

Discuss to what extent mental factors affect ageing.

According to the World Health Organisation (WHO), ageing refers to “the impact of the accumulation of a wide variety of molecular and cellular damage over time, which eventually leads to a gradual decrease in physical and mental capacity, a weakened immune system and, ultimately, death¹.” Common characteristics associated with this decay in physical health are increased susceptibility to disease, hearing loss, back and neck pains, wrinkles, and greying and thinning hair. However, other than a decline in physical health, ageing gives way to a decrease in cognitive performance, with – at its best – slowness in thinking and difficulty focusing, and – at its worst – neurological disorders like dementia. As of March 2023, dementia cases are increasing by nearly 10 million every year, with 55 million people currently impacted by this condition².

Though the process of ageing varies among individuals, and whilst cognitive and physical effects are only a proportion of what ageing entails, this essay will revolve around the effect of psychological factors on the risk of contracting diseases, and the way memory is affected as individuals age.

Physical Ageing

¹ World Health Organisation (2022). *Ageing and health*. <https://www.who.int/news-room/fact-sheets/detail/ageing-and-health>

² World Health Organization (2023). *Dementia*. <https://www.who.int/news-room/fact-sheets/detail/dementia>

To many people, ageing is synonymous with one's physical decline, including increased frailty, and susceptibility to disease³.

One of the most common diseases amongst the elderly population is cardiovascular disease (CVD). It is estimated that the prevalence of CVD is at 75% for adults aged 60-79 and 86% in those over 80, and, as of 2019, was the leading cause of death globally. An estimated 17.9 million lives fall victim to CVD every year, and the WHO defines CVD as "a group of disorders of the heart and blood vessels and include coronary heart disease, cerebrovascular disease, rheumatic heart disease and other conditions."⁴ While often regarded as somatic, studies support that mental factors play a role in its progressive development.

A case-control study carried out by INTERHEART in 2004 evaluated the relationship between psychosocial factors, alcohol consumption, physical activity, and other factors and acute myocardial infarction (MI)⁵. With research of coronary heart disease (CHD) and cardiovascular disease mainly derived from European regions, those at INTERHEART aimed to increase knowledge of risk factors of CHD across different geographical regions and among various ethnicities. Across 52 countries, 15152 cases and 14820 controls were enrolled in the study. Within the psychosocial composite score, factors such as depression, perceived stress and life

³National Institute on Aging (2020). *Understanding the Dynamics of the Aging Process*.

<https://www.nia.nih.gov/about/aging-strategic-directions-research/understanding-dynamics-aging#:~:text=Some%20age%2Drelated%20changes%20are,of%20chronic%20diseases%20in%20humans>

⁴ World Health Organization (2021). *Cardiovascular diseases (CVDs)*.

[https://www.who.int/news-room/fact-sheets/detail/cardiovascular-diseases-\(cvds\)](https://www.who.int/news-room/fact-sheets/detail/cardiovascular-diseases-(cvds))

⁵ Yusuf, S., Hawken, S., Ounpuu, S., Dans, T., Avezum, A., Lanas, F., McQueen, M., Budaj, A., Pais, P., Varigos, J., Lisheng, L., & INTERHEART Study Investigators (2004). Effect of potentially modifiable risk factors associated with myocardial infarction in 52 countries (the INTERHEART study): case-control study. *Lancet (London, England)*, 364(9438), 937–952. [https://doi.org/10.1016/S0140-6736\(04\)17018-9](https://doi.org/10.1016/S0140-6736(04)17018-9)

events were included, and the INTERHEART investigators found that risk of acute MI was increased from exposure to long term stress, even when taking into account other factors, namely smoking, obesity and hypertension. The MI odds ratio for individuals exposed to psychosocial stressors more than doubled, jumping from 68.5 to 182.9.

As suggested by the INTERHEART study in 2004, long-term stress is correlated with higher risks of acute MI. When enduring chronic stress, the adrenal glands release cortisol, a hormone which increases one's blood cholesterol, triglycerides, blood sugar, and blood pressure. These factors contribute to CVD⁶. When faced with a perceived threat, the hypothalamus stimulates the release of a surge of hormones such as adrenaline and cortisol. The release of adrenaline causes the heart to beat faster and hence cause higher blood pressure, whilst cortisol changes the immune system responses and suppresses the digestive system. Though these stress responses tend to be beneficial in the short-term, chronic stress will lead to an extended exposure to cortisol and other stress hormones, which contributes to causing CVD.

Though the INTERHEART study is very generalisable, with a large sample size spanning across multiple ethnicities and regions, it may struggle with bidirectional ambiguity: There is a possibility that higher stress found amongst those in the case group could be a consequence of acute MI, instead of as a cause of it. In the study, participants that had characteristic symptoms of new MI within 24 hours were included in the case group. As a result, when assessing stress

⁶ University of Rochester Medical Center. *Stress can increase your risk for heart disease.*
<https://www.urmc.rochester.edu/encyclopedia/content.aspx?ContentTypeID=1&ContentID=2171#:~:text=Studies%20suggest%20that%20the%20high,plaque%20deposits%20in%20the%20arteries>

levels, it is difficult to determine temporality, as it is uncertain whether stress preceded CVD, or if stress was a consequence of recently experiencing MI⁷. Furthermore, though the study addresses many confounding factors such as smoking and obesity, there are still other variables impacting CVD and stress that were unaccounted for. This suggests that there is a more complex relationship between stress and cardiovascular disease than initially perceived, making it hard to relate chronic stress as a direct causation of CVD.

Cognitive Ageing

Another aspect commonly associated with the process of ageing is one's cognitive decline, especially in terms of memory. The WHO defines dementia as “a term for several diseases that affect memory, thinking, and the ability to perform daily activities,” with Alzheimer's disease as the most common form of dementia, affecting 60-70% of cases worldwide⁸.

Alzheimer's disease is described to be “the abnormal build-up of proteins in and around brain cells,” including proteins such as amyloid and tau. As a result of this build up, there is a decrease in neurotransmitters, which are involved in sending signals between brain cells⁹. Some factors associated with this damage of brain cells include ageing, genetic inheritance, and health and lifestyle factors like anxiety and depression.

⁷ Lagraauw, H. M., Kuiper, J., & Bot, I. (2015). Acute and chronic psychological stress as risk factors for cardiovascular disease: Insights gained from epidemiological, clinical and experimental studies. *Brain, behaviour, and immunity*, 50, 18–30. <https://doi.org/10.1016/j.bbi.2015.08.007>

⁸ World Health Organization (2023). *Dementia* <https://www.who.int/news-room/fact-sheets/detail/dementia>

⁹ National Health Service (2021). *Alzheimer's Disease*. <https://www.nhs.uk/conditions/alzheimers-disease/causes/#:~:text=Alzheimer%27s%20disease%20is%20thought%20to,form%20tangles%20within%20brain%20cells>

In a longitudinal study carried out by the SOF research group (2017), 1425 community-dwelling women were monitored over an average of 5 years¹⁰. Researchers recorded their anxiety at baseline using the Goldberg Anxiety Scale (GAS), with 13% of the women showing signs of moderate/severe anxiety symptoms and 28% showing signs of mild anxiety. GAS is a self-report instrument which takes into account and enquires anxiety symptoms experienced within the previous month. Participant responses are rated as yes (1) or no (0) across 9 items (final score being between 0-9). At baseline, 832 individuals scored 0 (no anxiety), 403 scored mild anxiety (1-4 score) and 190 with moderate/severe anxiety (5-9). After around 5 years, 16% of women that were older, in a depressed mood, took more antidepressants, exercised less etc. at baseline had developed dementia. Women who reported having mild anxiety at baseline were seen to have an increased risk of dementia after 5 years in comparison to those that had shown little to no signs of anxiety at baseline.

From the SOF research group study, a correlation between anxiety levels of risk of developing dementia is revealed. This conclusion is supported by a meta-analysis of eight studies representing 29,608 participants carried out in 2020. Results found that participants with prevalent anxiety at baseline had a 24% higher risk of developing dementia in the follow up¹¹.

Research has shown that anxiety disorders are linked to a decrease in brain derived neurotrophic factor (BDNF) levels or polymorphisms. BDNF is a protein which plays a role in

¹⁰ Kassem, A. M., Ganguli, M., Yaffe, K., Hanlon, J. T., Lopez, O. L., Wilson, J. W., Ensrud, K., Cauley, J. A., & Study of Osteoporotic Fractures (SOF) Research Group (2018). Anxiety symptoms and risk of dementia and mild cognitive impairment in the oldest old women. *Aging & mental health*, 22(4), 474–482. <https://doi.org/10.1080/13607863.2016.1274370>

¹¹ Santabárbara, J., Lipnicki, D. M., Olaya, B., Villagrasa, B., Bueno-Notivol, J., Nuez, L., López-Antón, R., & Gracia-García, P. (2020). Does Anxiety Increase the Risk of All-Cause Dementia? An Updated Meta-Analysis of Prospective Cohort Studies. *Journal of clinical medicine*, 9(6), 1791. <https://doi.org/10.3390/jcm9061791>

neuronal plasticity, neuronal survival and stimulates the growth of neurons and synapses¹². It is located in areas such as the hippocampus and the cerebral cortex: areas which are crucial in cognitive processes including memory and learning¹³. Therefore, low levels of BDNF have previously been associated with impairment to immediate memory, decreased cognitive function and neurological diseases like dementia¹⁴.

Moreover, the study shows that anxiety may not be the sole mental factor contributing to higher risk of cognitive decline. Previous research has shown that there is high comorbidity between anxiety and depression, with experts estimating that 60% of individuals with anxiety also show symptoms of depression¹⁵. As a result, the extent in which mental factors affect cognitive ageing may not be solely limited to anxiety alone.

However, anxiety and depression may be a reductionist explanation of increased risk in developing dementia. For instance, other factors such as smoking, genetics, cholesterol, and alcohol consumption have previously been shown to impact one's risk of dementia¹⁶. In the study carried out by the SOF research group, it is hard to determine whether anxiety is the sole determinant of participants' increased risk of dementia, or if confounding variables such as

¹²Bathina, S., & Das, U. N. (2015). Brain-derived neurotrophic factor and its clinical implications. *Archives of medical science : AMS*, 11(6), 1164–1178. <https://doi.org/10.5114/aoms.2015.56342>

¹³Brattico, E., Bonetti, L., Ferretti, G., Vuust, P., & Matrone, C. (2021). Putting Cells in Motion: Advantages of Endogenous Boosting of BDNF Production. *Cells*, 10(1), 183. <https://doi.org/10.3390/cells10010183>

¹⁴Bathina, S., & Das, U. N. (2015)

¹⁵Salcedo, B. (2018, January 19). *The Comorbidity of Anxiety and Depression*. National Alliance on Mental Illness. <https://www.nami.org/Blogs/NAMI-Blog/January-2018/The-Comorbidity-of-Anxiety-and-Depression#:~:text=In%20mental%20health%2C%20one%20of,with%20depression%20also%20experiencing%20anxiety.>

¹⁶Stanford Medicine (2020). *Dementia*. <https://stanfordhealthcare.org/medical-conditions/brain-and-nerves/dementia/risk-factors.html>

genetics have an effect on their findings. In many longitudinal studies following individuals years after an initial baseline assessment, it proves to be hard to determine the extent of the effect that external variables—including those listed above—have on one’s cognitive decline.

Additionally, there is difficulty in defining anxiety from one person to the next. As an emotion, it can cause feelings of tension and apprehension, but anxiety disorders vary depending on the person, and the experiences they have endured. When operationalizing anxiety or neurological disorders like depression, it is important to remember that they are complex conditions that result in differing impacts for each individual. Finally, in the SOF research group study, participants’ anxiety was measured using a self-report questionnaire, which could be unreliable due to recency bias. This is where one’s response may be affected because of the tendency of individuals to give excessive importance or weight onto more recent events. Hence, research supporting anxiety’s role in dementia has some limitations.

Conclusion

The ageing process is multifaceted. This essay explores the effect of long-term stress and anxiety on specific processes within physical and cognitive ageing. As said earlier, the act of ageing presents itself differently from one individual to the next, and there are a plethora of other aspects that play a role in the gradual decline occurring within our body.

Though the role of mental factors in ageing can be argued upon, multiple studies which account for a large sample size supports the notion that psychological stressors interfere with biological processes and lead to deterioration. Particularly, physical ageing correlated with long term stress while cognitive ageing was associated with anxiety and depression. However, their effect is limited. Inevitably, unforeseen variables will affect and therefore distort results of psychological studies, making it hard to draw conclusions from research studies alone. Moreover, there is a difficulty in operationalising mental factors within studies, because they are an amalgamation of biological, cognitive, and sociocultural predispositions. Overall, there is a correlation between some aspects of ageing and mental factors, but the multifaceted nature of mental factors calls for an interactionist approach when investigating possible correlations.

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