Chapter 3
Gerontopsychology: Ageing is All in Your Head

Mike Martin, Nathan Theill and Vera Schumacher

3.1 Summary and Learning Goals

Gerontopsychology explores the effects of ageing on the brain and on personality. It explores how cognitive functions change with ageing and how individuals can cope with such change in order to maintain a high quality of life. An important age-related cognitive change is dementia, which is a disease that causes people to lose their memory and their capabilities. This chapter describes how common dementia is across Europe and it discusses what we can do to prevent it.

After reading this chapter, you should be able to:

- Explain what fluid and crystallized intelligence are
- State how fluid and crystallized intelligence change with old age
- Name four explanations for age-related changes in fluid and crystallized intelligence
- Explain why older people can have a good quality of life even when their cognitive health declines
- Describe what people can do to prevent dementia

3.2 What is Gerontopsychology?

Gerontopsychology is the field of psychology which investigates stability and changes of behaviour and experience of human beings in their later life. It assumes that processes of development and change in the course of ageing are not necessarily unidirectional decline processes, but rather can be multidirectional or stable. This is in contrast to the time gerontology became established as a discipline, when declines were the defining features of ageing or senescence. In contrast, gerontopsychology focuses on the developmental potentials of ageing individuals'

M. Martin (✉) · N. Theill · V. Schumacher
Institute of Psychology and International Normal Aging and Plasticity Imaging Center, University of Zurich, Zurich, Switzerland
e-mail: m.martin@psychologie.uzh.ch

K. Komp and M. Aartsen (eds.), *Old Age in Europe*, SpringerBriefs in Aging,
DOI: 10.1007/978-94-007-6134-6_3, © The Author(s) 2013

personal and environmental resources. Thus, there is a shift in research from pathological to healthy ageing.

3.3 Central Theories and Concepts in Gerontopsychology

In the following, the basic concepts and theories of gerontopsychology will be discussed, concentrating primarily on aspects of cognitive ageing. Two major concepts in this area are the concepts of cognitive health and of quality of life. Both terms refer to functional concepts of competence, i.e., they describe and explain how elementary cognitive and non-cognitive processes are actively managed by individuals to achieve stability in such complex functional outcomes as cognitive health and wellbeing. Cognitive health refers to "not just the absence of disease, but rather the development and preservation of the multidimensional cognitive structure that allows the elderly to maintain social connectedness, an ongoing sense of purpose, and the abilities to function independently, to permit functional recovery from illness or injury and to cope with residual functional deficits" (Hendrie et al. 2005, p. 1). Quality of life (QOL) refers to the "… integration of multiple subjective representations of the functionality of ones' resources. That is, QOL … is higher, the more strongly individuals represent their resources as being principally functional to perform complex activities that serve individually central life or goal domains" (Martin et al. 2012, p. 35). Thus, both concepts are situated in the individual and environmental context and imply that next to the characteristics of individual resources, influences such as the integration into social structures and the adaptation to different environments and situations have to be taken into consideration when measuring performance.

Cognition is composed of multiple abilities which demonstrate different developmental courses (multidimensionality), and the mean levels of most cognitive abilities decline differentially across adulthood (Park et al. 1996). Cognitive abilities can generally be categorized into two types of intelligence. In fact, a multitude of studies have reported age-related declines in measures of fluid intelligence such as speed of processing, working memory, cued and free recall, reasoning, or verbal fluency. In contrast, performance in tests of crystallized intelligence (Horn and Cattell 1967), i.e., experience—and culture-dependent non-speeded performances such as vocabulary normally increases quickly after mastering language and then more slowly across the lifespan well into very old age (multidirectionality). That is, despite the general tendency of a decrease in cognitive abilities, some individuals maintain or even increase their cognitive abilities in old age. More generally, cognitive ageing can be characterized by interindividual differences, generational differences, multidimensionality, and multidirectionality (Baltes and Schaie 1976).

Currently, four main theories are used to explain the differential age-related changes in measures of fluid and crystallized intelligence. Salthouse (1991, 1996) proposed the processing speed theory which assumes that the age-related differences in performance are the consequence of a general decrease in speed

of performing mental operations. According to Salthouse's theory the slowing in processing speed is related to all aspects of cognition whether they have a speed component or not (Park 1999). A similar theory is the one developed by Craik and Byrd (1982). They argue that the age-related decline in cognitive functioning is due to reduced processing resources. Processing resources describe the ability to self-initiate processes and to manipulate and process information and are best measured by working memory tasks. Although both theories explain age differences in more complex cognitive performances requiring the integration of multiple elementary cognitive processes, it is only speed that accounts for the variance in less effortful memory tasks such as spatial memory (Park et al. 1996). Hasher and Zacks (1988) see the decline in inhibitory control, i.e., the ability to suppress currently irrelevant informations or behaviours, as cause for cognitive deficits associated with age. According to this theory, older individuals have more problems to inhibit prior information from working memory, thus reducing the "work space" for new material (Glisky 2007). Another approach is to relate changes in sensory functions such as visual and auditory acuity to age-associated changes in cognitive function. Lindenberger and Baltes (1997) found that both, visual and auditory functions together can account for a large amount of the variation in intellectual functioning. These findings were the base of the their "common cause hypothesis" stating that sensory function, as a general marker of the intactness of the neurobiological architecture is fundamental for all cognitive functions and has, when it declines, a generally negative effect on all cognitive abilities (Park 1999).

All cognitive ageing theories can account for age differences in cognitive abilities. However, they differ in focusing on basic mechanisms such as processing speed or sensory functions that are closely linked to age-related changes in neuronal structures or in focusing on complex performances such as inhibitory control that allow the use of task-specific compensatory strategies and processes. Whereas the former can be influenced by large amounts of practice, but show hardly any transfer to untrained tasks (e.g., Willis et al. 2006), the latter can be improved through strategy trainings and adaptive interventions needing relatively small amounts of practice and promising a transfer to untrained tasks (e.g., Borella et al. 2010).

3.3.1 Multidimensionality, Multidirectionality, Individual Differences and Generational Differences

Schaie (1974) proposed that most of the age differences in the performance of cognitive abilities result from cohort differences rather than age differences and that "… presumed universal decline in adult intelligence is at best a methodological artifact" (Schaie 1974, p. 802). This suggests that factors other than age and practice in specific cognitive skills such as generational differences in schooling or use of technology should also be considered when looking at the development of cognitive abilities across the lifespan (Schaie 2005).

3.3.2 Cognitive Health

A concept which gained more and more interest in gerontopsychological research in the last few years is the concept of cognitive health. The term refers to individuals' ability to adapt their cognitive performance to changes in the environment and focuses on the ability to stabilize cognitive functioning. Whereas most existing cognitive ageing research focuses on the prediction of cognitive decline or on interventions aiming at improving impaired cognitive performance, cognitive health research examines which factors may support stable levels of cognitive functioning.

An important term in conjunction with cognitive health is plasticity. As healthy cognitive development is characterized by successful adaption to an individual's environment, successful adaption of a person in turn leads to behavioural as well as neuronal plasticity. Hence, the concept of cognitive health and cognitive plasticity are closely interconnected. Willis et al. (2009) define cognitive plasticity as individuals' latent cognitive potential or individuals' cognitive capacity under certain specified conditions. Since there is a close relationship between neuronal activation and cognition for specific cognitive abilities, cognitive plasticity should be observable in both neuronal as well as behavioural data. However, the exact relationship between them is still unclear. Some researchers have demonstrated that in older people there are only small or even negative effects between cognitive performance and the reductions in cortical volume (Rodrigue and Raz 2004). According to Stern (2002), for instance, cognitive plasticity can exist despite the fact that neuronal plasticity has been compromised (cognitive reserve).

In contrast to the passive models of brain reserve which see reserve as the result of brain size and synapses, the theory of active cognitive reserve states that the brain actively copes with or compensates for pathology. Concerning plasticity this means that the brain is able to utilize brain networks more efficiently or acquire new compensatory brain networks. This phenomenon has been observed in individuals with higher levels of intelligence and educational and occupational achievement. Whereas people with lower intelligence demonstrate functional deficits after brain damage, people in the same situation with a higher level of intelligence can maintain their performance level. This concept of cognitive reserve can be transferred to non-pathological ageing. Since the brain is subject to various age-associated decomposition processes, an active lifestyle can build up cognitive reserve, which allows long-term plasticity even in old age (Stern 2002).

3.3.3 Quality of Life

Quality of life (QOL) is increasingly suggested as the central outcome variable in research on health-improving or preventive interventions in old age (e.g. Garratt et al. 2002). This is based on the observation that objective improvements in resources, performances, and functioning often do not lead to similarly large improvements in levels of self-reported life satisfaction, wellbeing or QOL

(e.g., Clark et al. 2012), and that low levels of resources alone do not necessarily motivate individuals to use available and affordable interventions and respite services (e.g., Martin et al. 2009).

Although by now a large number of instruments measuring QOL or contributing factors have been developed (see Ettema et al. 2005), there is still no firm consensus on the exact definition of QOL. The WHO attempt (The WHOQOL Group 1995) to define QOL as a broad, metadisciplinary construct encompassing medical, psychological, and sociological aspects is helpful in that it gathers different conceptual strands into a shared framework. However, such a broad definition does not clearly separate QOL from similar—but distinct—constructs such as life satisfaction (Diener et al. 1985) and wellbeing (Ring et al. 2007).

There are currently two main approaches to determine QOL in old age: (a) the sQOL approach to measure the subjective evaluation of an individual's overall life situation and QOL, and (b) the oQOL approach to infer QOL of an individual from the outside, e.g., by measuring health impairments. The former approach rests on the assumption that QOL is by definition a subjective state and, consequently, must be measured through subjective statements. Here, the reported sQOL is often understood to reflect the discrepancy between an individual's current life situation and some subjectively ideal or optimal life situation. Examples of such measures are the SWLS ("Satisfaction with Life Scale"; Diener et al. 1985), the SEIQoL-DW ("Schedule of Evaluation of Individual Quality of Life—Direct Weighting"; Hickey et al. 1996) or the EUROHIS-QOL (Power et al. 2005). The instruments differ in determining sQOL either on the basis of global life satisfaction items (SWLS), or, via domain-specific satisfaction items (EUROHIS-QOL, SEIQoL-DW). However, the type and amount of domains that are used to define sQOL (e.g., physical health, environment, social relationships, autonomy, or spirituality) depend on the particular instrument and the population to be examined, thus making direct comparisons between different instruments difficult.

The second approach, which uses objective measures of QOL, is based on the assumption that oQOL is higher, the better—or less impaired—the given resources of a person are (independent of any subjective judgement). This way, oQOL can be determined more reliably, without individual report biases, and without requiring a statement from the person whose oQOL is being measured, such as in the case of dementia. However, it hardly takes into account interindividual differences in the functionality of available resources to achieve individually meaningful goals. What is more, the combined measurement of resources or resource impairments, is often positively labelled "quality of life" when in fact it is no more than a combination of resource impairment measures.

The fQOL model (Martin et al. 2012) defines QOL as the integration of multiple subjective representations of the functionality of ones' resources. That is, it assumes that fQOL is higher, the more strongly individuals represent their resources as being functional to perform complex activities that serve individually central life or goal domains. This model can be distinguished from the existing approaches: First, despite using subjective assessments, these are not satisfaction judgements, but rather functionality judgements. That is, a person can have similar levels of

sQOL with either high or low levels of objectively measured resources as long as the current levels of resources are represented as equally functional to achieve personally meaningful goals. If, for example, physical abilities are declining, one may no longer be able to run a farm to serve the goal of being close to nature, but one may be able to plant a small garden to achieve the same goal. If individuals manage to represent their physical abilities as equally functional to achieve the desired goal (and not to perform the same activity as before), their fQOL is stable.

3.3.4 Individual Coping Strategies

Cognitive health and QOL of a person depend strongly on the personal and environmental resources and on individuals' ability to adapt to different environments and situations. One self-regulatory mechanism to achieve a successful and healthy personal development and adaption is the selective optimization with compensation (SOC) strategy (Baltes and Baltes 1990). Selection refers to the process by which individuals choose tasks that are of high individual importance and that match their abilities. It is furthermore subdivided into elective selection (ES) which is guided by preference or social norms and loss-based selection (LS) which refers to a shift in personal goals due to a loss of internal or external resources. This means that the process of selection leads to a narrowing of alternative options so that persons concentrate on a reduced range of achievable goals. Because of the loss of resources in old age, the number of achievable goals usually decreases with increasing age (Baltes 1997). To achieve a selected goal, persons have to optimize their strategies by acquiring, refining and deploying resources. Optimization can be realized through training, learning new skills and high motivation (Staudinger and Bowen 2010). Compensation refers to acquisition and utilization of alternative means to reach given goals and keep performance at desired levels in face of actual or anticipated decreases in resources (Marcoen et al. 2007). A correct utilization of the SOC strategy should lead to better health, successful ageing and improved relationship quality (Freund and Baltes 2002).

Another self-regulatory approach related to the SOC concept, but more specifically related to cognitive functioning is the concept of resource orchestration. It assumes that performance in complex cognitive tasks such as job performance or problem solving requires the use of multiple cognitive abilities to various degrees in the course of performing the task. It requires the dynamic orchestration and timing of multiple skills. Therefore, the maximum performance level in a specific ability is hardly related to performance in a complex behaviour and, thus, improvement in elementary abilities, a typical goal of cognitive interventions, is unlikely to lead to large improvements in the complex, integrated behaviour or to transfer. Interventions using this approach instead define individually meaningful goals, identify the relevant abilities and focus on improving the orchestration process itself, i.e., helping to identify goals, helping to identify relevant abilities, and optimizing decisions when to use particular strategies to achieve the best possible match between variable environmental demands and individual goals (Zöllig et al. 2010).

3.4 What Does Gerontopsychology Tell Us about the Current State of Europe?

The demographic trend of the next years and decades in the more developed regions of the world shows an increasing life expectancy with older adults being the fastest growing group of the population (Dlugosz 2011; UN 2009). Europe currently has the highest median age of the population compared to all other parts of the world (Wancata et al. 2003). This involves numerous challenges for the society, the pension insurance, and the health care systems. One of the biggest challenges is the increase of the prevalence of dementia. Dementia is a disease that causes people to lose their cognitive ability faster than it would occur during the normal ageing process. As a result, people lose their memory, and later also their physical functioning. Between 5.9 and 9.4 % of all individuals aged 65 and older in Europe currently suffer from dementia (Berr et al. 2005) compared to less than 0.1 % in younger individuals (Harvey et al. 2003). Consequently, there is an increase of the prevalence of dementia with advancing age (Jorm and Jolley 1998; Ritchie and Kildea 1995). On average, the estimated prevalence of dementia in the population aged 60 and over in Europe is currently 6.2 % (Alzheimer's Disease International 2010), 60–70 % of those patients suffering from Alzheimer's disease (Berr et al. 2005; Bickel 2000). This prevalence rate is comparable to those of other more developed regions like North America or Australia, but is higher than those of other regions like Asia or Africa (Alzheimer's Disease International 2010). This is not surprising, since the more developed regions are characterized by longer life expectancies. Therefore, the average prevalence rate in Europe reflects the high prevalence of countries in Western Europe (7.2 %), which also have the highest life expectancy, whereas the rates in Central Europe (4.7 %) or Eastern Europe (4.8 %) are lower.

Estimations for the year 2050 assume that the number of dementia diseases in Europe is going to double, and the number in less developed regions is going to more than triple (Alzheimer's Disease International 2010). Here it becomes important that the life expectancy as well as the prevalence of dementia in Europe and other more developed regions is already comparatively high and in contrast to these regions, the population of the less developed regions is generally going to increase in the next decades, whereas in Europe only those parts of the population aged 60 and more is going to increase and the other parts of the population are expected to decrease. As a result, the ratio of older to younger individuals, especially those at working-age, will considerably increase in Europe. The same also applies to the ratio of demented persons. Were there still 69.4 persons in working-age per one demented person in 2000, this ratio will decrease until 2050 to 21.1 persons (Wancata et al. 2003). Currently, dementia costs in Europe reach 238 billion USD annually, 210 billion in Western Europe alone (Alzheimer's Disease International 2010). Therefore, it is important to investigate and determine the factors that could contribute to a successful cognitive ageing process and people being able to maintain their functional level up to an old age without developing a

dementia disease. On the other hand, it is just as important to arrange for adequate care provisions for those already suffering from dementia and to allow them a self-determined and independent life as long as possible. For that reason, we discuss how individual and environmental resources can contribute to maintaining this functional level and how an adaptation of the environment provides possibilities to live a mostly independent life despite dementia.

3.5 Current Debate in Gerontopsychology: Can We Stop Dementia?

The process of normal ageing generally involves a decline in cognitive abilities, but this does not imply that eventually everyone is losing his or her cognitive abilities or developing dementia. The majority of older adults are able to maintain their functional level up to very old age. To understand why some people suffer from dementia whereas others keep a functional level despite some losses, one must answer the question which individual or environmental resources may support successful cognitive ageing without developing dementia or help to compensate in case some cognitive abilities decrease. Although there are declines in many physical or cognitive resources, social resources and cognitive resources such as knowledge or strategic skills may increase with age. What is more, most resources can be improved through training interventions (Martin et al. 2011). When concerned with cognitively healthy ageing, the focus should, therefore, be on identifying these resources, the way they interact, and the factors that could contribute to strengthen them. Only this way is it possible to determine how the environment can be adapted to be adequate for different states of cognitive health or impairment.

3.5.1 Individual and Environmental Resources

Which are the specific resources and factors and how could they be influenced in a positive way? Clearly, cognitive resources are most relevant and engaging in cognitively demanding tasks should therefore represent one of the most promising strategies. Indeed, it has been shown that cognitive and intellectual stimulation seems to contribute to a cognitively healthy ageing process and prevent dementia (Qiu et al. 2001; Verghese et al. 2003; Wang et al. 2002; Wilson et al. 2002). Education itself is often reported to have a protective effect on dementia (Fratiglioni et al. 2007; Qiu et al. 2001). However, it is not clear if education is able to prevent dementia diseases or if educated people only are clinically diagnosed at a later date because of their capabilities and strategies to compensate for losses for some time. On the other hand, there are also physical conditions such as the absence of diabetes or even nutritional factors that are reported to have a

protective effect on dementia (Fratiglioni et al. 2007; Ritchie et al. 2010), just as socially and physically stimulating activities (Fratiglioni et al. 2007; Laurin et al. 2001). However, most of the reported effects are based on retrospective data, whereas causal effects require intervention studies. There are a number of cognitive training intervention studies that could show benefits of training, mainly on the targeted cognitive ability in healthy older adults (Willis et al. 2006). Cognitive trainings are supposed to have a positive effect not only in cognitively healthy older adults but also in risk groups or individuals with mild cognitive impairment (Belleville 2008; Mowszowski et al. 2010) and even in patients already suffering from dementia or Alzheimer's disease (Buschert et al. 2010). In addition to cognitive training interventions, a series of studies investigated the effect of physical training interventions on cognitive abilities and the progress of dementia. In general, they could show a positive effect of physical trainings on cognitive abilities in older adults (Colcombe and Kramer 2003). Even in individuals with cognitive impairment or dementia physical training improves cognitive function (Heyn et al. 2004), and, therefore, may protect against cognitive decline and dementia (Rolland et al. 2008).

Most training interventions involve a single target domain such as for example physical or cognitive ability. However, it is well established that global cognitive stimulation is more effective than training of specific cognitive functions (Sitzer et al. 2006) and that enriched environments allowing to engage in activities that activate different mental, physical or social skills has been shown to be more beneficial than in one of those activities alone (Karp et al. 2006). Moreover, strengthening of different resources could allow individuals to better adapt and compensate in case of losses in particular domains. Unfortunately, there are only few studies that have investigated the effect of combining cognitive and physical trainings. They have reported a potential long-term effect of combined training interventions on cognitive performance in healthy older adults that is superior to the single trainings (Fabre et al. 2002).

Although there are some additional benefits when training different resources separately, to gain an optimal effect on the functional level of older adults it is not sufficient to improve all these resources separately. In daily life, multiple cognitive and motor resources are often engaged simultaneously. Situations involving the simultaneous recruitment of cognitive and physical resources are usually more difficult to manage for older adults (Theill et al. 2011). Therefore, to maintain or even improve the global functional level, one would have to train different resources simultaneously for the training to correspond with demands in everyday life (for an example see Schaefer and Schumacher 2011). Future research in this area of simultaneous multiple ability trainings that can be integrated into everyday life will be most informative about interventions that may help to maintain high levels of functioning and by definition protect against declines or dementia.

We have argued that cognitive health and Quality of Life as concepts of functional competence are complementary to single ability deficit-oriented models of ageing. Both assume that active ageing can orchestrate the stability of important goal functions of health, productivity, and wellbeing, and that their individual

and subjective representation of the goal-relatedness of their behaviour drives the adaptive use of individual and social resources. Evidence for the effectiveness of interventions aiming at simultaneously supporting multiple resources that are dynamically related to complex performance and the stabilization of cognitive health and Quality of Life is now needed to develop interventions that can truly be considered relevant for the everyday lives of ageing individuals.

3.5.2 Adaptation of the Environment

The previous section has demonstrated that even patients with dementia can benefit from cognitively, physically or socially stimulating activities, as they could be able to positively influence the progress of disease. Strengthening these resources should, therefore, be a substantial part of treatment, since patients with dementia are especially at risk to reduce their activities and become socially isolated. But older adults with dementia also have specific housing and care needs due to their physical and cognitive status (Van Hoof and Kort 2009). Depending on the available resources, the environment has to be adapted so that an optimal person-environment fit provides adequate care and allows a self-determined and independent life for as long as possible. However, for an optimal person-environment fit one always has to consider the individual resources and goals of a person concerned, such as general mobility or the current social context situation, but also the presence of other physical or mental diseases that require treatment and care. Only with an individual adaptation a maximum wellbeing of patients can be guaranteed. Which are the care provisions in Europe and do they meet the requirements for an optimal adaptation of the environment?

There are huge differences in the offers for care provisions depending on the country across Europe. On the one hand, there are countries especially in Southern Europe like Greece, Italy or Spain, where the family predominantly provides care (Van Hoof et al. 2009). In this situation, the family usually makes the adaptation of the environment by supporting and taking care of their relatives suffering from dementia. The patients are therefore less frequently institutionalised, but in turn they are often not able to benefit from professional care and the situation could be a burden for the relatives and, as a consequence, for the patients as well. On the other hand, in most of the Western European countries, a collective responsibility exists for people who require intensive forms of care (Van Hoof et al. 2009). Here, although dementia is the major cause for institutionalisation in old age (Aguero-Torres et al. 2001), in the Western European countries the majority of patients with dementia are still cared for at home (De Vugt et al. 2006). Most European governments promote the construction of lifetime homes and different forms of non-institutional living in the own dwelling or assisted-living facilities (Van Hoof et al. 2009). However, in many cases institutional care is inevitable and the goal should then be to arrange these institutions as home-like as possible. One possibility for such care provisions are small-scale living or group living arrangements which can be found in the Netherlands, Belgium, France, Germany, Sweden, or the United Kingdom (Verbeek et al. 2009). These accommodations are characterized by a comparatively small size of six to eight people, and

provide 24 h-care and surveillance by one or two staff members (Van Hoof et al. 2009). Some of the rooms are shared such as the kitchen, living room, and in most cases the sanitary units, whereas there are also private areas with patients' own furniture and goods (Van Hoof et al. 2009). Such living arrangements are advantageous because they provide a homelike living community in combination with intensive professional care and treatment, which can be optimally adapted to the individual needs of the patients. Therefore, care provision should generally provide the adaptation of the environment to the individual needs and available resources of the patients, which in turn leads to different forms of interventions and care, but always support independence and a maximum perceived control for the person concerned.

Check Your Progress: A Quiz on Gerontopsychology

Question 3.1: How is the kind of intelligence called that is related to speed of processing and reasoning?

(a) Advanced intelligence
(b) Crystallized intelligence
(c) Crystalline intelligence
(d) Fluid intelligence
(e) Soft intelligence

Question 3.2: How does intelligence usually change when people age?

(a) Fluid intelligence stays the same, crystallized intelligence declines
(b) Fluid intelligence increases, crystallized intelligence declines
(c) Fluid intelligence declines, crystallized intelligence declines
(d) Fluid intelligence declines, crystallized intelligence remains the same
(e) Fluid and crystallized intelligence remains the same

Question 3.3: Which of the following is *not* a reason for age-related changes in intelligence?

(a) Sensory function decreases, which impacts cognitive function
(b) Vitamin deficiencies impact cognitive functioning
(c) Older people lose some of their cognitive processing resources
(d) All cognitive process slow down with age
(e) Older people suppress irrelevant information less effectively

Question 3.4: What is quality of life?

(a) It is the same as wellbeing
(b) It is the same as life satisfaction
(c) It describes the absence of diseases
(d) It describes a state where older people can do what they consider important
(e) It describes a state where older people can do everything they also could do as a youth

Question 3.5: Which of the following does *not* help to prevent or balance out dementia? (multiple answers possible)

(a) Do mentally demanding things
(b) Do sports regularly
(c) Drink enough water
(d) Get help from family members
(e) Spend time in warm climates

References

Aguero-Torres, H., Von Strauss, E., Viitanen, M., Winblad, B., & Fratiglioni, L. (2001). Institutionalization in the elderly: The role of chronic diseases and dementia. Cross-sectional and longitudinal data from a population-based study. *Journal of Clinical Epidemiology, 54*(8), 795–801.

Alzheimer's Disease International (2010). *World Alzheimer Report 2010*. London, United Kingdom.

Baltes, P. B. (1997). On the incomplete architecture of human ontogeny. Selection, optimization, and compensation as foundation of developmental theory. *American Psychologist, 52*(4), 366–380.

Baltes, P. B., & Baltes, M. M. (1990). Psychological perspectives on successful aging: The model of selective optimization with compensation. In P. B. Baltes & M. M. Baltes (Eds.), *Successful aging: Perspectives from the behavioral sciences* (pp. 1–34). Cambridge: Cambridge University Press.

Baltes, P. B., & Schaie, K. W. (1976). On the plasticity of intelligence in adulthood and old age: Where Horn and Donaldson fail. *American Psychololologist, 31*(10), 720–725.

Belleville, S. (2008). Cognitive training for persons with mild cognitive impairment. *International Psychogeriatrics, 20*(1), 57–66.

Berr, C., Wancata, J., & Ritchie, K. (2005). Prevalence of dementia in the elderly in Europe. *European Neuropsychopharmacology, 15*(4), 463–471.

Bickel, H. (2000). Demenzsyndrom und Alzheimer Krankheit: Eine Schätzung des Krankenbestandes und der jährlichen Neuerkrankungen in Deutschland [Dementia syndroms and yearly incidence in Germany]. *Gesundheitswesen, 62*, 211–218.

Borella, E., Carretti, B., Riboldi, F., & De Beni, R. (2010). Working memory training in older adults: Evidence of transfer and maintenance effects. *Psychology and Aging, 25*(4), 767–778.

Buschert, V., Bokde, A. L., & Hampel, H. (2010). Cognitive intervention in alzheimer disease. *Neurology, 6*(9), 508–517.

Clark, F., Jackson, J., Carlson, M., Chou, C., Cherry, B. J., Jordan-Marsh, M., Knight, B. G., Mandel, D., Blanchard, J., Granger, D.A., Wilcox, R.R., Lai, M.Y., White, B., Hay, J., Lam, C., Marterella, A., & Azen, S.P. (2012). Effectiveness of a lifestyle intervention in promoting the well-being of independently living older people: Results of the well elderly 2 randomised controlled trial. *Journal of Epidemiology and Community Health*, *66*(9), 782–790.

Colcombe, S., & Kramer, A. F. (2003). Fitness effects on the cognitive function of older adults: A meta-analytic study. *Psychological Science, 14*(2), 125–130.

Craik, F. I. M., & Byrd, M. (1982). Aging and cognitive deficits: The role of attentional resources. In F. I. M. Craik & S. Trehub (Eds.), *Aging and cognitive processes* (pp. 191–211). New York: Plenum Press.

De Vugt, M. E., Jolles, J., van Osch, L., Stevens, F., Aalten, P., Lousberg, R., et al. (2006). Cognitive functioning in spousal caregivers of dementia patients: Findings from the prospective MAASBED study. *Age and Ageing, 35*(2), 160–166.

Diener, E., Emmons, R. A., Larson, R. J., & Griffin, S. (1985). The satisfaction with life scale. *Journal of Personality Assessment, 49*(1), 71–75.

Dlugosz, Z. (2011). Population ageing in Europe. *Procedia Social and Behavioral Sciences, 19*, 47–55.

Ettema, T. P., Dröes, R.-M., de Lange, J., Mellenbergh, G. J., & Ribbe, M. W. (2005). A review of quality of life instruments used in dementia. *Quality of Life Research, 14*(3), 675–686.

Fabre, C., Chamari, K., Mucci, P., Masse-Biron, J., & Prefaut, C. (2002). Improvement of cognitive function by mental and/or individualized aerobic training in healthy elderly subjects. *International Journal of Sports Medicine, 23*(6), 415–421.

Fratiglioni, L., Winblad, B., & Von Strauss, E. (2007). Prevention of Alzheimer's disease and dementia. Major findings from the Kungsholmen Project. *Physiology and Behavior, 92*(1–2), 98–104.

Freund, A. M., & Baltes, P. B. (2002). Life-management strategies of selection, optimization, and compensation: Measurement by self-report and construct validity. *Journal of Personality and Social Psychology, 82*(4), 642–662.

Garratt, A., Schmidt, L., Mackintosh, A., & Fitzpatrick, R. (2002). Quality of life measurement: Bibliographic study of patient assessed health outcome measures. *British Medical Journal, 324*, 1–5.

Glisky, E. L. (2007). Changes in cognive function in human aging. In D. R. Riddle (Ed.), *Brain aging: Models, methods, and mechanisms* (pp. 3–20). Boca Raton: CRC Press.

Harvey, R. J., Skelton-Robinson, M., & Rossor, M. N. (2003). The prevalence and causes of dementia in people under the age of 65 years. *Journal of Neurology, Neurosurgery and Psychiatry, 74*(9), 1206–1209.

Hasher, L., & Zacks, R. T. (1988). Working memory, comprehension, and aging: A review and a new view. In G. H. Bower (Ed.), *The psychology of learning and motivation* (Vol. 22, pp. 193–225). San Diego, SA: Academic Press.

Hendrie, H.C., Albert, M.S., Butters, M.D., Gao, S., Knopman, D.S., Launer, L.J., & Yaffe, K. (2005). *Report from the critical evaluation study committee of the cognitive and emotional health project.* http://trans.nih.gov/cehp/CriticalEvaluationStudyReport.pdf. Accessed on 16 June 2012.

Heyn, P., Abreu, B. C., & Ottenbacher, K. J. (2004). The effects of exercise training on elderly persons with cognitive impairment and dementia: A meta-analysis. *Archives of Physical Medicine and Rehabilitation, 85*(10), 1694–1704.

Hickey, A. M., Bury, G., O'Boyle, C. A., Bradley, F., O'Kelly, F. D., & Shannon, W. (1996). A new short form individual quality of life measure (SEIQoL-DW): Application in a cohort of individuals with HIV/AIDS. *British Medical Journal, 313*(7048), 29–33.

Horn, J. L., & Cattell, R. B. (1967). Age differences in fluid and crystallized intelligence. *Acta Psychologica, 26*(2), 107–129.

Jorm, A. F., & Jolley, D. (1998). The incidence of dementia: A meta-analysis. *Neurology, 51*(3), 728–733.

Karp, A., Paillard-Borg, S., Wang, H. X., Silverstein, M., Winblad, B., & Fratiglioni, L. (2006). Mental, physical and social components in leisure activities equally contribute to decrease dementia risk. *Dementia and Geriatric Cognitive Disorders, 21*(2), 65–73.

Laurin, D., Verreault, R., Lindsay, J., MacPherson, K., & Rockwood, K. (2001). Physical activity and risk of cognitive impairment and dementia in elderly persons. *Archives of Neurology, 58*(3), 498–504.

Lindenberger, U., & Baltes, P. B. (1997). Intellectual functioning in old and very old age: Cross-sectional results from the Berlin Aging Study. *Psychology and Aging, 12*(3), 410–432.

Marcoen, A., Coleman, P. G., & O'Hanlon, A. (2007). Psychological ageing. In J. Bond, S. M. Peace, F. Dittman-Kohli, & G. Westerhof (Eds.), *Ageing in Society* (3rd ed., pp. 38–67). London: Sage.

Martin, M., Clare, L., Altgassen, A.M., Cameron, M.H., & Zehnder, F. (2011). *Cognition-based interventions for healthy older people and people with mild cognitive impairment.* Cochrane Database of Systematic Reviews. http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD006220.pub2/pdf/standard. Accessed 16 June 2012.

Martin, M., Peter-Wight, M., Braun, M., Hornung, R., & Scholz, U. (2009). The 3-phase model of dyadic adaptation to dementia: Why it might sometimes be better to be worse. *European Journal of Aging, 6*(4), 291–301.

Martin, M., Schneider, R., Eicher, S., & Moor, C. (2012). The functional quality of life (fQOL) model: A new basis for Quality of life-enhancing interventions in old age. *Journal of Gerontopsychology and Geriatric Psychiatry, 25*(1), 33–40.

Mowszowski, L., Batchelor, J., & Naismith, S. L. (2010). Early intervention for cognitive decline: Can cognitive training be used as a selective prevention technique? *International Psychogeriatrics, 22*(4), 537–548.

Park, D. C. (1999). *Cognitive aging: A primer*. Philadelphia, PA: Psychology Press.

Park, D. C., Smith, A. D., Lautenschlager, G., Earles, J. L., Frieske, D., Zwahr, M., et al. (1996). Mediators of long-term memory performance across the life span. *Psychology and Aging, 11*(4), 621–637.

Power, M., Quinn, K., Schmidt, S., & the WHOQOL-OLD Group. (2005). Development of the WHOQOL-old module. *Quality of Life Research, 14*(10), 2197–2214.

Qiu, C., Backman, L., Winblad, B., Aguero-Torres, H., & Fratiglioni, L. (2001). The influence of education on clinically diagnosed dementia incidence and mortality data from the Kungsholmen Project. *Archives of Neurology, 58*(12), 2034–2039.

Ring, L., Höfer, S., McGee, H., Hickey, A., & O'Boyle, C. A. (2007). Individual quality of life: Can it be accounted for by psychological or subjective well-being? *Social Indicators Research, 82*(3), 443–461.

Ritchie, K., Carriere, I., Ritchie, C. W., Berr, C., Artero, S., & Ancelin, M. L. (2010). Designing prevention programmes to reduce incidence of dementia: Prospective cohort study of modifiable risk factors. *BMJ, 341*, 1–9.

Ritchie, K., & Kildea, D. (1995). Is senile dementia "age-related" or "ageing-related"?–evidence from meta-analysis of dementia prevalence in the oldest old. *Lancet, 346*(8980), 931–934.

Rodrigue, K. M., & Raz, N. (2004). Shrinkage of the entorhinal cortex over five years predicts memory performance in healthy adults. *The Journal of Neuroscience, 24*(4), 956–963.

Rolland, Y., Abellan van Kan, G., & Vellas, B. (2008). Physical activity and Alzheimer's disease: From prevention to therapeutic perspectives. *Journal of the American Medical Directors Association, 9*(6), 390–405.

Salthouse, T. A. (1991). *Theoretical perspectives on cognitive aging*. Hillsdale: L. Erlbaum Associates.

Salthouse, T. A. (1996). The processing-speed theory of adult age differences in cognition. *Psychological Review, 103*(3), 403–428.

Schaefer, S., & Schumacher, V. (2011). The interplay between cognitive and motor functioning in healthy older adults: Findings from dual-task studies and suggestions for intervention. *Gerontology, 57*(3), 239–246.

Schaie, K. W. (1974). Translations in gerontology–from lab to life. Intellectual Functioning. *American Psychologist, 29*(11), 802–807.

Schaie, K. W. (2005). Longitudinal studies. In K. W. Schaie (Ed.), *Developmental influences on adult intelligence: The Seattle longitudinal study* (pp. 112–132). New York: Oxford University Press.

Sitzer, D.I., Twamley, E.W., & Jeste, D.V. (2006). Cognitive training in Alzheimer's disease: A meta-analysis of the literature. *Acta Psychiatrica Scandinavica, 114*(2), 75–90.

Staudinger, U. M., & Bowen, C. E. (2010). Life-Span perspectives on positive personality development in adulthood and old age. In M. E. Lamb & A. M. Freund (Eds.), *The handbook of lifespan development: Social and emotional development* (Vol. 2, pp. 254–297). New Jersey: Wiley.

Stern, Y. (2002). What is cognitive reserve? Theory and research application of the reserve concept. *Journal of the International Neuropsychological Society, 8*(3), 448–460.

Theill, N., Martin, M., Schumacher, V., Bridenbaugh, S. A., & Kressig, R. W. (2011). Simultaneously measuring gait and cognitive performance in cognitively healthy and cognitively impaired older adults: The Basel motor-cognition dual-task paradigm. *Journal of the American Geriatrics Society, 59*(6), 1012–1018.

The WHOQOL Group. (1995). The World Health Organisation quality of life assessment (WHOQOL). Position paper from the World Health Organisation. *Social Science and Medicine, 41*(10), 1403–1409.

United Nations (2009). *World population prospects: The 2008 revision, highlights.* Working Paper no. ESA/WP.210. New York: United Nations.

Van Hoof, J., & Kort, H. S. M. (2009). Supportive living environments. A first concept of a dwelling designed for older adults with dementia. *Dementia, 8*(2), 293–316.

Van Hoof, J., Kort, S. M. H., & van Waarde, H. (2009). Housing and care for older adults with dementia: A European perspective. *Journal of Housing and the Built Environment, 24*(3), 369–390.

Verbeek, H., van Rossum, E., Zwakhalen, S. M., Kempen, G. I., & Hamers, J. P. (2009). Small, homelike care environments for older people with dementia: A literature review. *International Psychogeriatrics, 21*(2), 252–264.

Verghese, J., Lipton, R. B., Katz, M. J., Hall, C. B., Derby, C. A., Kuslansky, G., et al. (2003). Leisure activities and the risk of dementia in the elderly. *The New England Journal of Medicine, 348*(25), 2508–2516.

Wancata, J., Musalek, M., Alexandrowicz, R., & Krautgartner, M. (2003). Number of dementia sufferers in Europe between the years 2000 and 2050. *European Psychiatry: The Journal of the Association of European Psychiatrists, 18*(6), 306–313.

Wang, H. X., Karp, A., Winblad, B., & Fratiglioni, L. (2002). Late-life engagement in social and leisure activities is associated with a decreased risk of dementia: A longitudinal study from the Kungsholmen project. *American Journal of Epidemiology, 155*(12), 1081–1087.

Willis, S. L., Schaie, K. W., & Martin, M. (2009). Cognitive plasticity. In V. Bengtson, M. Silverstein, & N. Putney (Eds.), *Handbook of theories of aging* (pp. 295–322). New York: Springer Publishing.

Willis, S.L., Tennstedt, S.L., Marsiske, M., Ball, K., Elias, J., Mann Koepke, K., Morris, J.N., Rebok, G.W., Unverzagt, F.W., Stoddard, A.M., Wright, E., for the ACTIVE Study Group (2006). Long-term effects of cognitive training on everyday functional outcomes in older adults. *Journal of the American Medical Association, 296*(23), 2805–2814.

Wilson, R. S., Mendes De Leon, C. F., Barnes, L. L., Schneider, J. A., Bienias, J. L., Evans, D. A., et al. (2002). Participation in cognitively stimulating activities and risk of incident Alzheimer disease. *The Journal of the American Medical Association, 287*(6), 742–748.

Zöllig, J., Eschen, A., & Martin, M. (2010). Lebenslanges Lernen: Vom Gedächtnistraining zum Beratungsansatz des Memory Management [Lifelong learning: From memory training to memory management]. In A. Frick, et al. (Eds.), *Gedächtnistraining: Theoretische und praktische Grundlagen [Memory traiing: Theoretical and practical foundations]* (pp. 4–12). Heidelberg: Springer.

Recommended Readings

Ettema, T. P., Dröes, R.-M., de Lange, J., Mellenbergh, G. J., & Ribbe, M. W. (2005). A review of quality of life instruments used in dementia. *Quality of Life Research, 14*(3), 675–686. *This article gives an overview of the most relevant instruments to measure quality of life in old age.*

Willis, S. L., Schaie, K. W., & Martin, M. (2009). Cognitive plasticity. In V. Bengtson, M. Silverstein, & N. Putney (Eds.), *Handbook of theories of aging* (pp. 295–322). New York: Springer Publishing.
This book chapter provides an overview of the various concepts of neural and behavioural plasticity.