



MYTH OR SCIENCE? MODERN TIMES ARE CAUSING DEPRESSION

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Insight

It is a phrase often uttered: 'in the good old days, everything was better'. And after these last few years in the face of – just to name a few examples - a pandemic, war, and climate change, this statement might start to feel more and more true. Were we not happier in the past? Are these modern times and all its crises causing us to be more anxious and depressed? In this editorial, we will find out whether we really experienced fewer mental health problems in the good old days and what the reason for this might be.

Introduction

According to the World Health Organization, mental health conditions are on the rise and quickly becoming a large public health concern. They are even naming it 'a leading cause of disability worldwide' [1]. Generally speaking, research agrees with this statement.

Between 2007 and 2017, there was a 13% rise in mental health conditions and substance use disorders [2]. One study that investigated the change in the global burden of depression between 1990 and 2017, found an increase from 17.2 million incident cases in 1990 to 25,8 million in 2017 [3]. In the United States, rates of major depression rose from 3.33% to 7.06% between 1991-92 to 2001-2 [4]. A more recent study found an increase in major depressive episodes from 2.0% to 3.2% between 2010 and 2019 among older adults. [5] The Lundby study compared the prevalence of mental disorders between 1947, 1957, and 1972 and found a tenfold increased risk for depression among young adults from 1957 to 1972 compared to 1947-1957 [6].

It is good to realise that not all research finds evidence for increasing cases of depression. Other studies performed in Canada and the Netherlands found that depression rates remained stable. However, one should consider that depression rates remained stable, despite the substantial increase in investment in treatments [7-9]. As research on depression did not start until the 20th century, accurate knowledge on trends and prevalence of depression from earlier centuries is not available. Furthermore, research on depression from the 20th century also suffers from limitations, such as recall bias, but evidence from longitudinal studies generally confirms the increase in depression [10].

Keeping this in mind, depression might indeed be placed under the umbrella of 'diseases of modernity', where it is accompanied by, among others, diabetes, obesity, heart disease, and cancer [11]. But what is 'modernity' exactly, and why is it being held responsible for these conditions?

Modernity

To explain the concept of modernity, we must return to the time that came before 'modern' times. We are a long way from the lives lived by our hunter-gatherer forebears. Therefore, it is hard to believe that the hunter-gatherer lifestyle was prevalent for almost 99% of human

history [12]. The agricultural revolution that significantly changed our human lifestyle 'only' happened 12,000 years ago.

This revolution meant a change from a nomadic and very active lifestyle to a more sedentary one. Over a few thousand years, we learned to farm and started living in settlements. Increased availability of food led to exponential population growth and subsequently to rising population densities, the hierarchisation of communities, control of natural resources, and an increase in armed conflicts [13]. In the late 1700s and early 1800s, the industrial revolution enters the scene and starts off the historical period of 'modernity': in Western Europe and North America, technical innovations allow for mechanization of agriculture and revolutionise our use of power, leading, once again, to significant social, cultural, and economic changes [13].

Although rapid urbanisation originally led to worse living circumstances, eventually improved civic hygiene, clean water supplies, sewage disposal, the emergence of public health infrastructure, more advanced medical technology, and the invention of vaccination decreased mortality, and increased life-span and population growth [13-15]. Another two industrial revolutions later, and we have arrived at the fourth industrial revolution of our current time. This time, it is exponential technological change, instead of just linear change [16].

An evolutionary mismatch

One of the consequences of these revolutions is the rise of non-communicable diseases (NCDs) as main cause of death [12]. The increased prevalence of NCDs is often explained by the 'evolutionary mismatch theory'. This theory proposes that due to rapidly changing environments following industrialisation, there is a mismatch between our evolved genetics and the environment we are currently living in [17]. In other words: our world and lifestyle changed too quickly for the human genome to adapt to it [18].

According to evolutionary mismatch theory, depression or low mood might have been a coping mechanism with adaptive advantages in our evolutionary past, but in our modern lifestyle, depression is over-induced [19]. Evidence for this can be acquired by researching groups of people that are still transitioning into a modern lifestyle.

For example, researchers studied the White Thai ethnic minority in Vietnam whose lifestyles incorporate both modern features and traditional features more associated with our evolutionary past. They found that common features of modernity, such as boredom, low income, and low levels of exercise were positively associated with psychological distress, whereas more traditional features such as enough sleep, higher levels of exercise, and access to resources like food by earning a sufficient income were negatively associated with psychological distress [19]. Another study researched the prevalence of depression among four groups of women in settings with different levels of modernisation and found that depression rates were lowest in the most traditional setting among rural Nigerian women, and highest in the most modern setting among urban residents in the United States [20].

So, what about modernity is mismatching in such a way that it is causing depression? It seems that common factors in hunter-gatherer lifestyles, such as living in a close-knit community with low levels of socio-economic inequality, engaging in plenty of physical exercise, and consuming a healthier, traditional diet are protective factors against depression. On the other hand, common factors in modernized lifestyles, such as social isolation, being overworked, lack of exercise, and increased socio-economic inequality, are risk factors for depression and stress [19, 21].

Diet, exercise and sleep

Although no 'one' diet was consumed by the hunter-gatherers, traditional diets seem to be higher in fibre, lower in glycaemic index, and more nutrient dense than food consumed in industrialised cultures [22]. As our society industrialised, technological advancements changed our way of food production and supply. The rise of supermarkets across the globe has had many benefits, but has also provided easier access to highly processed foods as these are more profitable [23]. Another important factor is the role of mass media and marketing as a driver of the shift in diet composition globally [22, 23]. Furthermore, the speed at which new products become part of global markets has also increased significantly [23]. The Westernised diet is generally high-fat, high-sugar, sodium-rich, and processed using synthetic food dyes, artificial sweeteners and flavour enhancers. This diet has been linked to chronic disease including depression [10].

In contrast, the Mediterranean diet conforms to a traditional dietary pattern and has been shown to improve physical health and quality of life [21]. One prospective study performed in 2009 found that the incidence of depression was lower among those that adhered to the Mediterranean dietary pattern [24].

In addition to our changing diets, exercise has declined. Exercise is crucial for regulating appetite, energy balance, and for the prevention and treatment of chronic diseases, including depression. [10, 21]. Where the hunter-gatherers were estimated to expend about 3,000 calories a day, surveys in the US show less than 50% manages to reach the recommended amount of physical activity [10, 21].

Not only have our indoor, sedentary jobs led to a decrease in physical activity, but they may also be to blame for widespread decrease in direct sunlight exposure. This may have resulted in our current vitamin D deficiency epidemic as well as widespread circadian rhythm dysregulation, which in turn could lead to changes in sleep patterns [10]. These changes may also contribute to an increased risk of depression [10, 25].

Urbanisation, nature & technology

A very important and unique element of modernisation is rapid urbanisation: in 1800, over 90% of the global population lived in rural areas. By 2050, over two-thirds of the global population will live in urban areas [26]. Another unique element accompanying this rapid urbanisation is the use of digital technology. Although the internet was not created until 1989, and social media not until the early 2000s, US adults now spend more than 6 hours per day on digital media [27]. Roger Walsh fittingly describes our current situation[28]:

'Yet today we are conducting a global experiment in which we increasingly spend our lives in artificial environments – walled inside and divorced from nature.'

As the experiment continues, we are slowly starting to understand the influence of technology and multimedia on our brain. In addition to many positive uses of digital technology, there are also substantial harmful effects: attention problems, such as symptoms of attention-deficit hyperactivity disorder (ADHD); impaired emotional and social intelligence due to less time being spent communicating face-to-face; technology addiction; social isolation; disrupted sleep and its previously described consequences; and may even adversely impact cognitive and brain development, resulting in, for example, poorer language development and behavioural problems [29].

The increased likelihood of developing depression might be linked to the use of mass media according to the 'social competition hypothesis' [30]. This hypothesis states that low mood is a mechanism that developed in our hunter-gatherer ancestors as a way to mediate competitive situations. More clearly explained: in situations of social competition, it might have been beneficial for individuals to enter in a temporary depressive state to accept defeat and accommodate reconciliation. However, in our current society mass media communication has allowed us to build social networks way beyond those of our ancestors. Therefore we are part of much larger – even worldwide – competitive groups that also include the most successful people on this planet. By constantly comparing ourselves to seemingly perfect 'competitors' on the other side of the planet, the depressive state that used to be beneficial is now over-induced. In modern research, there is some evidence that higher levels of screentime are associated with depressive symptoms among children [31] and that social media use is associated with depression in US young adults [32], but available research is conflicting [33].

Moreover, city-living has been clearly and extensively associated with an enormous range of mental health disorders, such as depression, alcoholism, and alienation [34]. In the meantime, we lack the positive influence on mental health that contact with nature brings us [35]. From an evolutionary perspective, our ancestors developed a connectedness to nature in order to survive. This is called 'biophilia' and this trait developed for the most part during a time only (wild) nature existed [36]. Only 0.1% of human history has been spent in urban environments, where nature is barely present or not at all. Therefore, our attraction and need to connect to nature is still present in our psychology, but this need is not met in many urban environments and may cause mental health problems [37] [38].

The modern social environment

Beyond diet, sleep, exercise and where we live, our social environment has also significantly changed. Pre-modernity and pre-industrialization, our hunter-gatherer forebears most likely lived in small-scale communities with strong interpersonal relationships and low social inequality [21].

Historically, industrialisation has always been considered a crucial factor in enhancing population health [15]. However, this may be an oversimplification as the direct consequences of rapid economic growth dramatically disrupt societies in terms of social relations and politics, as summarised in the four D's of rapid economic growth: disruption, deprivation, disease, and death [15].

Following industrialisation in the 1800s, traditional social structures characterised by a strong sense of community were replaced by a focus on individual needs that is present in our contemporary society [39]. Although individualism has been a great liberator and provided equal opportunities for many, we have also been made entirely responsible for our own successes and, unfortunately, failures [40]. Modern research in Canada has substantiated the importance of a strong community providing social support: a study researching depression and anxiety among both urban and rural dwellers found that those living in rural communities, associated with a strong sense of community, had a lower risk for depression. Disintegration is not just limited to larger communities; there is also evidence for the dissolving of family ties. This might play a role in the rise of depression rates [30].

A cross-temporal meta-analysis performed among American high school and college students between 1938 and 2007 found they scored above common cut-offs for psychopathology, including depression, five to eight as many times [41]. In addition to individualism, their results pointed towards materialism and unrealistically high expectations prevalent in Western culture as the culprits [41]. We are marketed to not only want to 'have' things, but also 'be' a certain thing, causing dissatisfaction with who we are [42]. Psychological studies have shown materialism to be associated with depression, anxiety, anger, isolation, and alienation [42].

In addition, Twenge et al (2009) also name the cultural shift away from intrinsic goals, such as finding meaning in life as a possible reason for a higher risk of psychopathology [41]. As society changed and scientific understanding expanded, religion and religious traditions that provided both answers and meaning in life decreased, exposing us to nihilism - the belief that there is no meaning to life at all [43]. One prospective study found that religiosity protected against depression and helped in depression recovery [44]. Religion provides meaning, hope and a supportive community; as long as the religious tradition does not hold its followers up to impossibly high standards and does not centre around themes of punishment and guilt [28, 45].

Modernity has even been proposed as a driver of narcissism [46]. We may have been so transformed by these social changes, that we have turned into the 'homo economicus', which is described as: '...persons characterized by extreme individualism, lack of empathy for others and need for admiration to compensate for their fragile self-esteem... [46].

Thus, living in our capitalist, consumption-based Western society has brought good things, but is also characterised by competitiveness, social isolation, socioeconomic inequality, family and community disintegration, and war. This is making us more susceptible to depression [10, 42, 47].

Some nuance

It is obvious then, is it not? Our genes simply do not fit in these modern times and as a result, our chances of happiness grow ever slimmer with each passing year. The grass was much greener when we were still sneaking through it on the hunt for our next meal.

Yet, it is good to remember that we humans have the tendency to romanticise the past, while being overly pessimistic about our future [48, 49]. When asked whether people believed the world was getting better or worse, only 3% of people in high-income countries such as France and Australia gave a positive answer [49]. In the meantime, poverty, child mortality and violence are declining, our lives are longer and healthier, and, let us not forget, we have successfully survived numerous end-of-world predictions [49]. A paper on exhaustion even suggests that we have unjustly pathologised modernity [48]. After all, depression is nothing new. In fact, 'melancholia', from which our modern concept of depression originates, was already described by Hippocrates, who lived between 460 and 379 BCE [50, 51]. Similar to Schaffner's (2016) view on exhaustion, is depression not universally present throughout history and therefore simply part of the human condition [48]? In addition, our increased awareness surrounding mental health and depression may also be in part responsible for the rise in depression diagnoses [30].

Conclusion

In conclusion, a genetic mismatch between past and current times is definitely a plausible explanation for modern health problems. However, nostalgia for a happier and simpler past is often misplaced and returning to our old ways is definitely not a solution. The fact remains that our world is changing rapidly and it is not always easy to keep up. However, as modernity has also supplied us with a wealth of knowledge at our fingertips, we are certainly equipped to incorporate the healthy elements of our hunter-gatherer past into our futures. And that, at least, is very positive.

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