in which a language is learned. As such, rather than regarding the language learning process as an isolated event that is systematically influenced by distinct factors such as age, it makes more sense to view language as an individual and dynamic system that changes based on the interaction with its environment.

This view is at the core of Complex Dynamic Systems Theory (CDST), which posits that language is a dynamic system and (second) language learning is a highly individual process with lots of variability, both internally in the form of an individual's initial (cognitive, biological and social) conditions, and externally in the availability and type of input. These factors are in constant interaction and continuously shape and change the language system. Development progresses in a non-linear way, with instances of rapid development or transitions (phase-shifts) when new patterns of use emerge through self-organisation of the system following iterations of the input (De Bot et al., 2007). An individual's learning trajectory may therefore be highly idiosyncratic: s/he is making sense of the input using his/her available internal and external resources, through which 'mistakes' may sometimes be made that, according to a linear view of language development, the learner should already have mastered. These ideas resonate with the finding by Kliesch et al. (2018), of the complex and individually distinct array of factors involved in attaining learning success. As such, they hold valuable insights for language pedagogy and teaching practice, where this contextually embedded view of language development is compatible with a usage-based (UB) framework of language learning (Verspoor and Phuong, 2015).

UB theory regards language learning as a bottom-up process that is exemplar-based and always rooted in (social) context. Increased exposure to exemplars of a language (through authentic input) leads to better entrenchment and the ability to abstract away from the idiosyncrasies of the input and note patterns (form-meaning mapping) (Roehr-Brackin, 2015). Frequency of occurrence, prototypicality of meaning and contingency of form-function mapping are key elements in constructing linguistic categories that shape an individual's L1 (Ellis et al., 2014).

From a UB and a CDST perspective, the learning environment plays a crucial role in the language learning process. The concepts in UB-theory, together with the insights from cognitive aging research may inform a set of best practices or optimal learning strategies for older adults learning a second language.

6.2.6 Best practices in (older) adult L2 learning and instruction

Best practices in older adult language education have developed little since the 1980s, when Joiner (1981) devised an optimal, goal-driven (building communica-

tive competence) learning programme with individualized, self-paced instruction at its core, and the inclusion of real-world materials to link learning to practice and boost motivation (an ‘immediate payoff’ (1981: 33)). Similarly, Schleppegrell (1987) argues that building self-confidence and lowering anxiety are core elements that enable successful learning. Therefore, fast-paced, irrelevant (i.e. not directly applicable to practice), error corrected teaching has a negative effect on older adults self-confidence and motivation to learn.

In a recent book on adult classroom (L2) learning, Johnson (2015) reiterates most of the above strategies, additionally stressing that an adult’s life experiences are the richest source of learning. She therefore calls for a ‘post-method’ approach to language teaching, where language learning always occurs in a context where internal and external factors shape the learning process (motivation, identity, and intercultural competence). Especially intercultural competence (the ability to move between cultures) is a critical feature to minimize the social and psychological distance of learners to the target culture and thus enable successful learning (Johnson, 2015, p. 44). Also, repeated exposure to input helps learners to not only consolidate certain language patterns, but it is also a useful strategy in building language awareness. Each time a learner is confronted with the same input, s/he pays attention to something different, and as such forwards learning. As the language system thus goes through similar iterations, complex patterns may emerge that change the system and direct the learner’s development (Verspoor and Phuong, 2015).

Of similar importance is the provision of a stress-free environment. Stress, and resulting language anxiety negatively influences success in language learning and may come about through a (high-stakes) environment in which an individual learner feels threatened, inexperience with (certain types of) instruction, or a lack of self-confidence (Pavlenko, 2005) and this effect may be strongest in older adults. Also, Antoniou et al. (2013) stress the importance of fundamentally different learning conditions for older and younger learners, and that mixed learner groups are therefore detrimental to the learning process. However, mixed-learner groups may be favorable on a motivational level. Both Kliesch et al. (2018) and Singleton (2018) remark that language classes of only age-peers may be unappealing, especially when the reason for taking up language classes (partly) concerns broadening one’s social environment.

On a cognitive level, finally, it has been argued that the more complex learning materials have been shown to result in the greatest benefits for older adults. A course on digital photography skills was found to be much more beneficial than learning to quilt (Park et al., 2014). In this light, language learning may prove to be especially effective as it involves a wide brain network and taps into different cognitive processes, ranging from working memory to sound discrimination, task switching and rule learning (Antoniou et al., 2013).

6.2.7 Illiteracy

Previously, it has been outlined which learning strategies are effective in directing adult language learning. However, for a group of older adults with little educational experience and high levels of illiteracy, as is the case for the group of older migrants in the Netherlands that form the focus here, learning in itself is a daunting task. Low-literate learners typically lack metacognitive and metalinguistic awareness (knowledge about language). Literate learners can think of words and language as abstract units, because they are able to visualise words. This gives them valuable metacognitive and strategic skills that illiterate learners typically lack (Kurvers et al., 2015). Processing oral corrective feedback (recasts) on production errors, for example, is more difficult for illiterate learners as they lack the visual representation of their production and how it compares to the recast (Tarone et al., 2009). For illiterate learners, semantic meaning is therefore one of the most valuable resources in learning.

Only recently, research on so-called Low-Educated Adult Second Language and Literacy Acquisition (LESSLA) has started to emerge (van de Craats and Kurvers, 2009). A study towards teacher-student interaction during oral skills practice in the LESSLA classroom found that the most widely-employed teacher-centered framework of instruction, IRF (Instructing, Response (from student) and Feedback) is beneficial in that, although it might constrain students' spontaneous reactions, the teacher can 'fluctuate between focusing on rote learning, checking (vocabulary or grammar) knowledge, scaffolding, modelling or even challenging the students to think creatively' (Strube, 2009, p. 60). The teachers that collaborated in the study note that the typical LESSLA learner has underdeveloped study skills. They note modelling and scaffolding techniques and pos-

itive feedback as effective teaching strategies (Strube, 2009).

In addition, a longitudinal study towards effective classroom strategies for low-literate adult language learners (Condelli et al., 2008) corroborated that using materials from everyday life links unfamiliar information to what learners already know, which is crucial in building motivation and engaging students in learning. Also, a varied instructional approach (alternating more explicit attention to language patterns and practising language in meaningful ways) helps learners to grasp the complexity of the second language.

6.2.8 Learning materials for low-literate adults.

Having reviewed the literature on cognitive aging, L2 learning and learning strategies for older adults and for older low-literate adults, the next part of the chapter gives an overview of the material that so far exists (in the Dutch context) and that may or may not be useful in guiding low-literate adult language learning. The close examination of a number of adult L2 learning methods may unlock information regarding the practical learning trajectories of older, low-educated adults. Based on the literature above, we hypothesise that those methods that employ a mostly practical and motivational approach are most successful in advancing the language learning process. Other factors that are deemed to be beneficial are small groups, scaffolding techniques, multimodal instruction (e.g. Total Physical Response (TPR)) and connection to already known or previously learned individual experiences. Although the methods are restricted to a Dutch context, the findings may in general be transferable to similar (western) context that host large numbers of lowly educated older migrants with poor L2 skills.

6.3 Methodology

The synthesis below is not an exhaustive list of all available methods relating to language leaning, participation and/or empowerment of adults in Dutch society. Rather, it is a discussion of those programmes that are either successful language learning methods for low-educated groups or that provide a unique approach towards integrating/empowering fragile migrant groups in society. The aim of this overview is therefore to highlight and discuss the most prominent and visible

programmes that have been designed and implemented with regard to language learning for special groups in Dutch society. Inclusion in the discussion is, however, based on a few criteria, described in the following procedure.

6.3.1 Inclusion criteria

The materials legible for inclusion were identified through the following channels:

- A recent overview of available L2 (Dutch) learning materials in the prominent magazine LES for professional L2-Dutch teachers and researchers (Les, 2016);
- The literature on SLA for low-educated groups in the Netherlands, especially the empirical research conducted with LESLLA (Low-Educated Adult Second Language and Literacy Acquisition) learners;
- Overview of methods that are used at various institutions for literacy in the Netherlands (Strube, 2006);
- The database on Dutch L2 materials compiled by the website ‘Taaluniversum’ (Taalunie, 2013);

The same language learning programmes sometimes occurred in multiple sources, reflecting their prominence. Inclusion of the L2 programmes in this study was based on the criteria shown in Table 6.1.

Table 6.1: *Inclusion criteria*

Selection	Details
Target group	(Senior) migrants, low-educated migrants, migrant women
Focus	L2 learning, social participation, empowerment
Level	Zero, building up to maximally A2 (CEFR)
Skills targeted	Oral skills, very basic (pre)literacy skills, functional and/or social language usage

Also those programmes that are solely geared towards preparing individuals for the entrance exam were excluded from a detailed analysis. These programmes often focus mostly on reading skills and work towards a high stakes direct goal: passing the entrance exam, which is a different goal from those methods that aim to enhance social participation.

The selected programmes are evaluated below on the basis of how the methods are compiled, how effective they are and whether they can be useful to a population of older migrants, if it concerns a general 'adult' target population.

6.3.2 Analysis

Each programme is briefly described in terms of the employed materials and the underlying theoretical construct (if present). Subsequently, the effectiveness of the different methods and materials is determined according to either evaluations that have been conducted by the developers or external parties, or reviews of the methodology by experts in the field. In Table D.1 (in the appendix) each method is briefly described in terms of its target population, year of implementation and theoretical considerations, according to the criteria outlined in Table 6.1.

6.4 Practical relevance and authentic input

The majority of the selected methods in Table D.1 employ a communicative, task-based learning approach (Van den Branden et al., 2009), and include materials that have a clear and direct practical relevance. This is achieved by embedding the method in a social context or situation: either by introducing the learner to a family, as they progress through their first months in the Netherlands (Nieuwe Start!), or introducing individuals and their daily routines and situations (Fatima Tas; De week van Karla; Wij wonen nu in Nederland). Other methods integrate language tasks into social situations or actions, such as talking about the body and health issues (Van top tot teen) or practising different social situations (Praatwijzer, Taalriedels). These connections to 'real-life' are argued to keep the learners interested and motivated, as the relevance of the learning material shows a direct practical application, and they help to structure the lessons and exercises according to a set storyline. This refers back to the observation that older adults

learn differently than their younger peers and reiterates the argument that real-life experiences are crucial in making the learning material relevant and boost motivation (Condelli et al., 2008; Joiner, 1981).

From a UB perspective, the connection of learning material to daily life warrants the use of authentic materials, which has been proven to be an effective tool in L2 instruction (cf. Verspoor and Phuong, 2015). Nonetheless, use of authentic sources is largely absent in the methods. Although dialogues and exercises mimic situations in real life, the recordings and other source material is often specifically designed and adapted to the learning context. Jazz chants (Taalriedels), for example, are controlled dialogues – fun and easy to practice in a group, but taken out of their (rhythmic) context, it will be difficult for learners to actually implement certain sentences in daily conversations. Likewise, *Thuis!* makes use of spoken dialogues in different situations (meeting someone on the street, at a service desk, etc), after which learners dissect the dialogue and practise it themselves. Although this moves closer to the use of authentic-like input, the use of natural language is absent, as the language is simplified, possibly to allow a quicker and fuller understanding of the contents.

Although input is often authentic-like, the dissecting of it corroborates the UB notion of repetition and ‘automatising’ input to become procedural knowledge. In addition to *Thuis!*, most methods (*SpreekTaal*, *Praatwijzer*, *Woord voor woord*, *Nieuwe Spreekrecht*, *Fatima Tas*) place repetition of input material at the core of the lesson. However, as the input is mostly non-authentic, it seems that this mostly results in explicit knowledge, and the question is whether this can ever become proceduralised, implicit knowledge. To ‘consolidate’ the new information from the methods, what happens in most methods here is repetition through exercises, which typically move from receptive and closed to productive and open. Whether this is enough to ‘automatise’ certain constructions is doubtful. Antoniou et al. (2013) have argued that in order to achieve explicit knowledge to become proceduralised, it would be best to have explicit instruction sessions in addition to some speaking practice with a native speaker for the newly acquired structured constituents to become engrained in the older learner’s mind.

Especially illiterate learners, who cannot rely on written information for support and have to rely solely on visual and auditory cues and their memory skills to understand the learning material, benefit from information repetition through

various modalities (Strube, 2009). To aid the process of automatization, techniques that rely on other cognitive modes (motoric, pattern-recognition/ musical, visual, etc.) to decipher the target input material, such as TPR or the jazz chants with their rhythmic mode of instruction, may strengthen the consolidation process.

6.5 Evaluations

Apart from the methodological considerations of each method, one major disadvantage is that almost none of the methods in Table D.1 have been formally evaluated in terms of their pedagogical success. Sometimes, the material is still too new to warrant any evaluation, such as in the case of *SpreekTaal*. Hardly any records exist of formal evaluations of the methods discussed here, which makes it difficult to assess the effectiveness of the techniques used. Only the (dis)continuation and number of reprints of other methods give an indication of the degree of success. *Taalriedels*, for example, recently commissioned a reprint (2015) and its presence in a variety of methods discussed here demonstrates some of its effectiveness in teaching. *Thuis!*, on the other hand, has been discontinued, possibly because the offered material was too high stakes for the target population (notable older low-educated adults) (Veth, 2006).

The most well-documented method is *Themis/IDEAL*, which is more of a social empowerment than a language learning method (focusing on empowering disadvantaged, uneducated, non-western immigrant women), but which provides a number of useful techniques and insights into language pedagogy that may be effective for language teaching to older adults.

The success of *Themis* (first commission in Leiden (NL), followed by a Europe-wide implementation and evaluation) derives from its central pedagogical focus (the participatory psycho-social approach), which is to create a ‘safe learning environment’; and the adaptability to individual situations, through the portfolio-approach in the form of a ‘*Themis-tree*’ that functions as a self-evaluation tool (van Dijken et al., 2006).

At the end of one year of instruction the most notable – and important – observation was the increase in self-esteem, which not only increased the use of the L2 in the lessons, it also allowed the participants to take a more communicative

stance in society, by visiting the doctor independently and having more effective contacts, outside their own language group (cf. Ramscar et al. (2014), who claim that low self-esteem is detrimental for wellbeing and even physical health). Their level in general increased towards A2 of the CEFR (Common European Framework of Reference) (van 't Rood, 2013). The Themis module advocates a dual language approach – moving gradually from instruction in the mother tongue to instruction in the target language and a facilitator (role-model) from a similar cultural and linguistic background, which proved effective throughout the learning trajectory.

Themis differs from the other methods discussed here in viewing language as a tool towards social participation. By placing the group dynamics and the environment at the core of the method, it shows that language follows communication, which stimulates an intrinsic motivation to learn (about) the L2 in its speakers. The consequence is that it is not an efficient method in terms of time. The content requires a lot of repetition, negotiation and discussion and, because of the small groups (10-15 participants), individual attention is feasible but also pretty intense. Whereas the other methods discussed here might also deploy role-play games, questions, and portfolio-based learning, they are more time-efficient but less focused on building individual self-confidence and empowerment. Across the methods, there seems thus to be a trade-off between individualised, time-consuming instruction versus efficient group-based learning (which is the preferred manner of instruction for most methods).

The current further absence of any evaluation or longitudinal studies towards the immediate and long-term effects of the different methodological techniques used within this sample prevent any conclusions being made on sustained and possibly enhanced L2 use.

6.6 Language training for older adults

As highlighted in the beginning of this paper, language training may hold beneficial effects for cognition. This is not entirely undisputed (cf. Ramos et al. (2017) who failed to find such effects for the cognitive domain), and from the discussion of the methods above it has become clear that there are numerous approaches to adult L2 teaching - making a clear one to one mapping of language

training and cognitive benefits difficult to establish. However, rather than just highlighting potential cognitive benefits, L2 acquisition may hold important social consequences, such as lowering L2 anxiety (cf. Pavlenko, 2005) and increasing self-esteem (cf. Ramscar et al., 2014), which may in effect have an impact on an individuals' cognitive disposition (cf. Kliesch et al., this volume).

The Themis approach is exemplary of these social pay-offs. By placing the notion of empowerment (through language) at the core of the method, language is successfully introduced as a tool to promote active social participation. This contrasts with the other, full-fledged language methods (Thuis!, Nieuwe Start!, Breekijzer), which place building L2 proficiency at the core of the method, and employ strategies that not necessarily pose benefits for low-educated adult learners (non-authentic material, written cues, and homework that may well requires participants to step outside of their comfort zone).

Although objective evaluations of the methods are missing, the fully integrative methods seem to be too tightly packed with learning material and strategies. As such, they try to do too much in a restricted timeframe (the language class) and often with heterogeneous groups (cf. Schleppegrell (1987), who notes the great variety in adults' initial conditions and previous life experiences, that they all, as individuals, bring to the classroom).

Moreover, little attention is directed towards shaping the learning environment, which is pivotal in advancing the learning process and noting social – and perhaps even cognitive – benefits (Antoniou et al., 2013). By marginalising the role of self-esteem and independence, and sometimes overlooking cultural differences (cf. Johnson, 2015), who argues that intercultural competence is of critical importance to learning), the social pay-off of fully integrative methods may be less (but note: Thuis! And SpreekTaal pay attention to building intercultural awareness by discussing learner's experiences with certain themes).

On the other hand, the more functional approaches (such as Taalriedels and Fatima Tas) are often incorporated into the full-fledged methods (indicating their popularity) and may be beneficial in group-wise learning as they (1) stimulate the learning process by calling on additional cognitive modalities, and (2) are inherently 'safe' and playful group tasks that reduce speaking anxiety.

Most importantly, it follows from the discussion above and the literature on (older) adult L2 learning that L2 learning needs to be regarded not as a goal in

itself but as a tool to promote social interaction and integration, and it is through the stimulation of social wellbeing that cognitive effects may potentially be observed. L2 training is foremost a social and interactional process. Benefits may therefore only be observed if participants feel 'safe' and at ease in the learning environment. This is equally achieved by small (homogeneous) groups (Schleppegrell, 1987), a positive stance towards participants' L1 (Themis), and the use of non-threatening material in the form of relatable, restricted content (Fatima Tas, De week van Karla, SpreekTaal), visual cues for illiterate learners and therefore also absence of digital materials (despite the individualised adapted learning benefits) - since only a minority of the older illiterate learners are digitally literate.

6.7 Conclusion

In this chapter we have seen that 'third age L2 learning' is becoming more and more of a necessity for older adult migrants who grow old in an L2 environment. The extensive focus on the cognitive benefits of language learning in old age has paved the way for promising research looking into the remedial or boosting (neurological) effects of foreign language training on the aging process. However, the social element of language learning has so far been mostly overlooked. We have highlighted that especially the vulnerable group of older, low-literate migrant learners may not only benefit from language training on a cognitive level, but that engaging in a communicative and social activity may equip them with vital social tools and self-confidence to access healthcare services and information and prevent social isolation.

The aspect that sets these learners apart from other type of third age language learners is their limited educational experience, low-literacy, and hence restricted learning skills. Through an evaluation of some best practises in the teaching of an L2 to older adults, this chapter has built up towards an investigation of those L2 learning materials that are available in the Dutch context, specifically geared towards low-literate (older) adult learners. In order to engage these adults in language learning and to be able to potentially observe cognitive benefits, it seems that the driving force behind successful learning is how language learning is perceived. Rather than viewing language mastery as the goal, language is a tool – not only in the practical sense of better social participation and communication, but

also in enabling larger cognitive changes in an individual. Crucial to this view is the interaction of language and learning with its environment, both external in the form of materials and methods, as well as internal in the form of an individual's initial cognitive capacities and previous language experiences.

Although cognitive capabilities change over the lifespan, the brain retains much of its plasticity well into old age, which makes learning new skills in an individual's Third Age not an impossible task (cf. Singleton, 2018). However, in L2 learning, proficiency increases have only been observed after a substantial amount of time invested in L2 learning (cf. Ramos et al. (2017), who note increased rudimentary L2 proficiency after a year), and cognitive effects surface sooner, but still only after at least three months of training (cf. Li et al., 2014). Based on the discussion above, social effects are suspected to appear sooner. Especially for the group of dependent older migrants with low educational experience and high levels of illiteracy, L2 training may be beneficial first and foremost in decreasing L2 anxiety and increasing self-esteem, through which independence and social wellbeing is boosted.

At the beginning of this chapter we stated that older migrant learners may benefit from L2 learning on two levels: the practical, interactional level, and the internal, brain level. We believe that, in order to observe positive effects on both levels, an effective L2 training uses the cognitively enriching and challenging experience of learning a new language as a tool to first and foremost promote social wellbeing through increasing self-esteem and lowering anxiety. This can be achieved through group-wise learning with a direct practical relevance, whereby a safe learning environment is the key element at the start. Building L2 proficiency is at the outset therefore of secondary importance.

PART III

Discussion and conclusion

CHAPTER 7

Discussion

The Netherlands is a multilingual society *par excellence*, where different languages and dialects are used and where everyone, to some degree, speaks, knows or is surrounded by and exposed to (see Bice and Kroll, prep) multiple languages, dialects or accents. When multilingualism is omnipresent and embedded in the social environment, it forms the ideal test bed for studies examining the influence of multilingualism on broader processes, such as aging, which can be characterised as a complex interaction of physical, psychological and social factors. The chapters in this thesis have explored *aging in multilingual Netherlands*; how the (multi-faceted) multilingual environment shapes the aging process (cognition, wellbeing and health status) of various older individuals.

In line with the majority of the research conducted on this topic, multilingualism can be regarded not only as a communicative asset, but also a mechanism/tool that positively influences cognitive performance. Contrary to the everyday multilingual reality of Dutch society, the language of administration and of healthcare in the Netherlands is still predominantly monolingual Dutch. As such, the language environment may actually impose language barriers, linguistic anxiety and social drawbacks for those individuals in society who age in an environment where the dominant language differs from their mother tongue.

The studies in this dissertation have offered a reflection on how the concept of multilingualism in research on aging is approached. The presented findings

from the two approaches, one looking at multilingualism as an asset in cognitive aging, and the other considering the influence of language on the wellbeing and health status of older migrants, demonstrate that multilingualism is always rooted in a social context. This discussion, therefore, argues for more individual differentiation in studies on (cognitive, social or other) aspects of the multilingual experience.

7.1 Short summary of studies and findings

The first part of this thesis examined the (beneficial) role of multilingualism on cognition. By examining a large cohort of multilingual seniors (65+) from the three northern provinces of the Netherlands, it was assessed which aspects of multilingualism, and – crucially – under which circumstances multilingualism could contribute to enhanced cognitive performance. By employing a large study sample, collecting a wide variety of background information of the participants, and by employing the relatively novel PLS statistical approach it was determined that the study of language and cognitive control cannot and should not isolate language from its interactional context.

Rather, it is precisely when considering the usage context of multilingualism that cognitive advantages may be observed in some individuals. More specifically, individuals who (have the opportunity to) use different languages in different social domains show enhanced cognitive attention, but only in relation to certain personality characteristics, education, and quality of life criteria. Moreover, when examining the social use of language and examining the linguistic details of individuals' close personal relationships, it was observed that a more linguistically diverse network interacts with the age of onset of acquisition of different languages, as well as with personality characteristics.

The second part of this thesis subsequently examined the often anecdotally observed 'language barrier' in migrant aging. Chapters 4, 5 and 6 dealt with the question of how language may put up a barrier to healthy aging (i.e., access to and use of care, information and services) for individuals who age in an environment where they have limited proficiency in the dominant language. By means of a series of tasks (language, literacy and cognition) and in-depth interviews with a group of older, female Turkish first-generation adults aging in the Netherlands,

it appeared that a low command of their L2 (Dutch) may fuel feelings of L2 insecurity, but especially in cases where social support is absent.

The second section of this thesis revealed the close link between language usage, feelings of L2 insecurity, mindset and the mediating role of social support. The majority of the older adults reported a limited L2 proficiency, which may culminate in linguistic insecurity and a language barrier when they are not firmly embedded in a support network, either in their L1 or L2. Without any means to either organise care within the L1 environment or reliance on proficient L2 speakers to allow communication in L1 dominant settings, wellbeing levels for these older adults are compromised.

Crucially, the perception of wellbeing in relation to language is highly individually distinct. It results from an interaction of health status, migration histories, formation of social networks, communicative opportunities in the environment and perceptions of norm-induced language behaviour and aging behaviour. (By this the stereotypical notion of a native speaker norm for language, as well a view on aging as a gradual process of decline are meant). These two norm-based concepts are recurrent themes in both sections of this dissertation.

7.2 Aging and decline

Aging is often regarded as a gradual process of decline. With increasing age, physical and psychological abilities decrease and induce late-life dependence. Indeed, biological aging can generally be regarded as system failure: a system, although built from non-aging parts, may deteriorate with age as a result of the system's redundancy for irreplaceable elements (Gavrilov and Gavrilova, 2003). Humans have high system redundancy (i.e. many cells), through which they have a high damage tolerance (i.e., longevity). Over time, however, damage accumulates, resulting in system failure, and thus aging. Although this explains the biological deterioration in aging, it also makes it easy to assume a deficit perspective on the entire aging process (psychological and social aging), which perhaps is not entirely accurate.

A staircase view of the lifespan, which ascends until young adulthood – when physical and psychological abilities are at their peak – and descends after that, gained popularity in the post-renaissance world (Johnson, 2005). As highlighted

in the introduction, increased longevity posed an economic burden on society, through which old age came to be regarded as a social problem. This problematic, dependency-based view of old age led to stereotypical notions of older adults, known as 'ageism' (Butler, 1969).

One of the manifestations of ageism in language is through the notion of elderspeak. As mentioned in the introduction, elderspeak is an adapted form of language (register) that can often be observed in interactions between caring staff and clients in caring homes. The use of this adapted form of speech may be beneficial to communication (slower speech rate, simpler sentences) but may also reinforce old age stereotypes of decline, with the consequence that some older adults experience a decreasing sense of wellbeing (Kemper and Harden, 1999).

It is a product of the decline perspective on aging, fuelled in part by observations that older adults generally experience cognitive slowing (Wingfield and Grossman, 2006). A theory proposed in the introduction of this dissertation challenges this view by postulating that aging is rather an accumulation of experiences, and that the slower processing speed derives from longer or heavier search demands through all these experiences to reach the correct information (Ramscar et al., 2014).

This theory is reminiscent of lexical processing accounts in bilinguals, whereby some studies find bilingual disadvantages in verbal fluency tasks. This is a result of bilinguals using each of their languages less frequently or of having more lexical competitors to choose from, which makes the search to reach the target lexical item take longer than for their monolingual peers (cf. Ivanova and Costa, 2008). Part of the results in this dissertation shows support for such experience-related or knowledge-accumulated slowing, in the data of the older Turkish females. In chapter 5, some older adults note that the large cognitive load associated with learning and processing new information prevents them from taking up language learning. This aligns in part with the accumulation of life-experiences and slower cognitive processing account of Ramscar and colleagues above, but couples this to a 'fixed' mindset in which the accumulation of knowledge and experience wears individuals down and hampers the acquisition of new knowledge (also see the section below).

In other cases, however, enhanced cognitive processing is coupled with personality traits relating to being open to new experiences (cf. chapters 2 and 3).

For those multilinguals, the ability to attend quickly to the relevant information, reflecting enhanced cognitive performance, might ‘undo’ some of the age-related slowing effects as a result of increased life-experiences. It is crucial then to see multilingualism as truly a part of a cluster of factors that shape the aging process of individuals.

Notably in this light, too, is that although younger adults consistently outperform older adults on speed in cognitive processing tasks (Rabbitt, 2005), older adults are upon closer inspection often more accurate than their younger counterparts. This is especially prevalent in lexical processing tasks, where Ramscar et al. (2013) show that performance on paired associative learning tasks changes as a result of an accumulation of lexical knowledge with age and experience. When controlling for learning (in models on lexical learning and cognitive performance), the authors demonstrate that there is very little variance in the results left that can be attributed to ‘decline’.

This view reiterates that the brain is plastic and the ability to learn does not wither with age. When individuals adopt a positive mindset to aging (Dweck and Molden, 2017, see also the introduction to this thesis) as a process of enrichment or growth, they may experience positive outcomes when it comes to late-life learning and sense of wellbeing, as has been demonstrated in chapters 2 and 3.

7.3 Effects of a positive mindset to aging

The positive influence of late-life language learning may both be observed in enhanced communication in the dominant language, lower L2 anxiety and a heightened sense of wellbeing for older migrants, as well as cognitive stimulation through sustained brain effort. The findings in this dissertation can be linked to this deficit perspective on aging and learning and prompt a couple of interesting avenues for further research.

The older migrants discussed in this dissertation typically hold a deficit perspective (or in the psychological terminology of Dweck and Molden (2017) a fixed mindset) towards the multilingual environment and their language learning abilities, as mentioned above. For some, language (the L2) even induces anxiety in communicative settings, prompting stress, withdrawal and feelings of loneliness. This is especially true for the older migrants. It seems that multilingualism in

fact induces a growth or open mindset in the group of multilingual older adults, evidenced from the fact that multilingualism clustered together with openness to new experiences. This fixed view on language learning, and aging in general, may stem on the one hand from individual language experiences and histories, poor health and wellbeing or indeed both being intricately linked. On the other hand, this fixed view may be perpetuated by the L2-dominant environment, whereby a monolingual and native-like Dutch norm continues to set the standard for communication. Attaining full proficiency in Dutch to adhere to this norm is far beyond the reach of an individual's capabilities. Some of the older migrants noted in chapter 5 that the fear of being judged by Dutch native speakers prevented them from engaging in L2 communicative situations.

This view of impossible L2 attainment is further supported by a general lack of suitable educational material for low-literate adult learners (see chapter 6), through which also low-threshold language learning opportunities are limited. The absence of language material and courses reinforces the aging stereotypes of decline, in which learning new things is futile.

A worthwhile avenue for future research is to examine whether a change in mindset from a deficit/fixed view on abilities to a growth perspective on cognition may lower the language barrier for older migrants. Changing this mindset begins by society taking a more open stance towards speakers of other languages and low-literate groups in healthcare settings.

Recently, some steps have been taken towards a more culturally/linguistically sensitive communicative approach in the healthcare sector. A cross-cultural screening tool for dementia, for example, marked a break away from language-dependent cognitive measures by being the first, well-studied and documented screening tool that allowed an accurate non-verbal screening of dementia across different language and cultural backgrounds (Uysal-Bozkir, 2016). Not only does this make the diagnosis for dementia for these groups less prone to errors, it also signals that the healthcare sector is becoming aware of the growing group of older adults with diverse linguistic backgrounds and does not solely focus on Dutch-proficient older adults.

Similarly, research has raised awareness of the limited health literacy among some L1 speakers. By applying a different communicative approach in the form of, for instance, photo novellas, the quality of doctor-patient interactions and health

behaviour significantly increased for native older adults with limited health literacy (Jagt et al., 2015). Extending these photo-novellas to cater for other languages may lower the language barrier in healthcare communication, or at least provide an extra tool to better understand the healthcare practices, which may decrease vulnerability in a linguistically diverse group.

A growth mindset to aging and learning is further supported by suitable approaches to language learning. Chapter 6 suggests that language needs to be viewed as a tool to accomplish something meaningful or as enabling active social participation, whereby the effects need to be immediate. This echoes the approach to language learning that is advocated by CLIL (Content and Language Integrated Learning), in which language is a medium to learn content, e.g. history or physics. It will be intriguing to explore to what extent an activity (e.g., a cooking class) could embed language learning strategies, through which older migrants both engage in social participation, do something meaningful and simultaneously trigger their brain to pick up language cues.

An interesting approach in this regard is the concept of ‘*linguaging*’ that was put forward in chapter 5. In ‘*linguaging*’, older adults are engaged in activities that go beyond simple communication but are more effortful and engage their learning abilities to promote cognitive functioning (Swain and Lapkin, 2011). These activities stimulate the brain, e.g., in the form of solving crossword puzzles, composing a poem or discussing an article. For the older migrants these activities could be integrated into language learning, by using linguistic scaffolding techniques and perhaps also by engaging their L1.

Alternatively, rather than language boosting cognitive functioning and general health, could a change in cognitive stance trickle down on the language domain and boost language learning? This question flips the dominating hypothesis in multilingualism and cognition research that language control may impact domain-general cognitive control. When examining this alternative view, a change in mindset (from a deficit view on abilities to a growth perspective) functions as a catalyst for a change in cognitive stance. As the studies in chapters 2 and 3 demonstrated that personality traits relating to openness to new experiences contributed to enhanced cognitive performance, a positive and open mindset towards learning could not only boost domain-general cognitive functioning, but also enhance those cognitive functions pertaining directly to language. This idea

is in line with the notion of neural multi-functionality; a concept that argues for a constant and dynamic interaction of cognitive domain-general neural networks and networks specialised for sentence processing and lexical retrieval. This non-selectivity of the brain has been demonstrated in language recovery from aphasia, where executive functions impact aspects of semantic processing and reshape the neural circuitry (Cahana-Amitay and Albert, 2014). Future research could establish whether stimulation of a positive mindset to aging, cognition and learning (not language specific) spills over into enhanced language-specific functions.

For now it is interesting, perhaps, to see how languaging can be inserted into enhancing language learning and cognition for all older adults, and thus to let the two separate studies reported on in this dissertation come full circle.

7.3.1 Implications

There might be a way in which languaging may bring the two groups this dissertation has reported on together. Taking the example of a cooking class mentioned above, older migrant women could cook together with older Dutch women. In setting up an activity in which these two groups interact, older migrants benefit in terms of language learning and native, multilingual older adults may benefit in terms of cognitive engagement. They not only exchange recipes and learn from each other in a cultural sense (promoting social participation from both ends), all participants also have to negotiate language.

For the older Dutch adults, the activity is an excellent opportunity to be immersed in a different linguistic setting and may trigger their language skills. At the same time, they have to adapt their Dutch language use to make their meaning come across and can forward the Dutch proficiency of the older migrants through scaffolding techniques in a safe setting, which requires the Dutch elders to 'language'.

The older migrants, in turn, may experience a safe environment to practise the language by means of a meaningful activity in which they can be the teachers regarding 'content'. Their self-esteem will increase as the positive attitude to Turkish of their Dutch peers gives a sense of equality in terms of languages (there is no dominant language). At the same time, they will be able to teach the Dutch adults to cook a recipe that these Dutch adults are unfamiliar with.

Indeed, studies have started to investigate the benefits of late-life language learning for cognition (Antoniou et al., 2013; Kliesch et al., 2018). Short experiences with another language, e.g. in the form of a language course, already have been found to hold beneficial cognitive effects. The idea of language learning as healthy behaviour is even being popularised through a website and campaign advocating for a ‘healthy linguistic diet’ (Mehmedbegovic and Bak, 2018).

Not always do positive cognitive changes occur after language learning, however (see Ramos et al., 2017), and more research is needed to uncover precisely how late-life language learning may benefit cognition (upcoming research projects on late-life language learning include a number of current and upcoming (PhD) projects from the University of Groningen). Yet, there is certainly no harm in taking up language learning, if only as it enables social participation and aids communication.

As we know that the brain retains much of its plasticity in old age, seeing and acting on opportunities to use different languages in different domains, together with personality traits relating to openness to new experiences and feeling well – as has been demonstrated in chapters 2 and 3 – creates conditions that are beneficial to cognitive attention orienting processes and aid mental flexibility. The next section examines how this mental flexibility may be aided by multilingualism.

7.4 Language control

In an overview article on bilingual language processing, Fricke et al. (2018) argue that bilinguals use a multitude of regulatory strategies to manage their languages. The fundamental differences observed between individuals in language processing may be an effect of a speaker’s language regulation history. This signifies how an individual adapts his or her language use to the linguistic contexts in which the languages are used. This notion lines up with the findings in chapters 2 and 3 of this thesis that the interactional context of multilingual language use and experience with this context is imperative to domain-general cognitive performance.

Indeed, a recent study assessed the flexibility of bilingual language control in a naming task for 45 Dutch-English bilinguals (young adults) in different language contexts (dominant L1 Dutch or non-dominant L2 English). It was found that naming overall was slower for the language (L1 or L2) that matched the language

context. In other words, switching in the dominant L1 context is symmetric and reflects a global slowing of the L1. For switching in an L2 context, bilinguals depend on local control, whereby the L2 is inhibited more strongly than the L1, resulting in asymmetric switch costs (Timmer et al., 2018). The authors argue that bilinguals adjust their control mechanisms according to the language context to allow for equal access to both languages. Hence, the bilingual language control system is flexible and adapts to the context.

When applying this to the adaptive control hypothesis by Green and Abutalebi (2013) and our results, the findings from Timmer et al. (2018) may complement the evidence for the observation that especially in a dual-language context, whereby both languages are present and individuals need to switch frequently but in a controlled way, the greatest cognitive benefits may be observed. The continuous adjustment of the control mechanisms could train the brain to become more attentive and efficient in switching between languages.

The results in chapter 3 assert that the sustained use of different languages with social relationships modulates cognitive control. However, as having diverse social relationships only marginally contributed to enhanced cognitive performance, it is not merely experience, but rather usage, independent of the length with which individuals have been able to practice the language, and also partly independent of proficiency. All in all, it is thus perhaps more by virtue of the linguistic context, rather than the type of bilingualism in individuals that cognitive differences may be observed.

7.4.1 A multilingual experience

Taking this further, it could even be questioned whether multilingualism should be operationalised according to what inherently exists in individual minds, or whether it is rather more productive, in this case, to consider multilingualism as a contextual variable, a process, and hence a ‘life-experience’ (cf. Bialystok and Sullivan, 2017). This would infer that for linking multilingualism to cognitive performance, it should not be considered an individual trait – something that an individual possesses – but a feature that may be intensified by, or may or may not arise from the language environment.

This suggests a view of multilingualism in which an individual does not hold

two separate language systems in one mind, but a more holistic view (cf. Grosjean, 1998) of unique individual lexicons in which words are activated to a stronger or weaker degree depending on the context in which the language user finds him or herself. This view is very much in line with bilingual lexical access models such as BIA+ (cf. Dijkstra and Heuven, 2002).

Grosjean (1989) famously observed that a bilingual is not two monolinguals in one; i.e. a bilingual does not typically hold two equally proficient separate language systems in one mind. In fact, bilinguals are typically ‘unbalanced’ in their linguistic knowledge. For example, their vocabularies in each language will be strongly tied to the domain in which this language is mostly used. Therefore, they typically know words in one language that they do not know in the other. As bilinguals have specified vocabularies for specific domains, the context may already trigger the activation and subsequent selection of the right linguistic form.

Part of the enhanced attention control observed in the studies in this thesis, therefore, may stem from an efficient regulatory mechanism whereby the multilingual individual uses the cues of the context to activate the correct linguistic system. This will be relatively fast, as vocabularies may overlap, but also show distinctions when they are typically used in specific domains. In a context where both languages may be spoken to an equal degree, a multilingual will probably have a larger vocabulary in one language compared to the other, and will be extra attentive to contextual language cues to modify language behaviour, especially when speaking the ‘weaker’ language, to prevent interference from concepts in the stronger language.

This idea ties in with the observation on the differential language control mechanisms engaged in minimizing interference from the weaker or stronger language as observed by Timmer et al. (2018). It also relates to the findings in the present thesis, where cognitive effects are observed for those multilinguals who use their different languages across different social domains. The use of the L2 across social domains interacted with degree of proficiency in the L1, suggesting that multilinguals need to focus their attention more carefully on actively selecting words from the L2 in contexts for which they also hold a strong L1 vocabulary. It also demonstrates that a balanced use does not necessarily also entail a balanced proficiency.

In her study on bilingual advantages in a group of older bilinguals (Dutch-

Frisian), Houtzager (2015) found that, in her population of Frisian-Dutch older adults, more balanced bilinguals in terms of use and proficiency, performed better on measures of executive function. This relates to the findings in the present thesis whereby, irrespective of language proficiency, a more balanced use of different languages induces cognitive benefits. Indeed, Treffers-Daller (2016) points out that language balance and language dominance are two different concepts. Balance may refer to the degree of *proficiency* in both languages or degree of *usage*, in which language A may be used in context A and language B in context B, or languages A and B are equally used across contexts. An individual may be strongly dominant in one language, but still be balanced in his or her use of different languages. Therefore, to obtain a more fine-grained picture of multilingual differentiation, language should both be assessed on the traditional dimension of competence (language proficiency) as well as communication (language usage) (Treffers-Daller, 2016).

7.4.2 The monolingual myth

An imbalance in language proficiency is, in much of the research on bilingualism, still often interpreted as a deficit or disadvantage, relative to a monolingual norm. The language of linguistic competence leads to disadvantages in, for example, word processing efficiency (Ivanova and Costa, 2008). However, given the observations above, it can be questioned how legitimate or real a comparison between monolinguals and bilinguals is. Bonfieni (2018) notes that both the bilingual advantage in relation to cognition, as well as the reported disadvantage for bilingual word processing are in fact artificial constructs that emerge from the circumstances under which language processing and control are measured (2018, p. 152).

Moreover, also monolinguals will have different linguistic repertoires for specific interactional contexts. Indeed, even within a language, there is stylistic variation and use of different registers. Monolinguals, too, need to continuously monitor their environment for linguistic cues and select the socially appropriate form of language for a specific context. As it has become evident in the present thesis that in a diverse sample of multilingual older adults the use of different languages across different social domains (in combination with individual and

environmental factors) confers cognitive benefits, should we not dispose of these dichotomous concepts and assess bilingualism along a continuum, thereby also including monolinguals? This reiterates a reconsideration of operationalising language knowledge; not only in terms of proficiency, but also in terms of usage, and perhaps not even referring to distinct ‘languages’.

One theory that does away with all language boundaries, but from which we can learn how to rethink our view of bilingualism is translanguaging. In translanguaging, there are no separate linguistic systems and individuals have a single linguistic repertoire (Otheguy et al., 2018). This is reminiscent of Grosjean’s holistic bilingualism, in which an individual is a contextually situated language user with differential linguistic experiences. Indeed, when we know that languages are jointly active (cf. Kroll et al., 2012), can we actually speak of separate language systems? The individual linguistic repertoires and linguistic practices constitute individual idiolects that, in fact, can be considered qualitatively monolingual in the sense that there are no distinctions based on language.

7.4.3 Linguistic implications

This brings us back to our implication in section 7.3.1, regarding the mental stimulation of learning and integrating new language concepts into one’s linguistic repertoire. Translanguaging may be an effective concept to illustrate the linguistic implications of the activity of a cooking lesson.

Both groups of older adults (the Dutch and Turkish elders) add new language concepts to their linguistic repertoire, which are meaningful in the context of the activity in which they are used and learned. Negotiating language from a translanguaging perspective in this way allows individuals to internalise and identify with these language concepts and make them inherently part of their linguistic repertoire. Notably, individuals are not condemned for using the L1 within this activity, as they will crucially need this to scaffold and understand the L2 concepts (cf. the *Themis* method in chapter 6, where the L1 is an important part in slowly developing L2 proficiency). In this way, both groups of older adults extend their language knowledge and, perhaps more importantly, embed this knowledge in social practice immediately, which may have positive repercussions for social integration and wellbeing.

7.5 Study improvements and avenues for future research

This thesis has offered a perspective on multilingualism and aging, whereby the focus has not been solely on cognitive effects, but also examined an aging group for whom language may be an obstacle rather than an asset in healthy aging. Although the strength of this thesis lies precisely in the novelty of how these two complementary perspectives may forward our understanding of the role of language in aging, they are nonetheless rather specific in participant focus, methodology and the extent to which results are interpretable beyond the context of the Netherlands.

The ideas and arguments put forward in this thesis, therefore, should prompt further research into aging and multilingualism of different societal groups. Departing from the conclusions in this thesis regarding the operationalisation of multilingualism as a dynamic, continuous and socially embedded variable, the following paragraphs offer some hints to improve upon and/or extend the research in this thesis.

The Dutch aging demographics prompted the selection of participants for both studies. Without being aware of much prior research beyond anecdotal observations of a language barrier for migrants in caring institutions, the practical choice for the selection of participants for the second study was made to focus on the first largest aging migrant group in the Netherlands, Turkish older adults. It soon turned out that these migrants constitute a rather special group in society, as they maintain strong ties to and a strong focus on their country of origin, stronger than other migrant groups. They, moreover, form a well-organised group in society.

Access to the community proved challenging without command of the Turkish language, resulting in the participant sample for the study in this thesis being relatively small. Notably, we refer to 'the older migrants' although data is based on one specific group. To what extent the linguistic situation of our Turkish migrants is also applicable to other migrant groups in society is worthwhile to investigate further.

Future interviews can be more focused towards individual language histories and usage, and, as it was found in this thesis that social embedding seemed to be an important predictor in language behaviour, tailor questions more specifically

towards social language usage. The language measure should be extended with longer production data to create a more accurate picture of L2 proficiency, but it should be kept in mind that this measure should reflect context-specific language use if the intention is to assess a language barrier in relation to receiving appropriate care and assistance. Also, measures of L1 proficiency may be insightful when considering language maintenance or shift to the host language.

The multilingual northerners tested in the first part of this thesis are a much more heterogeneous group in terms of languages, proficiencies and demographics. For examining the multidimensionality of multilingualism this heterogeneity was ideal, although there is a bias towards the number of older adults speaking a regional dialect, or Frisian in comparison to older adults with different language combinations. The current study did not take language typography/(dis)similarity into account, whereas especially for dialectal variation, different languages may overlap to considerable degrees (see for example Perdue (1993) on typological proximity effects in L2 acquisition). Although, as argued in this discussion chapter, different linguistic varieties are difficult to separate into different language systems and is a practice that we should perhaps abandon, it is still insightful to explore whether language typology will affect the extent to which individuals switch less or more controlled, and whether this has repercussions for cognitive performance.

Language usage data in this study relied on self-reports on the frequency with and domains in which individuals use each of their languages. However, as others point out, self-reports have inherent shortcomings, especially when measuring language ability and proficiency (Treffers-Daller, 2016). A recent study examined differences in self-ratings of proficiency of different bilingual groups, and attested that self-ratings are highly unstable across different bilingual groups, especially when these groups have different acquisition histories and language combinations (Tomoschuk et al., 2018). Although self-reports allowed us to obtain a large participant sample due to the quickness with which proficiency is assessed, a future study would want to use a more objective measure of (productive and receptive) proficiency, e.g. in the form of a picture naming task, in addition to a self-report.

Moreover, as language usage changes over time, an ideal study should follow a group of multilinguals for an extended period of time and have them log their language usage, learning, and social activity. This would provide valuable data to

gain insight into how multilingualism fluctuates, the importance of context and the environment, and perhaps how differences in multilingualism reflect differences in cognitive performance within (rather than between) individuals.

Many studies on bilingual populations select a sample from a bilingual group and generalise to a wider population, thereby perhaps overlooking important differences *within* bilingual populations. The studies reported on in this thesis also selected a particular group of older multilinguals, such as northern older adults or Turkish older migrants. However, the mixed-method approach of the studies on the Turkish migrant group allows to differentiate among individuals within this group. The interview data provides a unique insight into how different individuals manage their (limited) L2 proficiency in relation to wellbeing and health status and care. Similarly, the extensive pool of data that was collected from the sample of multilingual older adults in the northern Netherlands allows for fine-grained differentiation among individuals. In this way, it is possible to get an insight into the variability within a group of multilinguals, which provides an argument for future studies to take this inter-individual variability into account more.

7.6 Conclusion

The insights gained from the studies reported on in this thesis highlight the variation of the multilingual environment and the different consequences it has on an individual's (perceptions of) cognitive health and wellbeing. It also provides some insight into the framing of multilingualism and the perception of the multilingual environment as a rich source for language practice and development or as a judgemental (monolingual norm-based) environment in which the individual does not belong and there is no room for growth. The multilingual experience extends therefore beyond simple language knowledge and includes opportunities for individuals to interact and develop language abilities. These abilities may be enhanced or restricted based on perceptions/attitudes towards languages/dialects/accents/registers employed by members in the environment, mindset of individuals and society, but also very practical matters such as health status (mobility) and wellbeing. As such, the multilingual experience is an in-

tegrated experience of social and cognitive factors, and under specific usage circumstances may promote mental flexibility.

Regarding cognitive performance, it is likely that it is through the combination of an individual's experiences and environmental factors that effects of multilingualism on cognitive control may or may not be singled out (in line with Valian, 2016). In operationalising multilingualism for cognitive performance, therefore, the findings in this thesis prompt the argument for a linguistic continuum, in line with Bonfieni (2018). Ideally, this continuum involves a time dimension (assessing language development over time), as language is a dynamic concept that develops over time with changes in input, exposure and the environment of individuals. Following individuals over time would also allow the investigation of the possible temporality of cognitive benefits, or whether sustained usage equals sustained cognitive control. A multilingual continuum also means that across-group comparisons are futile (see also Luk and Bialystok, 2013), as it is meaningless and impossible to capture bilingualism in one single factor and attest that *sec* bilingualism leads to cognitive enhancement.

The two different perspectives taken in this dissertation complement each other and forward our understanding of the multilingual experience as an individually differing (and malleable) variable. This places the outcomes of the studies in the longer tradition of research that advocates for a view of multilingualism in terms of individual differences and along a continuum (Cooper, 1969; Grosjean, 1998; Bonfieni, 2018). Viewing multilingualism as a multidimensional variable, which should be differentially operationalised when studying different phenomena relating to language use, development and impact, opens up the field of multilingualism and aging towards more fine-grained analyses and descriptions of an individual's language abilities in specific contexts.

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Appendices

APPENDIX A

Background and language questionnaire multilingualism



Vragenlijst Gezond ouder met twee talen

Deze vragenlijst bestaat uit 77 vragen over uw gezondheid, taalgebruik en welbevinden.

- Het invullen van de vragenlijst kost ongeveer een half uur.
- Lees elke vraag eerst helemaal door voordat u een antwoord kiest. Selecteer dan het antwoord dat het beste bij u past.
- Selecteer bij elke vraag maar één antwoord. Als u meer dan één antwoord mag selecteren, dan wordt dat bij de vraag genoemd.
- Als u het moeilijk vindt om de vragen te begrijpen of in te vullen, vraag dan hulp aan uw partner, een familielid of vriend.
- Sommige vragen lijken 'dubbel', maar we verzoeken u ze toch in te vullen. Ze zijn bedoeld om uw situatie nog eens van een andere kant te bekijken.
- Bent u klaar, kijk dan of u geen vragen vergeten bent.
- Door verder te gaan stemt u toe dat uw gegevens anoniem worden gebruikt voor onderzoeksdoeleinden. Het gehele toestemmingsformulier kunt u nalezen op de website, onder 'Toestemming'.

Contact:

Anna Pot: (050) 3635977

ID code

Q2 Voordat we beginnen maakt u hieronder een unieke, anonieme ID code. Deze code vult u straks opnieuw in, wanneer u aan de cognitieve taken begint. Op deze manier weten we welke antwoorden en data bij elkaar horen, zonder dat we deze kunnen herleiden naar specifieke personen. Door onderstaande vragen te beantwoorden, maakt u een unieke code aan.

Q3 Vul de eerste twee letters in van de voornaam van uw vader

Q4 Vul de laatste twee cijfers in van uw telefoonnummer

Q5 Vul de eerste twee letters in van uw geboortemaand in

Q6 Vul de eerste twee letters van uw voornaam in

Q7 Vul de laatste twee cijfers van uw postcode in

Q8 Wat is uw geboortedatum? (dd/mm/jjjj)

Algemeen

Q9 U bent een:

- Man (1)
- Vrouw (2)

Q10 Noteer hier de eerste 4 cijfers van uw postcode:

Q11 In welk land bent u geboren?

- Nederland (1)
- Ander land: (2) _____

Q12 In welk land is uw vader geboren?

- Nederland (1)
- Ander land: (2) _____

Q13 In welk land is uw moeder geboren?

- Nederland (1)
- Ander land: (2) _____

Q14 Wat is uw geboorteplaats?

Q15 Wat is de hoogste opleiding die u heeft afgemaakt?

- Minder dan 6 klassen lagere school (1)
- 6 klassen lagere school, lom-school, mlk-school (2)
- Ambachtsschool (3)
- Mulo/mms/mavo/middelbaar beroepsonderwijs (4)
- Hbs/gymnasium/atheneum (5)
- Universiteit/ hoger onderwijs (6)

Q16 Welk soort beroep heeft of had u?

- Eigenaar van een eigen bedrijf (1)
- Directeur of leidinggevende in een bedrijf (2)
- Zelfstandig boer of tuinder (3)
- Vrij beroep (4)
- Middenkader, werknemer in loondienst (5)
- Werkzaam bij de overheid (6)
- In een andere functie (7)
- Ik had geen beroep (8)
- Weet niet/ wil ik niet zeggen (9)

Q17 Wat is uw burgerlijke staat?

- Gehuwd (1)
- Gescheiden (2)
- Weduwe/weduwenaar/partner overleden (3)
- Ongehuwd (4)
- Duurzaam samenlevend, ongehuwd (5)

Q18 Wat is uw woonsituatie?

- Zelfstandig, alleen (1)
- Zelfstandig, met anderen (partner, kinderen, enzovoorts) (2)
- Verzorgingstehuis/ woonzorgcentrum sinds (vul het jaartal in): (3) _____
- Verpleeghuis sinds (vul het jaartal in): (4) _____

Q19 Als u alles bij elkaar optelt, wat is dan het maandelijks netto inkomen van uw totale huishouden?

- Geen inkomen (1)
- Tot 500 euro (2)
- 500 tot 1000 euro (3)
- 1000 tot 1500 euro (4)
- 1500 tot 2000 euro (5)
- 2000 tot 2500 euro (6)
- 2500 tot 3000 euro (7)
- 3000 euro of meer (8)
- Weet niet/ wil ik niet zeggen (9)

Q20 Selecteer hieronder welke hobby's u regelmatig beoefent. Hier zijn meerdere antwoorden mogelijk.

- Een muziekinstrument bespelen: ik speel nog steeds actief (vul het instrument in): (1) _____
- Een muziekinstrument bespelen: ik speel niet meer, maar heb gespeeld (vul het instrument in): (2) _____
- Ik ben bezig een taal te leren (9) _____
- Zingen (3)
- Puzzelen (4)
- Lezen (5)
- Sporten/wandelen/fietsen (6)
- Spelletjes spelen (7)
- Anders, namelijk: (8) _____

Gezondheid

Q21 De volgende vragen gaan over uw gezondheid. Selecteer het hokje van het antwoord dat het beste bij u past.

Q22 Hoe is uw gezondheid in het algemeen?

- Uitstekend (1)
- Erg goed (2)
- Goed (3)
- Redelijk (4)
- Slecht (5)

Q23 Hoe is uw gezondheid in het algemeen, in vergelijking met een jaar geleden?

- Veel beter (1)
- Iets beter (2)
- Ongeveer hetzelfde (3)
- Iets slechter (4)
- Veel slechter (5)

Q24 Lopen:

- Ik heb geen problemen met lopen (1)
- Ik heb enige problemen met lopen (2)
- Ik ben bedlegerig (3)

Q25 Zelfzorg

- Ik heb geen problemen om mezelf te wassen of aan te kleden (1)
- Ik heb enige problemen om mezelf te wassen of aan te kleden (2)
- Ik ben niet in staat om mezelf te wassen of aan te kleden (3)

Q26 Dagelijkse activiteiten:

- Ik heb geen problemen met mijn dagelijkse activiteiten (1)
- Ik heb enige problemen met mijn dagelijkse activiteiten (2)
- Ik ben niet in staat mijn dagelijkse activiteiten uit te voeren (3)

Q27 Pijn/klachten

- Ik heb geen pijn of andere klachten (1)
- Ik heb matige pijn of andere klachten (2)
- Ik heb zeer ernstige pijn of andere klachten (3)

Q28 Stemming:

- Ik ben niet angstig of somber (1)
- Ik ben matig angstig of somber (2)
- Ik ben ernstig angstig of somber (3)

Q29 Hersenfuncties, zoals geheugen, aandacht en denken:

- Ik heb geen problemen met mijn geheugen, aandacht en denken (1)
- Ik heb enige problemen met mijn geheugen, aandacht en denken (2)
- Ik heb ernstige problemen met mijn geheugen, aandacht en denken (3)

Q30 Rookt u?

- Ja, aantal sigaretten per dag: (1) _____
- Nee (2)

Q31 Drinkt u alcohol?

- Ja, aantal glazen per week: (1) _____
- Nee (2)

Q32 De volgende vraag gaat over de ziekten en aandoeningen die u heeft of heeft gehad. Selecteer de ziekten en aandoeningen die u heeft of heeft gehad in de afgelopen 12 maanden. U kunt meer dan één antwoord aankruisen.

- Suikerziekte (1)
- Beroerte, hersenbloeding, herseninfarct of TIA (2)
- Hartfalen (3)
- Een vorm van kanker (kwaadaardige aandoening) (4)
- Astma, chronische bronchitis, longemfyseem of CARA/COPD (5)
- Onvrijwillig urineverlies (incontinentie) (6)
- Gewrichtsslijtage (artrose, slijtagereuma) van heupen of knieën (7)
- Botontkalking (osteoporose) (8)
- Gebroken heup (9)
- Andere botbreuken dan gebroken heup (10)
- Duizeligheid met vallen (11)
- Prostaatklachten door goedaardige prostaatvergroting (12)
- Depressie (13)
- Angst-/paniekstoornis (14)
- Dementie (15)
- Gehoorproblemen (16)
- Problemen met zien (17)
- Niets van bovenstaande (18)
- Wil ik niet zeggen (19)

Kwaliteit van leven

Q33 De volgende vragen gaan over hoe u zich de afgelopen maand heeft gevoeld. Kruis het hokje van het antwoord aan dat het beste bij u past.

Q34 Hoe vaak bent u in de afgelopen maand erg nerveus geweest?

- Altijd (1)
- Heel vaak (2)
- Redelijk vaak (3)
- Soms (4)
- Bijna nooit (5)
- Nooit (6)

Q35 Hoe vaak heeft u zich de afgelopen maand kalm en rustig gevoeld?

- Altijd (1)
- Heel vaak (2)
- Redelijk vaak (3)
- Soms (4)
- Bijna nooit (5)
- c Nooit (6)

Q36 Hoe vaak heeft u zich de afgelopen maand neerslachtig en somber gevoeld?

- Altijd (1)
- Heel vaak (2)
- Redelijk vaak (3)
- Soms (4)
- Bijna nooit (5)
- c Nooit (6)

Q37 Hoe vaak heeft u zich de afgelopen maand gelukkig gevoeld?

- Altijd (1)
- Heel vaak (2)
- Redelijk vaak (3)
- Soms (4)
- Bijna nooit (5)
- c Nooit (6)

Q38 Hoe vaak heeft u zich de afgelopen maand zo somber gevoeld dat niets u kon opvrolijken?

- Altijd (1)
- Heel vaak (2)
- Redelijk vaak (3)
- Soms (4)
- Bijna nooit (5)
- c Nooit (6)

Q39 Hoe vaak hebben uw lichamelijke gezondheid of emotionele problemen in de afgelopen maand uw sociale activiteiten (zoals bezoek aan vrienden of naaste familieleden) belemmerd?

- Voortdurend (1)
- Meestal (2)
- Soms (3)
- Zelden (4)
- Nooit (5)

Q40 De volgende vragen gaan over uw kwaliteit van leven. Daarmee wordt bedoeld wat u van uw leven vindt. Bijvoorbeeld of u tevreden met uw leven bent, of u plezier in uw leven heeft en of uw leven u voldoening geeft. Kruis het hokje van het antwoord aan dat het beste bij u past.

Q41 Hoe is in het algemeen uw kwaliteit van leven?

- Uitstekend (1)
- Erg goed (2)
- Goed (3)
- Redelijk (4)
- Slecht (5)

Q42 Welk rapportcijfer geeft u uw leven op dit moment? Vul een cijfer in tussen de 0 en 10.

Q43 Hoe is in het algemeen uw kwaliteit van leven, in vergelijking met een jaar geleden?

- Veel beter (1)
- Iets beter (2)
- Ongeveer hetzelfde (3)
- Iets slechter (4)
- Veel slechter (5)

Q44 Bent u de afgelopen 12 maanden opgenomen geweest in een ziekenhuis?

- Nee (1)
- Ja (2)

Q45 Heeft u de afgelopen 12 maanden voor uzelf, de huisartsenpost bezocht of een visite van een huisarts gehad in de avond, nacht, of weekend?

- Nee (1)
- Ja (2)

Q46 Heeft u thuiszorg? Bijvoorbeeld wijkverpleging of gezinsverzorging?

- Nee (1)
- Ja (2)

Q47 Bent u de afgelopen 12 maanden tijdelijk opgenomen geweest in een verzorgingstehuis? Bijvoorbeeld omdat u na een ziekenhuisopname nog niet direct naar huis kon.

- Nee (1)
- Ja (2)

Q48 Bent u de afgelopen 12 maanden tijdelijk opgenomen geweest in een verpleeghuis? Bijvoorbeeld omdat u na een ziekenhuisopname nog niet direct naar huis kon.

- Nee (1)
- Ja (2)

Q49 Gaat u naar dagopvang?

- Nee (1)
- Ja (2)

Q50 Gaat u naar dagbehandeling?

- Nee (1)
- Ja (2)

Taal

Q51 De volgende vragen gaan over de talen die u beheerst. Als u niet meer dan één taal spreekt, vul dan toch zo volledig mogelijk onderstaande vragen in. Het programma geeft zelf aan wanneer u een vraag over kunt slaan. Let op: we maken geen onderscheid tussen 'talen' en 'dialecten', dus beschouwen streektalen en dialecten als het Gronings of Drents ook als een taal!

Q52 Noteer alle talen die u beheerst in volgorde van dominantie/vaardigheid (de taal die u het beste kent eerst)

Taal 1 (1) _____

Taal 2 (2) _____

Taal 3 (3) _____

Taal 4 (4) _____

Taal 5 (5) _____

Q53 Noteer alle talen die u beheerst in de volgorde waarin u ze geleerd heeft (uw moedertaal eerst)

Taal 1 (1) _____

Taal 2 (2) _____

Taal 3 (3) _____

Taal 4 (4) _____

Taal 5 (5) _____

Q54 Geef aan hoeveel uur u per dag gemiddeld besteedt aan:

Lezen (1)

Televisie kijken (2)

Radio luisteren (3)

Email, internet (4)

Q55 Geef aan hoe vaak u de afgelopen twee weken elk van de talen heeft gebruikt. Doe dit door de talen te nummeren: 1 staat voor het meest gebruikt, 5 voor het minst gebruikt.

_____ Taal 1 (1)

_____ Taal 2 (2)

_____ Taal 3 (3)

_____ Taal 4 (4)

_____ Taal 5 (5)

Q56 Zijn er situaties waarin mensen horen dat u een accent heeft in uw niet-dominante taal?

- Ja (1)
- Nee (2)

Condition: Nee Is Selected. Skip To: Geef aan in welke mate u elke taal ge....

Q57 Zo ja, vindt u dit over het algemeen vervelend?

- Ja (1)
- Nee (2)

Q58 Vermijdt u daardoor omgevingen en situaties waarbij u in uw niet-dominante taal moet spreken?

- Ja (1)
- Nee (2)

Q59 Geef aan in welke mate u elke taal gebruikt in de volgende situaties. Doe dit door het hokje aan te kruisen dat uw taalsituatie het beste weergeeft. Niet alle situaties hoeven op u van toepassing te zijn. In dat geval kruist u het hokje nvt (niet van toepassing) aan. Met familie

	Nooit (1)	Zelden (2)	Soms (3)	Vaak (4)	Altijd (5)
Taal 1	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Taal 2	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Taal 3	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Taal 4	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Taal 5	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q60 Met vrienden

	Nooit (1)	Zelden (2)	Soms (3)	Vaak (4)	Altijd (5)
Taal 1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Taal 2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Taal 3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Taal 4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Taal 5	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Q61 Met buren

	Nooit (1)	Zelden (2)	Soms (3)	Vaak (4)	Altijd (5)
Taal 1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Taal 2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Taal 3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Taal 4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Taal 5	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Q62 Sport

	Nooit (1)	Zelden (2)	Soms (3)	Vaak (4)	Altijd (5)	nvt (6)
Taal 1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Taal 2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Taal 3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Taal 4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Taal 5	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Q63 Huisarts

	Nooit (1)	Zelden (2)	Soms (3)	Vaak (4)	Altijd (5)	nvt (6)
Taal 1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Taal 2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Taal 3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Taal 4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Taal 5	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Q64 Ziekenhuis

	Nooit (1)	Zelden (2)	Soms (3)	Vaak (4)	Altijd (5)	nvt (6)
Taal 1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Taal 2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Taal 3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Taal 4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Taal 5	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Q65 Thuiszorg

	Nooit (1)	Zelden (2)	Soms (3)	Vaak (4)	Altijd (5)	nvt (6)
Taal 1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Taal 2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Taal 3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Taal 4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Taal 5	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Q66 Kennissen

	Nooit (1)	Zelden (2)	Soms (3)	Vaak (4)	Altijd (5)
Taal 1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Taal 2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Taal 3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Taal 4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Taal 5	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Q67 Religieuze bijeenkomsten

	Nooit (1)	Zelden (2)	Soms (3)	Vaak (4)	Altijd (5)	nvt (6)
Taal 1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Taal 2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Taal 3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Taal 4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Taal 5	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Q68 Vrijwilligerswerk

	Nooit (1)	Zelden (2)	Soms (3)	Vaak (4)	Altijd (5)	nvt (6)
Taal 1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Taal 2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Taal 3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Taal 4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Taal 5	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Q69 Alle volgende vragen gaan over de kennis van de eerste drie talen, of minder als het zo uitkomt, die u bij de vorige vragen heeft opgeschreven.

Taal 1: _____

Q70 Alle vragen in dit blok gaan over uw kennis van het _____

Q71 Wat is de leeftijd waarop u het _____ begon te leren?

Q72 Wat is de leeftijd waarop u het _____ aardig kon gebruiken?

Q73 Wat is de leeftijd waarop u begon te lezen in het _____

Q74 Wat is de leeftijd waarop u het _____ aardig kon lezen?

Q75 Kunt u schrijven in het _____?

- Ja (1)
- nee (2)

Q116 Geef hieronder aan hoe goed u het _____ kunt lezen, spreken en begrijpen. Doe dit door ieder aspect een aantal sterren te geven: 1 ster is een slechte beheersing, 5 sterren is een hele goede beheersing.

_____ Lezen (1)

_____ Spreken (2)

_____ Begrijpen (3)

Q76 Geef aan in hoeverre de volgende factoren van invloed zijn geweest op het leren van het _____ op een schaal van 1 tot 5.

	Helemaal niet (1)	Niet (2)	Een beetje (3)	Van invloed (4)	Sterk van invloed (5)
Interactie met vrienden (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Interactie met familie (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lezen (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Opleiding/zelfinstructie (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Werk (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Televisie kijken (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Radio/muziek luisteren (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Internet/ online activiteiten (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q77 Geef aan in welke mate u het _____ gebruikt voor de volgende situaties. Doe dit weer op een schaal van 1 tot 5.

	Nooit (1)	Zelden (2)	Soms (3)	Vaak (4)	Altijd (5)
Lezen (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Televisie kijken (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Radio luisteren (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Email, internet (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q78 Geef aan in hoeverre u het eens bent met onderstaande beweringen over het _____ Doe dit op een schaal van vijf.

	Helemaal niet (1)	Niet eens (2)	Neutraal (3)	Eens (4)	Helemaal eens (5)
Ik vind het leuk om deze taal te spreken (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ik spreek deze taal met zekerheid (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ik vind het belangrijk om deze taal te spreken (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Taal 2: _____

Q79 Alle vragen in dit blok gaan over uw kennis van het _____

Q80 Wat is de leeftijd waarop u het _____ begon te leren?

Q81 Wat is de leeftijd waarop u het _____ aardig kon gebruiken?

Q82 Wat is de leeftijd waarop u begon te lezen in het _____?

Q83 Wat is de leeftijd waarop u het _____ aardig kon lezen?

Q84 Kunt u schrijven in het _____?

Ja (1)

Nee (2)

Q117 Geef hieronder aan hoe goed u het _____ kunt lezen, spreken en begrijpen. Doe dit door ieder aspect een aantal sterren te geven: 1 ster is een slechte beheersing, 5 sterren is een hele goede beheersing.

_____ Lezen (1)

_____ Spreken (2)

_____ Begrijpen (3)

Q85 Geef aan in hoeverre de volgende factoren van invloed zijn geweest op het leren van het _____ op een schaal van 1 tot 5.

	Helemaal niet (1)	Niet (2)	Een beetje (3)	Van invloed (4)	Sterk van invloed (5)
Interactie met vrienden (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Interactie met familie (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lezen (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Opleiding/zelfinstructie (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Werk (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Televisie kijken (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Radio/muziek luisteren (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Internet/ online activiteiten (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q86 Geef aan in welke mate u het _____ gebruikt voor de volgende situaties. Doe dit weer op een schaal van 1 tot 5.

	Nooit (1)	Zelden (2)	Soms (3)	Vaak (4)	Altijd (5)
Lezen (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Televisie kijken (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Radio luisteren (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Email, internet (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q87 Geef aan in hoeverre u het eens bent met onderstaande beweringen over het _____ Doe dit op een schaal van vijf.

	Helemaal niet (1)	Niet eens (2)	Neutraal (3)	Eens (4)	Helemaal eens (5)
Ik vind het leuk om deze taal te spreken (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ik spreek deze taal met zekerheid (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ik vind het belangrijk om deze taal te spreken (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Taal 3: _____

Q88 Alle vragen in dit blok gaan over uw kennis van het _____.

Q89 Wat is de leeftijd waarop u het _____ begon te leren?

Q90 Wat is de leeftijd waarop u het _____ aardig kon gebruiken?

Q91 Wat is de leeftijd waarop u begon te lezen in het _____

Q92 Wat is de leeftijd waarop u het _____ aardig kon lezen?

Q93 Kunt u schrijven in het _____

- Ja (1)
- Nee (2)

Q118 Geef hieronder aan hoe goed u het _____ kunt lezen, spreken en begrijpen. Doe dit door ieder aspect een aantal sterren te geven: 1 ster is een slechte beheersing, 5 sterren is een hele goede beheersing.

_____ Lezen (1)

_____ Spreken (2)

_____ Begrijpen (3)

Q94 Geef aan in hoeverre de volgende factoren van invloed zijn geweest op het leren van het _____ op een schaal van 1 tot 5.

	Helemaal niet (1)	Niet (2)	Een beetje (3)	Van invloed (4)	Sterk van invloed (5)
Interactie met vrienden (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Interactie met familie (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lezen (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Opleiding/zelfinstructie (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Werk (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Televisie kijken (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Radio/muziek luisteren (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Internet/ online activiteiten (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q95 Geef aan in welke mate u het _____ gebruikt voor de volgende situaties. Doe dit weer op een schaal van 1 tot 5.

	Nooit (1)	Zelden (2)	Soms (3)	Vaak (4)	Altijd (5)
Lezen (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Televisie kijken (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Radio luisteren (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Email, internet (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q96 Geef aan in hoeverre u het eens bent met onderstaande beweringen over het _____. Doe dit op een schaal van vijf.

	Helemaal niet (1)	Niet eens (2)	Neutraal (3)	Eens (4)	Helemaal eens (5)
Ik vind het leuk om deze taal te spreken (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ik spreek deze taal met zekerheid (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ik vind het belangrijk om deze taal te spreken (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Sociale relaties

Q97 De vragen in dit blok gaan over de vijf personen met wie u het meest in contact staat. U hoeft niet per se de naam van de betreffende persoon in te vullen als u dat liever niet wilt. In dat geval kunt u een pseudoniem gebruiken.

Q98 Persoon 1

- Naam (1)
- Hoe kent u deze persoon? (2)
- Welke taal/talen spreekt u met hem/haar? (3)
- Hoe vaak heeft u contact met hem/haar? (4)
- In welke situaties (thuis, sport, kerk, etc) (5)

Q99 Persoon 2

- Naam (1)
- Hoe kent u deze persoon? (2)
- Welke taal/talen spreekt u met hem/haar? (3)
- Hoe vaak heeft u contact met hem/haar? (4)
- In welke situaties (thuis, sport, kerk, etc) (5)

Q100 Persoon 3

- Naam (1)
- Hoe kent u deze persoon? (2)
- Welke taal/talen spreekt u met hem/haar? (3)
- Hoe vaak heeft u contact met hem/haar? (4)
- In welke situaties (thuis, sport, kerk, etc) (5)

Q101 Persoon 4

- Naam (1)
- Hoe kent u deze persoon? (2)
- Welke taal/talen spreekt u met hem/haar? (3)
- Hoe vaak heeft u contact met hem/haar? (4)
- In welke situaties (thuis, sport, kerk, etc) (5)

Q102 Persoon 5

- Naam (1)
- Hoe kent u deze persoon? (2)
- Welke taal/talen spreekt u met hem/haar? (3)
- Hoe vaak heeft u contact met hem/haar? (4)
- In welke situaties (thuis, sport, kerk, etc) (5)

Wisselen

Q103 Deze laatste vragen gaan over uw neiging om te wisselen tussen talen of talen te mixen tijdens een gesprek. Dit kan voorkomen in sommige tweetalige contexten. We willen graag kijken welke wisselpatronen mensen gebruiken tussen hun verschillende talen. Als u onzeker bent over hoe u zichzelf een score moet geven op de volgende vragen, probeer dan uw manier van spreken te vergelijken met dat van anderen, of van mensen die u goed kent.

Q104 Wanneer ik in de ene taal spreek, kan ik me bepaalde woorden in de andere taal niet herinneren of er niet opkomen.

- Nooit (1)
- Zelden (2)
- Soms (3)
- Vaak (4)
- Altijd (5)

Q105 Ik neig ernaar te wisselen tussen talen gedurende een gesprek met 1 persoon (ik wissel bijvoorbeeld van het Fries naar het Nederlands).

- Nooit (1)
- Zelden (2)
- Soms (3)
- Vaak (4)
- Altijd (5)

Q106 Ik realiseer me vaak niet wanneer ik van taal wissel gedurende een gesprek of wanneer ik twee of meer talen mix.

- Nooit (1)
- Zelden (2)
- Soms (3)
- Vaak (4)
- Altijd (5)

Q107 Ik realiseer me me pas dat ik van taal wissel gedurende een gesprek wanneer iemand mij op deze wisseling attendeert.

- Nooit (1)
- Zelden (2)
- Soms (3)
- Vaak (4)
- Altijd (5)

Q108 Als ik van taal wissel, doe ik dat bewust (deze staat 2 keer in de datafile, gewoon en reverse-coded (deze gebruiken voor analyse))

- Nooit (1)
- Zelden (2)
- Soms (3)
- Vaak (4)
- Altijd (5)

Q109 Ik vind het moeilijk om de taal wisselingen die ik introduceer tijdens een gesprek onder controle te houden.

- Nooit (1)
- Zelden (2)
- Soms (3)
- Vaak (4)
- Altijd (5)

Q110 Er zijn situaties waarin ik altijd wissel tussen de talen

- Nooit (1)
- Zelden (2)
- Soms (3)
- Vaak (4)
- Altijd (5)

Q111 Er zijn bepaalde onderwerpen of zaken waarvoor ik normaal gesproken wissel tussen de twee talen

- Nooit (1)
- Zelden (2)
- Soms (3)
- Vaak (4)
- Altijd (5)

Persoonlijkheid

Q112 Als allerlaatste staan hieronder een aantal eigenschappen die al dan niet op u van toepassing kunnen zijn. Geef alstublieft voor elke bewering aan in hoeverre u het met de bewering eens bent. Beoordeel steeds in hoeverre beide eigenschappen op u van toepassing zijn, zelfs wanneer één eigenschap misschien meer van toepassing is dan de andere eigenschap.

Q113 Ik zie mezelf als:

	Sterk oneens (1)	Enigszins oneens (2)	Klein beetje oneens (3)	Niet oneens, niet eens (4)	Klein beetje eens (5)	Enigszins eens (6)	Sterk eens (7)
Extravert, enthousiast (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Kritisch, ruziezoekend (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Grondig, gedisciplineerd (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Angstig, makkelijk van streek te brengen (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Open voor nieuwe ervaringen, levendige fantasie (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Gereserveerd, stil (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sympathiek, vriendelijk (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lui, gemakzuchtig (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Kalm, emotioneel stabiel (9)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Weinig artistieke interesse, weinig creatief (10)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q114 Heeft iemand u geholpen bij het invullen van deze vragenlijst?

- Nee, ik heb de lijst alleen ingevuld (1)
- Ja, iemand heeft mij geholpen met het invullen van deze lijst (2)
- Ja, ik heb de antwoorden samen met iemand gekozen en genoteerd (3)
- Ja, iemand heeft de antwoorden voor mij gekozen en genoteerd (4)

Q115 Dit is het einde van de vragenlijst. Eventuele opmerkingen over de vragenlijst kunt u hieronder invullen. Vergeet niet om ook de cognitieve taken te doen! Hartelijk bedankt voor het invullen van deze vragenlijst!!

APPENDIX B

Full tables VIP scores

Table B.1: Mean VIP scores of PLS regression on Flanker data

Variable	Components	Mean	St.d	Min	Max
Age	10	1.586	0.899	0.224	2.353
Gender2	10	0.236	0.021	0.215	0.281
Education	10	0.455	0.26	0.152	0.775
Income	10	0.624	0.133	0.446	0.802
Self-reported health	10	0.623	0.054	0.553	0.725
Quality of life	10	0.298	0.261	0.043	0.611
No. of languages	10	0.31	0.098	0.111	0.4
Proficiency L1	10	0.135	0.013	0.113	0.156
Proficiency L2	10	0.109	0.025	0.079	0.174
Proficiency L3	10	0.16	0.065	0.066	0.217
AoA L1	10	1.709	0.147	1.349	1.918

Table B.1 continued from previous page

AoA L2	10	2.585	0.391	2.233	3.434
AoA L3	10	2.601	0.613	2.055	3.971
Contextual switching	10	0.358	0.049	0.241	0.407
Attitude L1	10	0.163	0.132	0.014	0.345
Attitude L2	10	0.232	0.131	0.082	0.445
Attitude L3	10	0.231	0.049	0.15	0.282
Extravert	10	1.011	0.364	0.516	1.42
Agreeableness	10	0.469	0.234	0.196	0.819
Conscientiousness	10	0.904	0.145	0.601	1.107
Emotional stability	10	1.454	0.171	1.22	1.846
Open to experiences	10	1.613	0.124	1.359	1.851
Province 2	10	0.302	0.032	0.243	0.334
Province 3	10	0.183	0.014	0.157	0.209
Early/late 2l	10	0.242	0.07	0.082	0.319
Physically active	10	0.198	0.129	0.061	0.386
Musical instrument	10	0.237	0.116	0.091	0.37
Language combinations	10	1.196	0.148	0.92	1.393
Across-domain L1	10	0.447	0.332	0.121	0.927
Across-domain L2	10	1.26	0.17	0.84	1.462
Across-domain L3	10	0.964	0.094	0.873	1.181
Early/late 3l	10	0.378	0.131	0.143	0.493

Table B.1 continued from previous page

Number unique Ls	10	0.817	0.072	0.748	0.97
Number unique relations	10	0.409	0.041	0.308	0.47
Corsi span score	10	0.737	0.086	0.52	0.8

Table B.2: Mean VIP scores of PLS regression on WCST data

Variable	Components	Mean	St.d	Min	Max
Age	5	3.266	0.33	2.769	3.569
Gender2	5	0.179	0.029	0.137	0.213
Education	5	0.894	0.17	0.631	1.052
Income	5	0.734	0.113	0.592	0.881
Self-reported health	5	0.082	0.015	0.067	0.108
Quality of life	5	0.222	0.111	0.157	0.418
No. of languages	5	0.062	0.046	0.024	0.125
Proficiency L1	5	0.268	0.085	0.169	0.367
Proficiency L2	5	0.322	0.096	0.166	0.404
Proficiency L3	5	0.068	0.029	0.023	0.104
AoA L1	5	0.568	0.39	0.334	1.261
AoA L2	5	3.341	0.299	2.878	3.67
AoAL3	5	2.369	0.215	2.196	2.724
Contextual switching	5	0.188	0.051	0.121	0.264
Attitude L1	5	0.581	0.173	0.362	0.787

Table B.2 continued from previous page

Attitude L2	5	0.29	0.045	0.21	0.321
Attitude L3	5	0.08	0.027	0.034	0.098
Extravert	5	1.321	0.255	1.087	1.74
Agreeableness	5	0.174	0.066	0.095	0.266
Conscientiousness	5	0.8	0.223	0.603	1.182
Emotional stability	5	0.371	0.26	0.033	0.763
Open to experiences	5	0.783	0.237	0.626	1.2
Province 2	5	0.22	0.075	0.138	0.329
Province 3	5	0.162	0.024	0.133	0.193
earlyLate 2	5	0.264	0.053	0.197	0.32
Physically active	5	0.086	0.011	0.075	0.099
Musical instrument	5	0.236	0.092	0.091	0.325
Language combinations	5	0.424	0.047	0.383	0.492
Across-domain L1	5	0.071	0.027	0.024	0.09
Across-domain L2	5	0.29	0.175	0.126	0.478
Across-domain L3	5	0.093	0.048	0.026	0.159
Early/late l3	5	0.405	0.081	0.319	0.506
Number unique Ls	5	0.451	0.093	0.344	0.579
Number unique relations	5	0.363	0.169	0.175	0.585
Corsi span score	5	0.577	0.064	0.475	0.631

APPENDIX C

Questionnaire Turkish older adults

Linguistic questionnaire for Turkish older adults in the Netherlands

Anna Pot – a.pot@rug.nl

This questionnaire is meant to provide an overview of the individual language background, language use, the relation between language and healthcare and the wellbeing of Turkish older adults in the Netherlands. Questions are adapted from Keijzer (2007) and Wiggins, Netuveli, Hyde, Higgs, & Blane (2007).

City/town:.....

ID:

A. General information

1. Age (date):
2. Place of birth:
3. Current nationality:
4. Year of emigration:
5. Reason for migration:
6. Places of residence within the Netherlands:

B. Language profile

7. Which languages do you speak? (mother tongue, other languages)

.....
.....

8. Did you attend school in Turkey (what is the highest level of education that you have completed)?

- a. None
- b. Primary school
- c. Secondary school
- d. Higher education
- e. University, degree:

9. Do you have difficulties with reading and writing?

- a. Yes, in Turkish
- b. Yes, in Dutch
- c. Yes, in both languages
- d. No

10. Have you actively tried to learn the Dutch language?

.....
.....

11. Did you attend Dutch language courses? If yes, where, when, at your own initiative, and for how long? If no, why not and was it possible to attend Dutch courses?

.....
.....
.....

12. What was it like to 'start over' in the Netherlands/ to build up a life in the Netherlands?

.....
.....

.....
.....
13. What were your most important activities in the Netherlands/ what is/was your profession?
.....
.....

14. Do you feel at home in the Netherlands?

15. Has your Dutch improved during your time spend in the Netherlands? Why (not)?
.....
.....

16. Do you consider it important to be able to speak/read and understand Dutch?
.....
.....

17. Have you ever been back to Turkey during your time in the Netherlands? When was the last time and why? (family visits, holidays)
.....
.....

18. Do you feel at home in Turkey?

19. Would you like to definitively return to Turkey?
.....
.....

20. Has your Turkish improved/deteriorated during your time in the Netherlands? Why (not)?
.....
.....

21. Do you consider it important to be able to speak/read and understand Turkish?
.....
.....

22. Generally speaking, do you have more Turkish-speaking or Dutch-speaking contacts in the Netherlands?
.....
.....

23. Do you feel more at home with Dutch or with Turkish culture?
.....
.....

C. Family

24. What is your current marital status?

- a. Married
- b. Divorced
- c. Widow
- d. Living together not married
- e. Single

25. If your (ex)-partner was not born in the Netherlands, what were the reasons for him to migrate to the Netherlands?
.....
.....

26. In which year did your (ex)-partner come to the Netherlands?

27. Which language(s) do/did you and your (ex)-partner speak with each other?
- a. Only Turkish
 - b. Both Turkish and Dutch but mostly Turkish
 - c. Both Turkish and Dutch but mostly Dutch
 - d. Only Dutch
28. Do you have children?
- a. Yes, (number)
 - b. No
29. Which language(s) do you mostly use with your children?
- a. Only Turkish
 - b. Both Turkish and Dutch but mostly Turkish
 - c. Both Turkish and Dutch but mostly Dutch
 - d. Only Dutch
30. Which language(s) do your children speak with each other?

-
31. Do you have grandchildren?
- a. Yes, (number)
 - b. No
32. Which language(s) do you mostly use with your grandchildren?
- a. Only Turkish
 - b. Both Turkish and Dutch but mostly Turkish
 - c. Both Turkish and Dutch but mostly Dutch
 - d. Only Dutch
33. Which language(s) do your grandchildren speak with each other?

-
34. Do you encourage your (grand)children to speak Turkish?
- a. Yes, often
 - b. Yes, sometimes
 - c. No, never
35. If your (grand)children do not speak or understand Turkish, do you regret that?
- a. Not at all
 - b. No opinion
 - c. Yes
36. Does your family live in the Netherlands or in Turkey?

37. How do you keep in touch with those relatives in Turkey and how often?

D. Acquaintances/ social contacts/ language contacts

38. Have you made many new friends/ contacts in the Netherlands? How?

39. Which language do you speak with the majority of these people?

40. Do you ever read a newspaper? Turkish or Dutch?

41. Do you ever watch TV? Turkish or Dutch?

.....
42. Do you ever listen to music/radio? Turkish or Dutch?
.....

E. Dutch in daily life

43. Are there people in your immediate surroundings with which you have to speak Dutch? If yes, who are they and how frequent are you in contact?
.....
.....

44. How do you bring your message across in a clear manner? Do you make use of hand gestures, or do you repeat yourself? Do you feel comfortable speaking Dutch?
.....
.....

45. Do you require the Dutch language in your day-to-day activities? For example if you need to see the GP, if you receive a phone call or a letter?
.....
.....

46. Do you participate in activities that are organised in the neighbourhood? If yes, what sort of activities? If no, why not? (I cannot partake, I do not want to partake, I do not know of any activities)
.....
.....

F. Use of care and healthcare facilities

47. Do you receive care or assistance, from whom and in what language? Please specify.

- a. Family:
- b. Social network:
- c. From outside (institutions):

48. Do you know where you can find information about health and healthcare? Do you know to whom you can turn for help or assistance?
.....
.....

49. Are you able to express your healthcare wishes clearly? If yes, with whom? If no, where and with whom?
.....
.....

50. Do you go out on your own? If you require assistance, in what form exactly?
.....
.....

51. Do you ever use public transportation or a taxi service? If yes, what are your experiences with this? If no, why not?
.....
.....

52. Do you make use of an interpreter? If yes, when and whom (formal or informal)?
.....
.....

53. Are you satisfied with the care and assistance that you receive?

.....
.....

54. Do you ever lay awake at night? If yes, what bothers you?

.....
.....

G. Wellbeing

To conclude, I would like to ask you a number of questions regarding your wellbeing. You can answer whether this applies to you on a four-point scale: never, not often, sometimes, and often. The questions are concerned with how you have felt in the past two weeks.

- 55. My age prevents me from doing the things I would like to do*
1. Never 2. Not often 3. Sometimes 4. Often
- 56. I feel that what happens to me is out of my control*
1. Never 2. Not often 3. Sometimes 4. Often
- 57. I feel left out of things*
1. Never 2. Not often 3. Sometimes 4. Often
- 58. I can do the things I want to do
1. Never 2. Not often 3. Sometimes 4. Often
- 59. I feel that I can please myself what I do
1. Never 2. Not often 3. Sometimes 4. Often
- 60. Shortage of money stops me from doing things I want to do*
1. Never 2. Not often 3. Sometimes 4. Often
- 61. I look forward to each day
1. Never 2. Not often 3. Sometimes 4. Often
- 62. I feel that my life has meaning
1. Never 2. Not often 3. Sometimes 4. Often
- 63. I enjoy the things that I do
1. Never 2. Not often 3. Sometimes 4. Often
- 64. I feel full of energy these days
1. Never 2. Not often 3. Sometimes 4. Often
- 65. I feel that life is full of opportunities
1. Never 2. Not often 3. Sometimes 4. Often
- 66. I feel that the future looks good for me
1. Never 2. Not often 3. Sometimes 4. Often

Thank you for your participation!

*= Items on the wellbeing questionnaire that are reverse coded for scoring.

APPENDIX D

Methods and materials L2 learning

Table D.1: *Methods and materials relevant for L2 learning with older, low-educated migrants*

	Focus	Target group	Theory/Didactics	Design
Themis/IDEAL (VantRood Educational services)	Building self-confidence and language awareness	Low-educated, illiterate, female migrants	<ul style="list-style-type: none">• Socio-cultural theory (Vygotsky),• Paulo Freie (anthropology).• Dual language approach• Building a safe environment is key.	<ul style="list-style-type: none">• 5 theme-based modules• building communicative competence through real-life input• Support group learning• Portfolio based

	Focus	Target group	Theory/Didactics	Design
Thuis! (De Bot & Gastelaars, VU Amsterdam)	Social participation and communication	Low-educated, literate older migrants	<ul style="list-style-type: none"> • Task-based approach • Communicative focus • Implicit grammar instruction 	<ul style="list-style-type: none"> • 10 theme-based modules of daily situations • emphasis on speaking and listening • Each theme: taalriedel, dialogues, letters, info snippets, fill-in-the-gap, activity outside classroom.
Ijsbreker/Breekijzer (Gathier & De Kruyf, ThiemeMeulenhoff)	Speaking/writing skills	Low-educated adult learners	<ul style="list-style-type: none"> • Task-based instruction • Self-reflection. • VUT-model 	<ul style="list-style-type: none"> • Traditional speaking, reading and writing exercises. • Self-reflection exercises. • Oral exercises and activities outside the classroom.
Nieuwe Start! (UTC Nijmegen, NCB uitgeverij)	L2 learning	Low-educated adult learners	<ul style="list-style-type: none"> • Target situations CEFR: communicative • Portfolio-based learning • Grammar offered implicitly. • From implicit and receptive to explicit and productive. 	<ul style="list-style-type: none"> • Task-based exercises (reading and listening) build around events encountered by the Karis family, who just started their lives in NL. • Writing exercises geared towards understanding. • High-stakes outside the classroom exercises: talking to someone on the street and asking questions

Focus	Target group	Theory/Didactics	Design
Nederlands in Beeld (Sciarone, BOOM uitgeverij)	Low-educated, low-literate adult learners	<ul style="list-style-type: none"> ● Picture-based learning. Pictures and sentences are offered and practiced with (writing) exercises. 	<ul style="list-style-type: none"> ● 18 audio lessons with exercises. ● Vocabulary is practiced by offering pictures, attaching these to words and forming sentences with these words.
Nieuwe SpreekRecht (Eelen & Massy, Van In)	Communication, vocabulary and grammar	Low-educated learners	<ul style="list-style-type: none"> ● Task-based method. ● CEFR levels (Breakthrough and Waystage). ● Practical context ● Soap-serie in audio-format with short exercises, embedded in practical situations. ● Multi-media: focus is on building communication through in- and out-of-classroom exercises (in familiar contexts). ● Attention is paid to building vocabulary and elementary grammar rules.
Van top tot teen (Klomp-houwer & van Osnabrugge, Coutinho)	Health communication	Low-educated learners	<ul style="list-style-type: none"> ● Receptive orientation with integrated TPR. ● Audio support ● Repetition ● Not pure language learning ● 5 lessons around body and health. ● Each lesson: short animation explaining the basic terminology, practising terminology through multiple-choice exercises, interactive exercises.

	Focus	Target group	Theory/Didactics	Design
SpreekTaal (Het begint met taal & VU Amsterdam, NCB)	Speaking and society	L2 learners (all levels)	<ul style="list-style-type: none"> • Task-based communicative method, • ABCD model of Neuner (1981) (A: offering words and sentences, B: consolidation, C: guided production, D: free production) • TPR 	<ul style="list-style-type: none"> • 15 modules, 4 chapters each theme based. • Oral method: practicing pronunciation • Dialogues, listening and answering, pointing (TPR), jazz chants, repeating sentences/dialogue, picture-elicited free speech. • Small groups
De week van Karla (Vanderstocken, CBE Gent)	Communicative and story-based	Low-educated learners	<ul style="list-style-type: none"> • ‘Alfa Nt2 Richtgraad 1.1’ (lowest pre-literacy level) competences 	<ul style="list-style-type: none"> • Four oral and four written modules based around the main character Karla Meers. • Vocabulary exercises, taalriedels (jazz chants) and listening exercises.
Taalriedels (Deen & van Veen, BOOM)	Speaking, jazz-chants	L1 learners (illiterate)	<ul style="list-style-type: none"> • Jazz chants (Caroline Graham) • Chunk-based learning 	<ul style="list-style-type: none"> • Participants repeat jazz-chants, building up in length and difficulty. First look at the illustration, listen and fill-in-the-gap exercise, rhythmic repetition, responding in

	Focus	Target group	Theory/Didactics	Design
De deur uit (NT2, VU Amsterdam)	Social mobility assessment (women)	Low-educated, isolated female migrants	<ul style="list-style-type: none"> • Social participation 	<ul style="list-style-type: none"> • Individual stocktaking of what participant can do and wants to do, selecting of activity and goal-oriented learning. • Goal is to partake in activity
Kies je route (NT2, VU Amsterdam)	Social mobility assessment (men)	Low-educated male migrants	<ul style="list-style-type: none"> • Social participation 	
PictoANT2 (Borgesius, Brinks, Jaquet & Nijdam, Harcourt Test Publishers)	Sentence forming, grammar awareness	Low-literate L2 learners	<ul style="list-style-type: none"> • Step-wise learning, moving from receptive to productive: (1) listen and look, (2) point, (3) repeat, (4) name. • No explicit grammar rules are given. • TPR element 	<ul style="list-style-type: none"> • Twelve booklets of 8 pages each with pictures and text written out in full. • Sentences start short and simple and increase in length and difficulty. • Grammar is introduced accordingly.

Continue on the next page

	Focus	Target group	Theory/Didactics	Design
Een dag met Fatima Tas (Das, Coutinho)	Picture-story, listening and speaking	Low-educated, illiterate learners	<ul style="list-style-type: none"> • VUT-model • Phase-wise learning: from receptive to productive learning, with a transfer phase. • Large TPR component. 	<ul style="list-style-type: none"> • 128-picture story and accompanying CD about a day in the life of a Turkish woman in NL. • Simple exercises (repeating, answering questions, retelling) and sharing own experiences (through interviews, role-play). • TPR component integrated.
Praatwijzer/ Samen op Pad (ETV/ITTA)	Practical vocabulary and communication skills	L2 learners	<ul style="list-style-type: none"> • Practice oriented: social situations • Video-clips • Repetition 	<ul style="list-style-type: none"> • Practising relevant vocabulary through video-clip. • Various exercises and out-of-classroom exercise where learners put what is learned into practice.
Woord voor woord (Wind, Alfa-college Groningen)	Vocabulary, self-paced	Illiterate L2 learners	<ul style="list-style-type: none"> • Video-clips • Listening and repeating vocabulary • TPR 	

	Focus	Target group	Theory/Didactics	Design
Wij wonen nu in Nederland (Fiolet)	Vocabulary exercises rooted in life-stories	L2 learners	<ul style="list-style-type: none">• No clear theoretical background	<ul style="list-style-type: none">• Vocabulary learning through listening to and reading along with stories from migrants who live in the Netherlands.

Nederlandse samenvatting

We leven met zijn allen steeds langer, en zijn daarnaast ook mobieler dan ooit tevoren. Dit resulteert in een toenemende ouderenpopulatie in met name westerse samenlevingen, die ook in cultureel en taalkundig opzicht steeds diverser wordt. Gezond oud worden vormt daarmee een belangrijk maatschappelijk thema, en onderzoek naar de voorwaarden en factoren om zo optimaal mogelijk oud te worden staat ook in de sociale wetenschappen steeds meer in de belangstelling. Zo deed binnen de taalwetenschap (en in de populaire media daarbuiten) een onderzoek uit 2007 naar de relatie tussen het kunnen spreken van meerdere talen en dementie veel stof opwaaien. Hierin werd beweerd dat meertaligheid de zichtbare tekenen van dementie met gemiddeld vier jaar uit kan stellen. Sindsdien houdt veel van het onderzoek rond meertaligheid en veroudering zich bezig met de cognitieve voordelen van het spreken van meerdere talen.

Hoewel dit thema meer inzicht biedt in het creëren van optimale condities (het beheersen van meer dan een taal) om gezond ouder te worden, behelst een cognitief perspectief niet alle consequenties van de toenemende talige diversiteit in een vergrijzende samenleving. Voor maatschappelijke instanties, of de zorg, is deze toenemende meertaligheid soms problematisch in het kunnen bieden van de juiste informatie of hulp. Hoewel meertaligheid op individueel niveau dus een factor kan zijn die bijdraagt aan gezond ouder worden, wordt dit nog vaak los gezien van meertaligheid in een maatschappelijke context.

Dit proefschrift probeert deze twee aspecten van meertaligheid (in de samenleving) en veroudering bijeen te brengen. Er wordt verslag gedaan van een studie naar de invloed van meertaligheid op cognitie van een diverse populatie meertalige ouderen. Daarnaast wordt gekeken hoe het ouder worden in een meer- or

anderstalige omgeving van invloed is op het welbevinden en de gezondheid van een groep oudere Turkse migranten, voor wie de dominante taal van de omgeving verschilt van hun moedertaal. Samen bieden deze studies in dit proefschrift een inzicht in de manieren waarop de talige diversiteit zijn weerslag heeft op het proces van gezond ouder worden voor een diverse groep ouderen in de Nederlandse samenleving.

Wat betreft de cognitieve consequenties van meertaligheid wordt aangenomen dat, door het wisselen tussen talen en het daarbij onderdrukken van een van de talen (competitie), het brein als het ware wordt getraind. In de literatuur wordt meertaligheid daarom wel aangemerkt als een ‘levenservaring’, die de cognitieve prestaties verrijkt (zie bijv. Bialystok, 2017). Echter, het blijkt moeilijk om cognitieve effecten direct toe te kunnen schrijven aan meertaligheid alleen, wanneer we ook rekening houden met andere individuele levenservaringen (zoals het bespelen van een instrument, of sociale participatie in de samenleving).

Dit proefschrift rapporteert als eerste over een grote epidemiologische studie (n=387) naar de cognitieve consequenties van meertaligheid in een zeer diverse, oudere meertalige populatie in Nederland (waarbij ook wordt gekeken naar dialectgebruik). De resultaten tonen aan dat cognitieve voordelen alleen voorkomen onder bepaalde, individuele omstandigheden. Daarnaast kunnen ze niet los gezien worden van andere (levensstijl) factoren, zoals een hoge mate van kwaliteit van leven, persoonlijkheidskenmerken waaronder openstaan voor nieuwe ervaringen, en mogelijkheden de talen te gebruiken in sociale interactie. Bevindingen worden gerapporteerd in hoofdstukken 2 en 3.

Tot nu toe werden positieve effecten van meertaligheid op cognitie voornamelijk gevonden in sterk gecontroleerde studies, waarbij groepen een- en meertaligen minutieus op elkaar waren afgestemd. Enige ‘verstoringe’ factoren, zoals muzikale hobbies of een migranten status, zouden een positief effect van meertaligheid op cognitie maskeren (Bak, 2017). In dit proefschrift wordt juist een perspectief op meertaligheid beargumenteerd waarbij dit wordt gezien als een multidimensionale, individuele en contextuele factor die de variatie in taal ervaringen, geschiedenis en gebruiken van individuen erkent. Immers, meertaligheid laat zich niet bestuderen in een geïsoleerde laboratorium setting, maar is juist altijd in interactie met de omgeving en dus aan variatie onderhevig. Op deze manier worden juist de ‘verstoringe’ factoren gezien als factoren die de bijdrage

van meertaligheid aan cognitie op individueel niveau (en in een gebruikscontext) kunnen verhelderen.

Door te kijken naar een grote en diverse groep meertaligen kunnen we onze kennis van de operationalisering en impact van meertaligheid vergroten, maar sturen we daarnaast het veld ook min of meer terug naar zijn wortels. Voordat het eerste artikel over de algemene cognitieve effecten van meertaligheid werd gepubliceerd in 2004 (Bialystok e.a. 2004), gaven onderzoekers al aan dat meertaligen verschillende taal-modi kunnen hebben, naar gelang de context waarin ze zich begeven. Daardoor zouden prestaties op taalkundige metingen afhankelijk zijn van deze gebruikspatronen (zie bijv. Cooper, 1969; Grosjean, 1998).

Dit idee is recentelijk weer aangehaald in de Adaptive Control Hypothesis (Green & Abutalebi, 2013) en toegepast op cognitieve prestaties. Dit proefschrift bouwt voort op deze dynamische perceptie van taalgebruik, maar gaat ook verder en bekijkt deze dynamische meertaligheid in interactie met de communicatieve context en met andere levenservaringen. Op deze manier wordt de precieze rol van meertaligheid in cognitieve veroudering duidelijker.

Ouder worden in een meertalige context kan dus cognitieve voordelen hebben en daarmee bijdragen aan gezond ouder worden, zoals wordt beschreven in dit proefschrift. Echter wordt meertaligheid en veroudering, zoals gezegd, nog vaak los gezien van de maatschappelijke context waarin het oud worden plaatsvindt. Naast positieve (cognitieve) effecten van meertaligheid kan de verscheidenheid aan talen van individuen in de maatschappij juist ook barrières opwerpen in de communicatie, bijvoorbeeld over zorg, waardoor meertaligheid de route naar gezond ouder worden bemoeilijkt. Wanneer we een accuraat en gedetailleerd overzicht willen hebben van de invloed van meertaligheid op veroudering dient dit aspect dus ook te worden onderzocht.

Dit proefschrift behandelt daarom ook de vraag hoe ouder worden in een omgeving, waar de dominante taal verschilt van iemands moedertaal, barrières op kan werpen die het optimale verouderingsproces in de weg staan. Voorgaande studies in de medische literatuur hebben laten zien dat met name de groep oudere Turkse migranten in Nederland (en elders in Europa) over het algemeen in een slechtere staat van gezondheid verkeert dan hun Nederlandse leeftijdgenoten (zie bijvoorbeeld Uitewaal e.a. 2004; Stronk e.a. 2001). Ondanks dat een taalbarrière in deze studies vaak wordt genoemd als belemmering van de (gezond-

heids)communicatie (en hierdoor wellicht bijdraagt aan een slechtere staat van gezondheid), is de invloed van een taalbarrière nog nooit eerder systematisch onderzocht.

Het tweede deel van dit proefschrift probeert daarom in kaart te brengen hoe de taalkundige omgeving invloed heeft op het verouderingsproces, en dan met name op welbevinden, van een groep oudere Turkse vrouwen (n=39). Gekozen is voor een Turkse doelgroep, omdat zij een van de eerste grote groepen migranten zijn die oud worden in een Nederlandstalige context, en daarnaast over het algemeen een lage beheersing van het Nederlands hebben. De bevindingen, verkregen uit interview data, tonen aan dat met name een lage beheersing van de tweede taal (T2, Nederlands) gevoelens van talige onzekerheid in de hand werkt. Dit heeft vervolgens weer zijn weerslag op het aangaan van sociale relaties in de T2, gevoelens van verbondenheid en lagere niveaus van welbevinden. Dit geldt niet voor iedereen, maar het blijkt dat een goede inbedding in ofwel een eerste-ofwel een tweede taal netwerk deze talige onzekerheden kan verminderen en daardoor meer optimale condities creëren om gezond ouder te worden. Bevindingen worden gerapporteerd in hoofdstukken 3, 4 en 5.

De twee perspectieven op meertaligheid en gezond ouder worden die worden gepresenteerd in dit proefschrift vormen tezamen een reflectie op hoe we het concept meertaligheid benaderen in onderzoek naar taal en veroudering. Het is daarbij belangrijk te kijken naar de context waarin iemand zijn of haar ta(a)l(en) gebruikt. Taal kan dus een factor zijn in het verkrijgen van een hogere mate van welbevinden en optimale gezondheid voor sommige ouderen, evenals een levenservaring op zichzelf die onder bepaalde omstandigheden bijdraagt aan betere cognitieve prestaties. Daarnaast heeft een meertalige samenleving implicaties voor de participatie en inclusie van de groeiende groep ouderen met een anderstalige achtergrond in de maatschappij. Gezond ouder worden vanuit een taalwetenschappelijk perspectief behelst dus het creëren van optimale condities door het spreken van meerdere talen op individueel niveau, alsook het erkennen van de toenemende meertaligheid in de samenleving. De bevindingen en discussies in dit proefschrift onderstrepen de noodzaak voor studies die kijken naar het effect van taal op het verouderingsproces van individuen in meertalige omgevingen.

Curriculum vitae

Anna Pot (Leeuwarden, 1991) obtained a BA in English Language and Culture from the University of Groningen in 2012. In 2013, she completed her MA in Applied Linguistics at the University of Groningen (*summa cum laude*) with a dissertation that considered the optimisation of a test of academic literacy for university students in South-Africa, under the supervision of prof. Albert Weideman. In 2014, she started as a PhD candidate at the Center for Language and Cognition at the University of Groningen, and a member of the School for Behavioural and Cognitive Neuroscience (BCN). During her PhD, she was in charge of organising a monthly colloquium series on language development across the lifespan (LANSPAN), initiating meetings of the Applied Linguistics PhD support group, as well as setting up monthly lunch talks on linguistics by members of the Center for Language and Cognition in Groningen. She was co-organiser of a workshop on Bilingualism and Cognitive Aging held in 2015 in Groningen, as well as organiser of the TABU-dag (2016), an annual linguistics conference for early-career researchers.

The studies described in this dissertation have separately been submitted to or published as separate articles in different international peer-reviewed outlets:

- Pot, A., Keijzer, M.C.J. and de Bot, K. (2018). Intensity of multilingual language use predicts cognitive performance in some older adults. *Brain Sciences* 8(5), 92. **(Chapter 2)**
- Pot, A., Keijzer, M.C.J. and de Bot, K. (submitted). The contribution of multilingual close social relationships to cognitive reserve. Submitted to *Bilingualism: Language and Cognition*. **(Chapter 3)**

- Pot. A., Keijzer, M.C.J. and de Bot, K. (2018). Do low L2 abilities impede healthy aging for migrant older adults in the Netherlands? *Dutch Journal of Applied Linguistics* 7(1), 109-120. **(Chapter 4)**
- Pot. A., Keijzer, M.C.J. and de Bot, K. (2018). The language barrier in migrant aging. *International Journal of Bilingual Education and Bilingualism*. DOI: 10.1080/13670050.2018.1435627. **(Chapter 5)**
- Pot. A., Keijzer, M.C.J. and de Bot, K. (2017). Enhancing language awareness in migrants' third age to promote well-being. In Danuta Gabryś-Barker (ed.), *Third Age Learners of Foreign Languages*. (pp. 176-200). Bristol: Multilingual Matters. **(Chapter 6)**
- Pot, A., Keijzer, M.C.J. and de Bot, K. (2018). De taalbarrière bij oudere Turkse vrouwen nader onderzocht. *Tijdschrift voor Gerontologie en Geriatrie* 49(6), 274-282. DOI: <https://doi.org/10.1007/s12439-018-0270-8>.

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