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An independent academic psychologist, based in England, who has written extensively on different areas of psychology with an emphasis on the critical stance towards traditional ideas.

A complete listing of his writings at http://psychologywritings.synthasite.com/.

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1. INEQUALITIES IN HEALTH

1.1. OVERVIEW

Michael Marmot summed up his concerns: "England is faltering. From the beginning of the 20th century, England experienced continuous improvements in life expectancy but from 2011 these improvements slowed dramatically, almost grinding to a halt. For part of the decade 2010-2020 life expectancy actually fell in the most deprived communities outside London for women and in some regions for men. For men and women everywhere the time spent in poor health is increasing" (Marmot et al 2020 p5).

Marmot et al (2010) addressed health inequalities, and Marmot et al (2020) considered changes in the subsequent decade (appendix 1A).

Marmot et al (2010) coined the term "proportionate universalism" to describe the allocation of resources to those who need them in the social hierarchy and to the degree of their need. "In the 2010 Marmot Review it was argued that governments need to ensure that there are sufficient resources in social determinants to support health and, critically, that these are distributed equitably to reduce inequalities" (Marmot et al 2020 p8).

But Marmot et al (2020) argued that the 2010s has seen the reduction in public spending, and an increase in health inequalities. For example, life expectancy declined in the most deprived tenth of neighbourhoods in England, and the "poorest areas have the highest preventable mortality rates and the richest areas have the lowest" (Marmot et al 2020 p13) [1].

The gap in life expectancy at birth in England in 2016-18 between the most deprived tenth of neighbourhoods and the least deprived is 9.5 years for men and 7.7 years for women (figure 1.1).

[1] "Avoidable mortality" - "deaths that could have been avoided through timely and effective healthcare, or by public health interventions, or both, including action on the 'causes of the causes' of mortality - the social determinants of health" (Marmot et al 2020 p31).

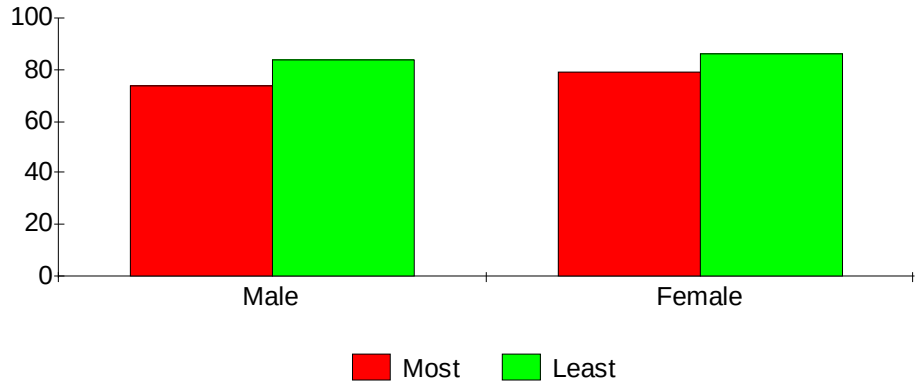


Figure 1.1 - Average life expectancy at birth (years) in England for most and least 10% deprived neighbourhoods.

Health life expectancy is the number of years an individual can expect to be in good health, and it is taken as an indicator of quality of life. This differs by twelve years between the most and least deprived local authority areas in England [2].

As part of the social determinants of health, Marmot et al (2020) talked of the "unhealthy high street" to show the impact of the environment upon health, including:

i) Lack of diversity in retail - eg: higher density of fast food outlets in deprived areas and the consequent increased risk of obesity.

ii) Lack of green areas - eg: leading to lower physical exercise.

iii) Noise and air pollution - physical and mental health consequences as well as a reduced quality of life.

iv) Litter and area degradation - eg: deprived areas have higher levels of litter and fly-tipped waste, which discourages physical activity.

v) Road traffic collisions - eg: rates of fatal and serious injuries for 5-9 year-olds are nine times higher in the most deprived one-fifth of neighbourhoods than the least deprived one-fifth (Marmot et al 2020).

vi) Crime and fear of crime - eg: disproportionate victimisation in poorer areas.

[2] One possible mechanism is via stress which produces changes in genes that trigger chronic inflammation, and this can lead to health problems (Coghlan 2013).

vii) Cluttered pavements and non-inclusive design - discourages physical activity.

1.1.1. Income

Benzeval and Judge (2001) began: "It is a truism that poverty is bad for health. However, the precise links between various definitions and perceptions of financial circumstances and different measures of health status are not clearly understood" (p1371) [3].

To overcome this, these researchers analysed data from the British Household Panel Survey (BHPS) (1991 to 1996-7), which is a nationally representative sample of 5000 households and 10 000 adults in Britain.

Individuals reporting lower income were more likely to have poor subjective health or a limiting illness. Average income was more important than current income, persistent poverty than occasional periods, and falls in income more important for health than increases. The income measures preceded the health outcomes, which gives the direction of the relationship between income and health (Benzeval and Judge 2001).

Four sets of questions on the BHPS measured health (limiting illness; health problems; subjective rating of health; psychological well-being), while information on income included from employment, benefits, pensions, investments and savings, and maintenance payments (Benzeval and Judge 2001).

1.1.2. Socio-Economic Status

Establishing the role of socio-economic status (SES) on adult health is not easy. The use of twin studies is one possible way.

Krieger et al (2005) reported one such study involving 308 female twin pairs in the USA (Kaiser Permanente Women Twins Study Examination II). The sample were both identical and non-identical, and lived together at least until fourteen years old. Childhood social class was rated as "non-working class" (NWC) or "working class" (WC) based on the head of the household, and the participants' SES was likewise rated in adulthood. This produced three groups for analysis: (i) concordant adult WC (both twins same adult SES), (ii) concordant adult NWC, and (iii) discordant adult SES (one WC/one NWC twin).

The discordant group was the main focus to see if

[3] The three richest Americans have as much wealth as the bottom 50% of the country's population (Stiglitz 2018-19). "Morale is lower in unequal societies, especially when inequality is seen as unjust, and the feeling to being used or cheated leads to lower productivity" (Stiglitz 2018-19 p93).

adult SES influenced health. The WC twin had poorer health than the NWC twin in this group.

Krieger et al (2005) summed up the implications of their study: "It is already believed that social class in children may affect later health; these results suggest that even individuals who had the same social class in childhood may have different health because of adult social class, including their living conditions after completing their educations. The implication is that interventions to eliminate social inequalities in health must take into account adult as well as childhood living conditions" (p0653).

1.1.3. Welfare Assistance

Welfare assistance is one way to help individuals and families in poverty. A variation is conditional cash transfer (CCT) programmes, where "families receive a cash payment only if they comply with a set of certain requirements" (Fernald et al 2008 p828) (eg: attendance at health clinics).

In Mexico, "Oportunidades" is an example of a CCT programme that was established in 1997. Low-income households eligible for the scheme received a monthly stipend based on obtaining preventive medical care, and extra payments for school attendance.

Fernald et al (2008) reported an evaluation of "Oportunidades" which compared 320 early-adopter and 186 late-adopter communities with data collected in 2003.

Children benefited in terms of health, growth and development from participation in the CCT programme. Higher cash payments led to greater benefits.

Fernald et al (2008) offered two pathways to explain the benefits:

a) Directly - More money equals more purchasing power. Parents could use "the cash transfer to purchase more or higher quality food or medicines when necessary. Similarly, they could use the cash to invest in household materials and equipment (eg: refrigerators, improved flooring, and other construction material) that could reduce a child's exposure to infection, all of which could contribute to increased growth and health outcomes. The money could also be used to buy books, newspapers, or age-appropriate toys that could be used to provide cognitive stimulation to children" (Fernald et al 2008 p835).

b) Indirectly - More money improves the psychological well-being of parents which, in turn, leads to improved care for the children.

1.1.4. Changing Pension Age

Statutory pensionable age (SPA) is increasing in many countries, like the UK, where it is rising (between 2010 and 2020) from 60 to 66 years for women born after March 1950 (Carrino et al 2020).

What are the effects on health of such an increase? One possibility is that "workers may invest more in their health if they expect to retire later, for example, by engaging in healthy behaviours if the benefits of a longer working life induced by better health are higher than the costs of reduced leisure-time due to a shorter retirement period" (Carrino et al 2020 p892). On the other hand, the demands of working may limit "health investments" (eg: exercise, cooking healthier foods, attending medical services). But work can have non-financial benefits like social contact, and mental challenges. The type of occupation will be crucial. For example, "later retirement for workers in a low occupational grade may increase exposure to work-related psychological and physical strain, which may result in poorer health as a result of extended exposure to these factors" (Carrino et al 2020 p892).

As changes to SPA are relatively recent, there are few studies. For example, in the Netherlands, increasing the early retirement age by five years for civil servants led to worse mental health, while lowering the SPA had positive effects for the newly retired (Carrino et al 2020).

Carrino et al (2020) concentrated their analysis on women in the UK born after March 1950 who faced the brunt of the SPA changes. Data from the annual "Understanding Society" survey for 2009 to 2016 were analysed. Validated questions on physical and mental health, and quality of life were included in the wide-ranging survey of health, social and economics subjects.

The use of a cut-off date of birth of March 1950 for changes to the SPA meant that there will be women of approximately the same age who are both retired and not retired. For example, a woman born in February 1950, say, could retire at 60 years old, while a woman born two months later has to continue to work. Both are sixty years old.

Analysis was made on data from 7374 women who had worked and retired, or were continuing to work after sixty years old.

Having to continue working was linked to poorer physical health and mental health (in the form of depression), especially for women in lower socio-economic groups, thereby widening health disparities. It was suggested that "these effects are driven by prolonged exposure to high-strain jobs characterised by high demands and low control" (Carrino et al 2020 p891).

The data were self-reports, and Carrino et al (2020) admitted, "estimate the impact of an SPA-increase on health in the months or first years following the introduction of the reform. We are not able to establish whether these effects are long-lasting, as the first cohorts affected by the reform have only been exposed for a short time" (p908).

1.2. HEALTH OF WASTE-PICKERS

In cities in developing countries, many urban poor survive by selling recyclable items salvaged from rubbish dumps. Known as "waste-pickers", this life is "characterised by 3Ds - dangerous, drudgery and demanding" (Chokhandre et al 2017 p2) [4].

There are health risks, exacerbated by poor living conditions and hygiene practices as well as substance use (Chokhandre et al 2017).

Chokhandre et al (2017) surveyed 200 adult waste-pickers at the Deonar dumping site in Mumbai, India, and 103 individuals from a comparison group. The waste-pickers had much higher rates of injuries (eg: lacerations from shards of glass) than the comparison group (75% vs 17%), and higher rates of respiratory symptoms (28% vs 15%) and stomach problems (32% vs 19%), for instance (figure 1.2). "Field insights suggest that the majority of the waste-pickers were not using any protective clothing such as gumboot, gloves and masks, which enhanced their health vulnerabilities. The reason for not using any protective clothing could be their ignorance and poverty" (Chokhandre et al 2017 p5).

The mean number of work days lost due to illness was eighteen for waste-pickers and eleven for the comparison group in the last six months.

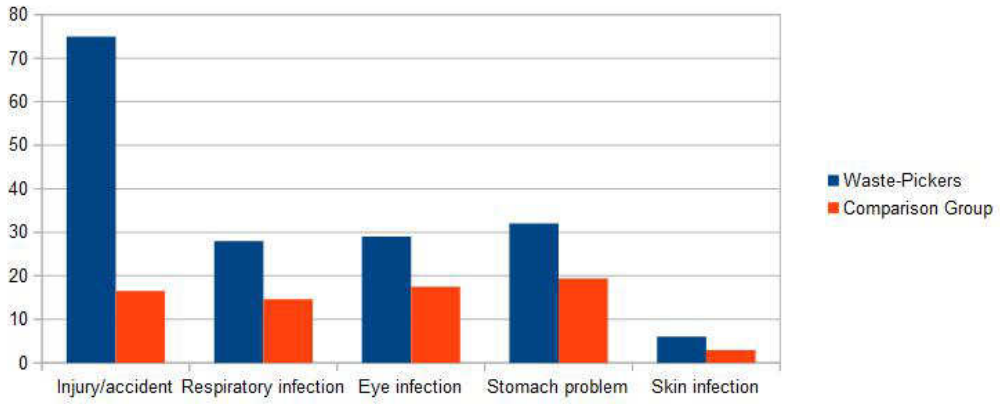
The participants were recruited from the slum communities living on the edge of the dumping site. Three communities were selected, and divided into clusters (groups of households). One-tenth of the clusters were randomly chosen, and then households within these clusters, and finally individuals within the household. The aim was 200 waste-pickers and 200 non-pickers, but ninety-three of the latter group were housewives and not included. The data were collected in 2014.

All health problems were self-reported for the previous six months. Chokhandre et al (2017) admitted: "The results of self-reported morbidities could be biased due to subjectivity in responses. Recall bias may also have affected the estimated prevalence of morbidities.

[4] Poor individuals face stigmatisation in society (appendix 1B).

Data were collected from waste-pickers who collect the waste from dumping site and not from the other type of waste-pickers who collect waste from road side or community bins and hence generalisation of the results must be done with caution" (p6).

Other studies (eg: Medina 2007) have pointed out the positive contribution to society of waste-pickers with the management and recycling of waste.



(Data from table 2 Chokhandre et al 2017)

Figure 1.2 - Prevalence of self-reported health problems (%).

1.3. APPENDIX 1A - JUSTICE

Health policy and systems research (HPSR) investigates "the performance of health systems and their sub-components (hardware: financing, governance, human resources, medical commodities and information systems; and software: power, values and relationships), consideration of how links among the sub-components shape performance and how to strengthen health system performance over time" (Pratt et al 2020 p1).

Pratt et al (2020) argued that social justice should be a key consideration of HPSR. They stated: "Much HPSR, especially in low-income and middle-income countries (LMICs), is conducted with the ultimate aim of reducing health disparities between and within countries and enhancing health system performance for those considered disadvantaged and marginalised. Recent work in bioethics suggests such an aim is necessary to advance health and social justice globally, and advancing justice is consistent with foundational moral commitments for public health research, practice and policy. Upholding justice in HPSR calls for not only achieving a fair share of

benefits and burdens for stakeholders in programmes of research, but also advancing health equity and, ultimately, social justice at a population or societal level" (Pratt et al 2020 p2).

Key to all of this is "bringing disadvantaged individuals and groups up to a 'sufficient' level of health and well-being, that is, that which is required for a decent life over a 'normal' life span (such as 75 years). To attain and maintain a sufficient level of health, individuals are entitled to (among other things) public health and healthcare systems that provide (1) universal/equitable access to quality healthcare services that they need and (2) protection against financial hardship due to out-of-pocket healthcare expenditures through equitable prepayment health financing mechanisms. Access to broader social or structural determinants of health and well-being is necessary as well" (Pratt et al 2020 p3).

Pratt et al (2020) outlined the areas of HPSR where social justice should be applied, including:

a) Research teams - eg: including individuals with a deep knowledge of the (disadvantaged) population being studied, and/or local researchers.

b) Research questions - eg: that the questions being asked are appropriate to the local communities.

c) Research populations - eg: the inclusion of marginalised individuals.

Cassell and Young (2002) raised the concern that "[w]here (HPSR) contributes to the planning of services and policymaking, the voice of the socially excluded may be muffled, and that of the better educated and materially secure, artificially amplified" (quoted in Pratt et al 2020).

1.4. APPENDIX 1B - STIGMATISING THE POOR

"Recessions appear to coincide with an increasingly stigmatising presentation of poverty in parts of the media" (McArthur and Reeves 2019 p1005). This usually involves "othering" (Lister 2015) people in poverty, and "representing them as part of an outgroup who were lazy, immoral and living fraudulently at the expense of hard-working taxpayers" (McArthur and Reeves 2019 p1006). While Jensen (2014) talked of "poverty porn" to describe documents about those in poverty.

McArthur and Reeves (2019) analysed five centrist and right-wing British newspapers ("Mail" (Daily and Sunday), "Telegraph" (Daily and Sunday), "Times" (Daily

and Sunday), "Financial Times", and "The Economist") for the period 1896-2000 for stigmatising language about the poor (eg: idler, feckless, scrounger, workshy). Rising unemployment correlated with rising stigmatising language, except for at the peak of very deep recessions (in the 1930s and 1980s).

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2. CORPORATE DETERMINANTS OF HEALTH

2.1. OVERVIEW

Millar (2013) coined the term "corporate determinants of health" to "described how some companies acted in ways that promoted health, embracing a 'triple bottom line' that encompassed 'people, planet, and profits'. They paid living wages and their fair share of taxes, empowered their workers, and mitigated their effects on the environment. Others, many employing the language of corporate social responsibility, pursued profit above all else, marketing unhealthy products, exploiting workers and suppliers, and giving nothing back to society" (McKee and Stuckler 2018 p1167). While industries can also have negative health consequences, as in tobacco, alcohol, and firearms.

Kickbusch (2012) developed these ideas with the term "commercial determinants of health", concentrating on marketing, lobbying, corporate social responsibility strategies to "whitewash tarnished reputations", and external supply chains (McKee and Stuckler 2018).

McKee and Stuckler (2018) outlined four ways that corporations influence health through their power:

i) Defining the dominant narrative - "They influence people's beliefs, cognitions, and perceptions on how society should deal with its most pressing health threats, using discourse that stresses the failure of public services, condemns any measure that can be portrayed as restricting the right of the individual to be 'free to be foolish' [Leichter 1991], elevates the primacy of individual choices over social solidarity, decries 'welfare cheats', and divides the poor into 'deserving' and 'undeserving' or 'self' and 'other'" (McKee and Stuckler 2018 p1168) (table 2.1).

ii) Setting the rules by which society operates - eg: defining global standards of cigarette tar content.

iii) Commodifying knowledge - eg: researching and developing medicines where there is a market (rather than a need) (appendix 2A).

- "Calpol", a well-known brand of liquid paracetamol, is commonly used with babies (eg: 84% of UK babies in the first six months of life) (Kleeman 2019).

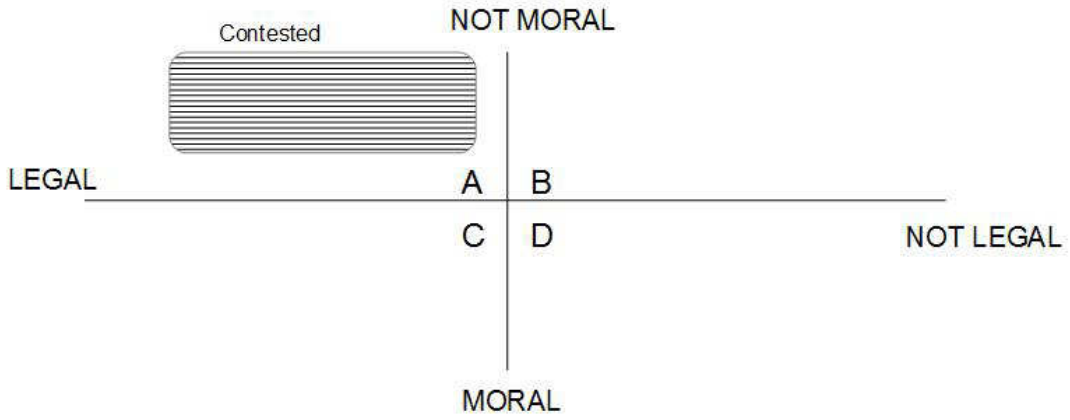
- It is widely available (ie: without prescription), flavoured with strawberry syrup, and recommended by the NHS. The producers ("Johnson and Johnson") have also aggressively marketed its use, including as a means to send babies to sleep (Kleeman 2019). For example, in a 1980s advertisement featuring an animated crying baby, the voiceover says: "There are times when every baby is just crying out for Calpol" (Kleeman 2019).

- Kleeman (2019) explained that "by turning to Calpol whenever our child is distressed, we contribute to an already rampant culture where problems are supposed to be solved by medication" (p11).

Table 2.1 - Calpol as an example of "defining the dominant narrative".

iv) Undermining rights (political, social, and economic) - eg: working conditions. "They can slow, or even reverse, the expansion of universal health coverage, promoting international trade deals that challenge national policies through investor–state dispute resolution procedures" (McKee and Stuckler 2018 p1169).

There is an intersection of legal and moral, which can be exploited, as in figure 2.1 and the example of the financial services industry.



Examples from financial industry/crime:
A = eg: selling free product for cash - ie: take advantage of buyer's lack of knowledge.

B = eg: fraudulent investment scheme that takes all of an individual's savings.

C = eg: selling shares in "blue chip" company.

D = eg: accepting a "handshake agreement" from a trusted person when written documents are required legally.

Figure 2.1 - The intersection of legal and moral.

2.2. TOBACCO INDUSTRY

The growing awareness of the harm to the environment of plastic waste is leading governments to phrase out single-use plastic products (eg: ban on plastic straws in European Union from 2021), but "these measures do not extend to one of the leading sources of plastic waste worldwide that is hiding in plain sight: the cigarette butt" (van Schalkwyk et al 2019a p1).

van Schalkwyk et al (2019a) explained: "The tobacco industry portrayed filters as a way to make cigarettes safer by absorbing some of the 'tar' that was implicated in the lung cancer epidemic. We now know that this safety argument was a myth, one of many created by the tobacco industry to sell cigarettes" (p1).

The filter paper changes colour changes colour which gives the impression that it is working. A scientist at a tobacco company admitted: "The cigarette smoking public attaches great significance to visual examination of the filter material in filter tip cigarettes after smoking the cigarettes. A before and after smoking visual comparison is usually made and if the filter tip material, after smoking, is darkened, the tip is automatically judged to be effective. While the use of such colour change material would probably have little or no effect on the actual efficiency of the filter tip material, the advertising and sales advantages are obvious" (in Harris 2011 quoted in van Schalkwyk et al 2019a).

van Schalkwyk et al (2019a) outlined their concerns: "The tobacco industry has worked hard to avoid anything that casts cigarettes in a bad light, including distracting attention from the pollution caused by butts. This includes creating downstream anti-litter campaigns in which it could control the messaging. Even though the cellulose acetate filter is the single most commonly collected item of litter globally, the industry has largely succeeded in avoiding the public outrage expressed towards plastic waste produced by, for example, McDonald's and Starbucks. Unlike manufacturers of some other polluting post-consumption waste products, such as refrigerators containing fluorocarbons, it has never been held accountable for the cost of the waste it generates" (p1).

The behaviour of tobacco companies has been called "the corporate determinants of health". "This involves looking upstream from the individual risk factors, such as tobacco or junk food consumption, to the entities that produce and promote them, seeking measures that constrain their activities, which too often lack transparency and scrutiny. As with all public health strategies, this requires a portfolio of policies, many of which seek to reduce consumption of these harmful products. They

include regulatory measures such as plain packaging and fiscal measures such as taxes. They also include actions that reduce the power of these companies, including those that reduce their access to funds for investment" (van Schalkwyk et al 2019b p599) [5].

van Schalkwyk et al (2019b) here were arguing for disinvestment as a public health strategy (eg: encouraging medical pension funds not to hold shares of tobacco companies).

Tobacco companies have responded to this idea and other criticisms over the years, including "using vehicles like the Philip Morris funded Foundation for a Smoke Free World to portray themselves as part of the solution rather than the problem. And they are well aware of the threat from the disinvestment campaign. They promote the argument, now clearly false, that tobacco investments continue to be sound financial choices and that soundness is the sole consideration of interest. They also seek opportunities to enact legislation that prevents divestment on anything other than financial grounds and placing high burdens of proof on institutional investors to justify their decisions. The intensity of their efforts is a demonstration of what is termed the 'scream test'. The more effective a measure is in reducing smoking, the 'louder', ie: more aggressive or radical, are the industry's counter-attacks on it" (van Schalkwyk et al 2019b p599) (appendix 2B).

2.3. SLOW DEATH

Berlant (2007) used the term "slow death" to refer to "the physical wearing out of a population and the deterioration of people in that population that is very nearly a defining condition of their experience and historical existence" (p754).

Slow death "prospers" in the "presentness of ordinariness itself" rather than in extreme situations. "In an ordinary environment, most of what we call events are not of the scale of memorable impact but rather are episodes, that is, occasions that make experiences while not changing much of anything" (Berlant 2007 p760).

Berlant (2007) considered "globesity" (the global obesity phenomenon) (Eberwine 2002) in this context - "This so-called epidemic, seen as a shaming sickness of sovereignty, a predicament of privilege and of poverty, a crisis of choosing and anti-will [Williams 1991], and an endemic disease of development and underdevelopment..."

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[5] Mbembe (2003) described power (and "the ultimate expression of sovereignty") in the ability "to dictate who may live and who must die" (p11). This was summarised in the term "necropolitics" (Mbembe 2003). In the past, such power resided with rulers, but now corporations have such power in their behaviour, and the direct or indirect impact on individual's health.

(Berlant 2007 p758).

The use of "so-called" gives an idea to Berlant's (2007) view. That is not to say that in the USA overweight and obesity is not common, but the point is when that becomes a "crisis". "In the US it is deemed a national epidemic because it serves institutional interests of profit and control..." (Berlant 2007 p763).

This is an important point that there is a context - capitalism. "The obesity epidemic is also a way of talking about the destruction of life, of bodies, imaginaries, and environments by and under contemporary regimes of capital. Capitalism here stands in for the relations between capitalists and workers and capitalists and consumers amid the shifting character of capitalist strategies and the net effect of the interaction of those strategies on the relevantly vulnerable populations, which include people of colour and the aged, but more broadly, too, the economically crunched. Capitalism points to a variety of phenomena related to the physical experience of production and consumption throughout a life cycle, the privatisation of schools and public metropolitan spaces, and the pushing out of the political from concepts of publicness, now saturated by the logic and activity of markets" (Berlant 2007 p764).

Usually obesity is linked to capitalism as "unintended consequences", "and/or the shameful toxic habits of individuals who, not knowing or caring, and having financial resources, undermine their own health one bad decision at a time" (Berlant 2007 p765). But individuals are "neither dupes to the interests of power as such nor gods of their own intention..." (Berlant 2007 p765). They are living in a system that "organises the reproduction of life" through biopower (Berlant 2007).

Health and illness have to be seen in this context. Harvey (2000) noted that "under capitalism sickness is defined as the inability to work" (Berlant 2007 p754). On put another way, "[H]ealth itself can then be seen as a side effect of successful normativity, and people's desires and fantasies are solicited to line up with that pleasant condition" (Berlant 2007 p765).

Bringing the ideas together, the nature of capitalism and its construction of life produces the slow death. Berlant (2007) developed the point: "The bodies of US waged workers will be more fatigued, in more pain, less capable of ordinary breathing and working, and die earlier than the average for higher-income workers, who are also getting fatter, but at a slower rate and with relatively more opportunity for exercise. Apart from working-class and sub-proletarian white women, who are more successful in mobilising bourgeois beauty norms for economic success in the service-sector economy, these overweight and obese poor will find it harder to get and keep jobs, remain healthy meanwhile, and afford health

care for the ensuing diseases. They will become progressively more sedentary not just from the increasing passivity of the more sedentary kinds of service-sector work, not just from working more jobs more unevenly, not just because of television, and not just because there are fewer and fewer public spaces in which it is safe and pleasurable to walk, but because it is harder to move, period. They will live the decay of their organs and bodies more explicitly, painfully, and overwhelmingly than ever before; and it has become statistically clear that between stress and co-morbidity they will die at ages younger than their grandparents and parents" (Berlant 2007 pp775-776).

The upshot is eating as "a kind of self-medication through self-interruption" (Berlant 2007 p777). Berlant (2007) explained: "Eating is a form of ballast against wearing out; but it is also a counter-dissipation in that, like other small pleasures, it can produce an experience of self-abeyance, of floating sideways. In this view it's not synonymous with agency in the tactical or effectual sense dedicated to self-negation or self-extension, but self-suspension" (pp778-779).

To reiterate, as capitalism wears the individual down, biopower creates the meaning of such an existence (ie: as normal), and food becomes a way to snatch pleasure, but that food is energy-dense and obesity follows.

2.4. APPENDIX 2A - OWNERSHIP OF LIFE

The International Treaty on Plant Genetic Resources for Food and Agriculture was set up to deal with see collections [6] - who can access their genetics and how to share the benefits from this use (Spinney 2019)?

But the "digital sequence information" (DSI) can subsequently be used without needing to access the physical sample.

However, there is no consensus over a definition of DSI - "should it include only DNA and RNA sequence data, for example, or also amino acid sequences and epigenetic data" (Spinney 2019 p21)?

DSI is often on public databases and researchers fear that restrictions could limit their access, and the benefits that accrue from research for everybody may be reduced. For example, a drug for Ebola was created in the USA by Regeneron Pharmaceuticals based on DSI (which had originally come from a clinical sample from a woman in Guinea). "Regeneron isn't obliged to share the benefits with Guinea because there was no physical sample

[6] The Convention on Biological Diversity covers all life (Spinney 2019).

involved. If the firm had to share, it may have had less incentive to develop the drug and more people might have died in the... outbreak" (Spinney 2019 p21).

2.5. APPENDIX 2B - DOUBT

Proctor (2008) reflected upon ignorance, which has "many interesting surrogates and overlaps in myriad ways with - as it is generated by - secrecy, stupidity, apathy, censorship, disinformation, faith, and forgetfulness, all of which are science-twitched" (p2). But he was more interested in the "conscious, unconscious, and structural production of ignorance", or "manufactured ignorance".

Proctor (2008) highlighted tobacco manufacturers here, and their "efforts to manufacture doubt about the hazards of smoking". It is not necessary to prove something true or false, but to produce "reasonable doubt".

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3. SOCIOLOGY OF LOW BACK PAIN

3.1. OVERVIEW

Low back pain (LBP) is very common, and is the leading cause of disability around the world (Thomson 2019).

Though the "Western lifestyle" including sitting for hours at a desk is part of the problem, Plomp et al (2015), for example, suggested an evolutionary basis (the "ancestral shape hypothesis") (appendix 3A). Simply, walking upright occurred quickly in evolutionary terms, and the spine is still "ancestral" (Thomson 2019).

Lifestyle factors like smoking and its damage to vessels that supply the spine, and obesity are relevant (Thomson 2019).

Clark and Horton (2018) emphasised the need for a global perspective on the problem. They stated: "Disability related to low back pain is projected to increase most in LMICs [low- and middle-income countries] where resources are limited, access to quality health care is generally poor, and lifestyle changes and shifts towards more sedentary work for some mean the risks will only increase" (Clark and Horton 2018 p2302).

Hartvigsen et al (2018) outlined the complexity of the condition: "Rarely can a specific cause of low back pain be identified; thus, most low back pain is termed non-specific. Low back pain is characterised by a range of biophysical, psychological, and social dimensions that impair function, societal participation, and personal financial prosperity" (p2356).

These authors outlined five contributors to the experience of LBP - genetic, biophysical [7], social (eg: socio-economic status), and psychological factors (eg: catastrophising - ie: the belief that a bad event is far worse than it actually is; self-efficacy - ie: belief that one is able to achieve certain goals), and co-morbidities. For example, in the last case, a study of over 200 patients in Uganda referred to a hospital

[7] For example, "some people with persistent low back pain might have alterations in muscle size, composition, and co-ordination that differ from those without pain" (Hartvigsen et al 2018 p2363).

orthopaedic clinic (Galukande et al 2005) found that nearly one in twenty had problems as a result of tuberculosis.

While detailed interviews in villages in Botswana (Hondras et al 2016) found that LBP had "both economic and subsistence consequences as well as loss of independence and social identity because of inability to fulfil traditional and expected social roles in a society with harsh living conditions" (Hartvigsen et al 2018 p2361).

Furthermore, "low back pain contributes to inequality. In low-income and middle-income countries, poverty and inequality might increase as participation in work is affected. Furthermore, formal return-to-work systems are often" (Hartvigsen et al 2018 p2362).

Buchbinder et al (2018) explained: "Prevention of the onset and persistence of disability associated with low back pain requires recognition that the disability is inseparable from the social and economic context of people's lives and is entwined with personal and cultural beliefs about back pain. Health and workplace policies and disability payment systems are often ineffective and wasteful, and they are key targets for improvements. Socio-economically disadvantaged people are over-represented among those with disabling low back pain. In many settings they will be further disadvantaged by restricted access to accurate information sources, health-care approaches that provide appropriate support for self-management of uncomplicated low back pain, and to specialised effective interventions, such as multi-disciplinary rehabilitation, for complex persistent low back pain" (p2384).

Furthermore, Buchbinder et al (2018) argued that LBP is "partly iatrogenic" - ie: "exposure to health care can sometimes have harmful consequences" (p2384) (eg: unnecessary and potentially addictive medication) (appendix 3B). They continued: "In low-income and middle-income countries, epidemiological evidence suggests that improving social and economic conditions could prevent or reduce incidence of low back pain, but could also create expectations and demands for medical investigations and low-value health care that paradoxically increase the risk of long-term back-related disability (what we term the low back pain paradox)" (Buchbinder et al 2018 p2384).

Put another way, move away from a biomedical view of LBP. The alternative is a biopsychosocial model. This views health beyond the absence of disease, as in Huber et al's (2016) concept of "positive health" - "the ability to adapt and to self-manage, in the face of social, physical, and emotional challenges" (quoted in Buchbinder et al 2018).

"For people with persistent low back pain, positive

health entails learning how to cope with a long-term health problem through self-management activities, and learning to seek health care only when needed. Passive approaches such as rest and medication are linked with worsening disability, whereas active strategies such as exercise are associated with reduced disability and less reliance on formal health care" (Buchbinder et al 2018 p2386).

3.2. TREATMENTS

Foster et al (2018) began: "Despite the plethora of treatments and health-care resources devoted to low back pain, back-related disability and population burden have increased" (p2368). These authors explained this situation as due to "substantial gaps between evidence and practice". They considered "examples of effective, promising, or emerging solutions from around the world" (Foster et al 2018 p2368).

1. Prevention - There is little research on prevention, and "widely promoted interventions" (eg: no-lift policies; ergonomic furniture) lack "a firm evidence base" (Foster et al 2018).

Steffens et al (2016), for example, in a systematic review found only 21 trials on prevention, and the only form conclusion that could be made was for the benefits of exercise (but this was based on moderate quality evidence). While "poor to very-poor quality evidence existed that education alone, back belts, shoe insoles, and ergonomic programmes might not be effective" (Foster et al 2018 p2368).

2. Treatment - There is reduced emphasis on pharmacological solutions in recent years, and increased interest in the self-management of LBP with therapies. "Consistent recommendations for early management are that individuals should be provided with advice and education about the nature of low back pain and radicular pain [8]; reassurance that they do not have a serious disease and that symptoms will improve over time; and encouragement to avoid bed rest, stay active, and continue with usual activities, including work" (Foster et al 2018 p2369).

Foster et al (2018) listed some of the issues and problems with treatments:

- A gap between evidence and practice leading to "both overuse of low-value care and under-use of high-value

[8] Pain that radiates from the back into the legs.

care" (p2371).

- Medication is often a first choice while exercise is not recommended more often than so.

- The waste of health resources when surgery is over-prescribed.

- Risks to patients including opioid addiction, exposure to radiation during imaging, and wound healing after surgery.

- Differences within countries (eg: urban vs rural).

3. Miscellaneous - Foster et al (2018) were positive about public health interventions, like mass media campaigns to change perceptions of LBP.

In reference to dealing with LBP globally, Foster et al (2018) ended their article: "The starting point in high-income countries will be different from low-income and middle-income countries, and their priorities are likely to differ. No single solution will be effective, and a collective, global effort will take time, determination, and organisation. Without the collaborative efforts of people with low back pain, policy makers, clinicians, and researchers necessary to develop and implement effective solutions, disability rates, and expenditure for low back pain will continue to rise" (p2380).

3.3. DIFFERENCES IN PRESCRIBING

Benzodiazepines (BDZs) and "Z-drugs" (non-BDZs - eg: zopiclone) are widely prescribed for insomnia, anxiety, and acute back pain, for example (Soyombo et al 2020). It has been calculated that over a quarter of a million people in the UK are on long-term prescriptions for these drugs (Soyombo et al 2020). There are concerns about tolerance, dependency, and withdrawal, as well as increased risks of falls for older adults, and cognitive impairments, and traffic accidents generally (Soyombo et al 2020).

Analysis of data by Tsimtsiou et al (2009) in the UK and Olfson et al (2015) in the USA, for example, suggested differences in prescribing based on age, gender, and socio-economic status (SES) (eg: more prescriptions for older women).

Soyombo et al (2020) explored this further using 2017 data from primary care practices in England. SES was defined for neighbourhoods by using the Index of Multiple Deprivation (IMD) scores, which combines seven domains

(eg: income levels; amount of crime; barriers to housing and services). Ten categories (deciles) of IMD scores were used. Prescribing data were converted into milligram-equivalents of diazepam per 1000 patients.

In total in 2017, over 14.6 million prescriptions of BDZs and Z-drugs were written, and prescribing was significantly higher in the highest IMD scoring neighbourhood-practices compared to the lowest category. In other words, the poorest neighbourhoods had the highest prescriptions. This was the case after adjusting for age and sex.

Soyombo et al (2020) explained further: "The prescription of benzodiazepines and Z-drugs is subject to large geographical variation in England; eg; we found a preponderance of higher prescribing rates in coastal regions, but no clear north–south divide. Social status alone cannot explain this geographic variation. The strength of the association between IMD scores and prescribing rates was not replicated for each individual drug, likely as an expression of the diverse indications for these medications" (p197).

However, "IMD score, age and sex only explained a small proportion of the overall variation in prescribing across GP practices" (Soyombo et al 2020 p194).

Though all data for England were used, and for the whole year to avoid seasonal variations in prescribing, practices with fewer than one thousand patients were excluded.

The use of IMD scores for the neighbourhood where the practice was based is not the same as the SES of the individual patient. Soyombo et al (2020) admitted: "A further limitation of aggregated data is the lack of detail around the intended indications for prescribing. We did not consider prescriptions originating outside of primary care or private prescriptions, and these may have had an impact on results; eg: if those in underserved populations are less likely to seek private prescriptions" (p198).

3.4. APPENDIX 3A - ANCESTRAL SHAPE HYPOTHESIS

To be precise, the "ancestral shape hypothesis" was an attempt to explain intervertebral disc herniation as the cause of back pain. This is "a prolapse of the gelatinous substance inside the disc, the nucleus pulposus, either horizontally through the fibrous outer disc layers or vertically into the vertebral endplate" (Plomp et al 2015 p2).

The common ancestor of hominins, chimpanzees, and bonobos is assumed to have been a knuckle-walker (like

current chimpanzees) [9]. But the human ancestor became bipedal at some stage. "Given that the ancestral vertebral shape would not have been adapted for bipedalism, individuals whose vertebrae are towards the ancestral end of the range of shape variation can be expected to suffer disproportionately from external load-related spinal pathologies" (Plomp et al 2015 p2).

Plomp et al (2015) continued: "Selection likely acted to improve the ability of the vertebrae to cope with the new demands, but given that vertebral shape is almost certainly influenced by multiple genes and that the spine is multi-functional, we can also expect that within a hominin species, some individuals will have vertebrae that are closer in shape to those of the common ancestor than others" (p2).

Plomp et al (2015) presented evidence to support this hypothesis with 2D images of 114 human (54 classed as "pathological"), 56 chimpanzee, and 27 orang-utan vertebrae. From the bones seventeen points ("landmarks") were distinguished (figure 3.1).

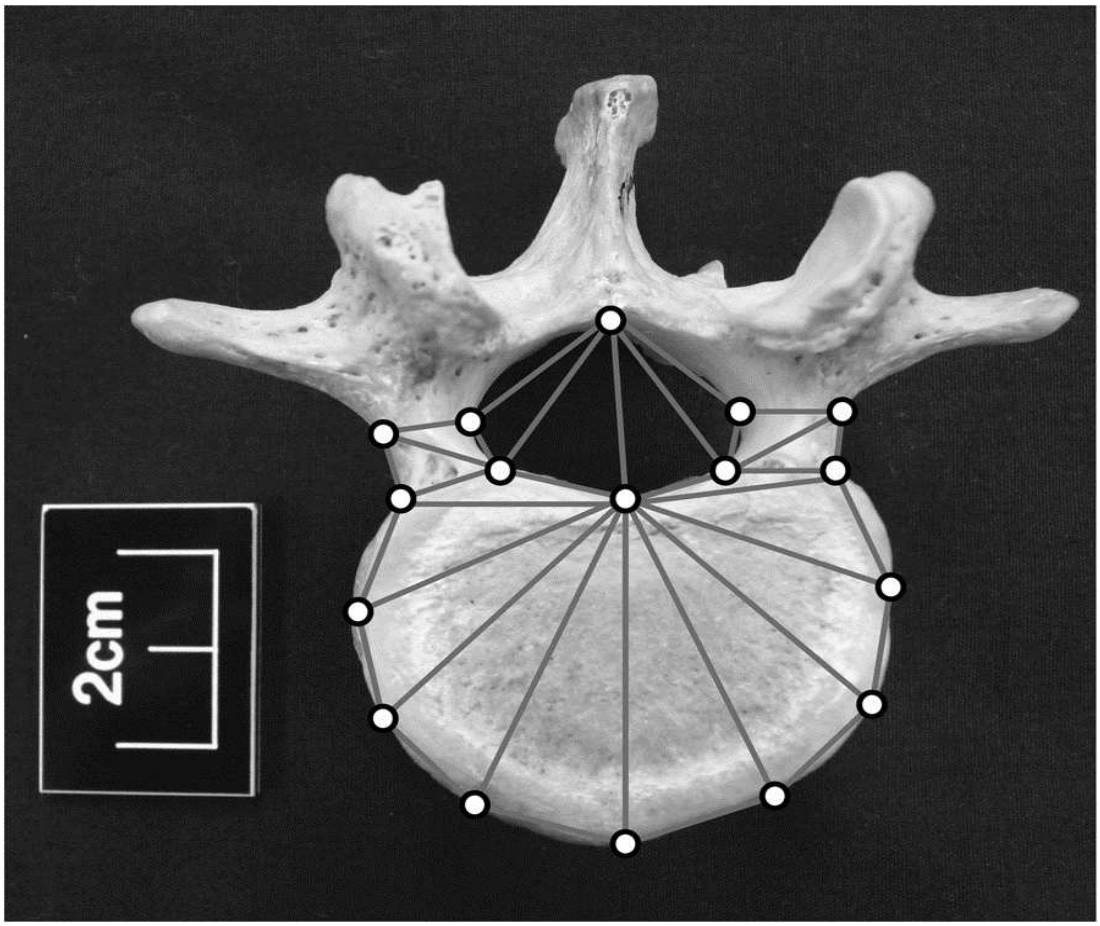
The researchers found support for two predictions:

i) The three groups of vertebrae will differ in shape.

ii) Pathological human vertebrae (ie: prone to LBP) will have a similar shape to chimpanzee and orang-utan vertebrae.

This type of research and hypotheses are an example of "evolutionary medicine", which "has identified the value of considering evolutionary adaptations to enable better understanding of human developmental issues, chronic diseases, and nutritional needs" (Plomp et al 2015 p8).

[9] The alternative hypothesis is that the common ancestor was an arboreal quadrumanous climber like modern-day orang-utans. Either way, bipedalism is challenging to the ancestral spine (Plomp et al 2015).



(Source: Plomp et al 2015 figure 1)

(Picture of human vertebrae)

Figure - Location of seventeen landmarks on vertebrae.

3.5. APPENDIX 3B - PATIENTS

Analysing twenty-two general practice consultations in Bristol and Birmingham, Robinson (1995) distinguished two types of patient contributions to the interaction (not directly invited by the doctor.

Type 1 - Comments and queries that arise from the knowledge and experience of the patient (ie: formulated prior to the consultation.

Type 2 - Comments and queries in response to the information given by the doctor (ie: formulated during or after the consultation).

A "passive patient" may not make Type 1 comments because they feel inhibited by the unintentional or deliberate behaviour of the doctor. On the other hand, it is possible that patients do not make these comments because the consultation is used to clarify their views

or put their symptoms in perspective (Robinson 1995). But how patients make sense of their illness is crucial in what is remembered and understood of the consultation (Tuckett et al 1985).

Type 2 comments may not be given because the doctor or patient assumes they understand the advice given. Studies of the consultation often interview patients after the event to assess their level of recall and understanding. But this can ignore the fact that patients continue to think about their problem after the consultation, and "hence to become aware of residual queries. Residual queries may not always be a sign of communication failure, but rather one sign of a thoughtful patient" (Robinson 1995 p133).

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4. PHYSICAL HEALTH SHORTS

4.1. MEAT ALLERGY

A growing number of people, particularly in the USA, are allergic to "the meat of mammals and everything else that comes from them" (McKenna 2018 p9) [10] (eg: dairy products; wool; gelatine from their hooves) [11].

This has been called "alpha-gal allergy" (or syndrome - AGS) [12], and is an autoimmune response to alpha-gal [13] in mammals [14]. The cause seems to be a bite from a tick (the "lone star tick"; Amblyomma americanum) (McKenna 2018) [15]. "Normally, alpha-gal found in red meat poses no risk to humans, but after attachment of some tick species, it is possible that alpha-gal-containing antigens from the tick delivered into the host's skin trigger an alpha-gal-directed IgE response" (Crispell et al 2019 p2).

4.2. LIQUORICE

Edelman et al (2020) reported the case of a 54 year-old man in the USA who consumed one or two large packages of liquorice-flavoured sweets daily, which led to sudden cardiac arrest. Liquorice produces a number of physiological changes, including reducing blood potassium and thus raising blood pressure, and effects on the

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[10] Around 5% of the US population is estimated to have a food allergy of some kind (Crispell et al 2019).

[11] First (anecdotal) cases in the USA linked to tick bites around the year 2000, but confirmed evidence not until 2010 (Steinke et al 2015).

[12] It differs from other allergic reactions in that symptoms are often delayed 3-5 hours, for example, and the most common reaction is itching (Steinke et al 2015). "Most food-related symptoms occur between a few minutes to 2 h after ingestion. Acute, potentially fatal, anaphylactic reactions generally are manifested within minutes of exposure to the trigger food. However, delayed hypersensitivity reactions to foods (eg: eczema) are not uncommon, and generally develop several hours after allergen exposure" (Crispell et al 2019 p2).

[13] Galactose-alpha-1,3-galactose (alpha-gal) - present in tissue and meat of non-primate mammals (Steinke et al 2015).

[14] Technically, it is a specific immunoglobulin type E (IgE) anti-body response to alha-gal (Steinke et al 2015).

[15] Crispell et al (2019) found alpha-gal in the saliva of the Black-legged tick (Ixodes scapularis) as well as well in an experiment, but not in the Gulf Coast tick (Amblyomna maculatum) or American dog tick (Dermacenter variabilis).

liver, which culminated in the heart attack.

4.3. COFFEE

There is some evidence that coffee drinking may reduce the risk of certain illnesses, like heart disease (Klein 2020). Karabegovic et al (2020) suggested that the reason may be that drinking coffee was associated with epigenetic [16] changes at eleven particular DNA sites. These sites were linked to digestion, processing harmful substances, and controlling inflammation (Klein 2020).

Establishing causality is still open to question (Klein 2020).

4.4. GUT AND MOOD

The idea that gut bacteria can influence mood has emerged this century. Sudo et al (2004) noticed that "germ-free" mice (ie: born without gut microbes) behaved differently in response to stress (ie: an exaggerated response), and "acted like they were depressed" (Anderson 2019 p34).

This has become known as the "gut-brain axis" (Anderson 2019). Other researchers (eg: Dinan and Cryan 2013) have been able to manipulate the mood of mice by changing the bacteria in the gut (eg: through food or faecal transplants) (Anderson 2019).

This led to the idea of "psycho-biotics" - probiotics to improve mood (Anderson 2019).

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5. MENTAL HEALTH SHORTS

5.1. DIAGNOSIS OVER THE LIFESPAN

Diagnosis of a mental disorder is made at one point in time, and it is assumed that this is correct for the individual's lifetime. But Caspi et al (2020) asked: "what if most patients tend to meet the criteria for many different diagnoses in turn, not only within 1 diagnostic family, but across families, too? What if the predominant pattern were one in which the onset of mental disorder occurs in the first decades of life and, thereafter, whenever an individual is assessed for a disorder, that individual might meet the criteria for a succession of different diagnoses?" (p2).

A large-scale Danish study (Plana-Ripoll et al 2019), for example, found that "most patients do meet the criteria for many different diagnoses in turn... every mental disorder diagnosed was associated with an increased risk that the patient would be diagnosed at another time with other disorders, both inside and outside the index disorder's family" (Caspi et al 2020 p2). This study included nearly six million in-patients and out-patients, and covered almost twenty years. But it was criticised for the "Berkson bias" (Berkson 1946).

Hospital records are biased towards complex cases with longer impairment, and ignore individuals treated swiftly by GPs, say, or those who do not seek treatment. "Thus, it is possible that crossing diagnostic families is unique to clinical patients but does not generalise to the fuller population of individuals experiencing mental disorder" (Caspi et al 2020 p3).

Caspi et al (2020) used data from the Dunedin Birth Cohort Study to investigate this possibility. This cohort includes individuals born in Dunedin, New Zealand, in 1972-73, who at eleven years old were interviewed the first time about mental disorders. Regular interviews were performed until the most recent at 45 years old. At this time, 938 of 997 living cohort members participated.

In the teenage years, 35% meet the criteria for any mental disorder, around 50% in the late teens and early 20s, and 44% at 45 years old. Early onset of a disorder was associated with later diverse diagnoses. "Participants characterised by only 1 pure disorder were

atypical. For example, among participants ever diagnosed with an internalising disorder, most (503 of 712 [70%]) also experienced externalising or thought disorders and another 16% (113 of 712) had multiple kinds of internalising disorders. This left only 14% (96 of 712) of participants with internalising disorders who experienced only 1 pure type of internalising disorder, such as depression or 1 anxiety disorder type" (Caspi et al 2020 p6).

Caspi et al (2020) described an "ebb and flow" of mental disorders over time. So, "participants with a disorder in any of the 3 diagnostic families at 1 specific age were at higher risk for both other diagnostic families at subsequent ages, and all disorders were associated with an elevated risk for all other disorders" (Caspi et al 2020 p7).

Note that because of the length of the study, the diagnostic criteria used had changed (ie: from DSM-III to DSM-5). But this could not explain the overall finding that "mental disorder life histories shift among different successive disorders" (Caspi et al 2020 p2).

5.2. SUB-SAHARAN AFRICA AND SCHIZOPHRENIA

The outcome of schizophrenia is different for men and women. "For example, women are more likely to achieve functional remission than men, have less severe clinical symptoms, including a lower level of negative symptoms, although women have been found be more likely to have depression" (Mayston et al 2020 p1581). Oestrogen may play a part in these differences, for example. But there are "cultural" factors also (Mayston et al 2020).

For instance, women with schizophrenia may be more "acceptable" in rural China, leading to better social support, or put another way, men with schizophrenia were more likely to be living along (Ran et al 2015) [17]. Similarly, in India, men with schizophrenia's failure to fulfil occupational norms (ie: hold down a job) led to worse outcomes, whereas women were not expected to work outside the home (and so continued to receive social support) (Thara and Rajkumar 1992) [18].

However, Mayston et al (2020) did not find this in rural Ethiopia. This study followed 358 individuals diagnosed with schizophrenia over 10-13 years, who were part of a cohort recruited in 1998 in Butajira (south-west of Addis Ababa). In high-income countries, cohorts

[17] This study followed 265 women and 224 men over fourteen years.

[18] In a 13-year follow-up of 64 women and 56 men with schizophrenia in urban Nigeria (Gureje and Bamidele 1999), it was found that "although women had a more benign course of illness and were more likely to be married, they were more likely to report lower frequency and quality of social contact" (Mayston et al 2020 p1582).

are recruited through psychiatric services, but in low- and middle-income countries "the vast majority of men and women living with schizophrenia do not access biomedical health services, and do so many years after onset of illness" (Mayston et al 2020 p1582). The Butajira cohort were recruited with a door-to-door survey of a mental health screening questionnaire.

Overall, there was no difference in the functioning or recovery in the sample by gender (including course of illness, number of psychotic episodes, and adherence to medication). Though there were some differences like lower overall life satisfaction reported by women, or men having co-morbid substance use (khat or alcohol).

The number of women in the study was small (n = 62).

Mayston et al (2020) stated: "Case-finding strategies to identify women living with schizophrenia who may be 'hidden' may be necessary: for example, snowball sampling among health service providers, religious and traditional healers, other key informants in communities may be needed to achieve a representative sample" (p1590).

5.3. SLEEP AND EMOTIONS

Sleep deprivation (and restriction) have an impact on emotions. Emotional memories are consolidated during sleep, which reduces their negative emotional reactivity (Walker and Van der Helm 2009), or maintains it (Wagner et al 2006), depending on the theory (Tempesta et al 2020).

"Emotional reactivity" is defined as "the quality and intensity of response to affective stimuli" (Tempesta et al 2020 p1). This is usually tested by affective pictures, which are scored for arousal (eg: calm - excited), and valence (eg: negative, neutral, positive) (Tempesta et al 2020).

Tempesta et al (2010), for example, found that neutral pictures were evaluated more negatively by sleep-deprived than normally sleeping participants. This study, like most, involved sleep deprived individuals (ie: no sleep), but sleep restriction is more of an issue in real life (ie: less hours sleep than the ideal). So, Tempesta et al (2020) performed their study "to evaluate the effects of five consecutive days of sleep restriction on emotional reactivity in healthy young adults" (p2).

Forty-two individuals in their 20s in Italy were recruited for this crossover design study. During the "sleep condition" (SC) participants were instructed to sleep their normal 7-8 hours (Sunday to Thursday), but in the "sleep-restricted condition" (SRC) the next week, they were told to go to bed at 2 am and get up at 7 am

(Sunday to Thursday) [19]. in the morning of the Fridays, the participants were presented with emotional stimuli - pleasant, unpleasant, and neutral pictures - and rated the emotion (valence) and the strength of the emotion (arousal).

Overall, in the SRC the participants rated pleasant pictures significantly less positively, and the neutral pictures more negatively than in the SC, but there was no difference for the unpleasant pictures. So, sleep restriction leads to a negative evaluation of pleasant and neutral stimuli, and this fits with the theoretical position of Walker and Van der Helm (2009) that "sleep attenuates negative emotional reactivity" (Tempesta et al 2020 p6).

The participants slept at home, so the researchers had limited control over environmental factors. Tempesta et al (2020) also accepted that the "study focused on effects of sleep restriction on emotional reactivity across 5 days, which did not allow the assessment of day-to-day changes. Moreover, whether the effect of sleep restriction is cumulative cannot be answered by our study: indeed, after chronic sleep restriction, long-term behavioural adaptation could take place, bringing emotional reactivity back to basal levels" (pp7-8). The measures of emotional reactivity were subjective, as were sleep data. The ideal would be objective measures of both sleep and emotional reactivity (Tempesta et al 2020).

5.4. LOBOTOMY

The history of psychiatry can be presented in "a rather sanitised version" if lobotomy is downplayed. Tranoy and Blomberg (2005) made this point for Norway, and as a criticism of Kringlen's (2004) history of Norwegian psychiatry.

For the period 1938 to 1972 at Gaustad (Norway's main psychiatric hospital) in Oslo, lobotomies were commonly performed, and in greater numbers than other institutions in Scandinavia (Tranoy and Blomberg 2005). "Gaustad remained a centre for psychosurgery research until the 1960s, with financial support from the Ford Foundation and the United States Department of Defence

[19] The researchers explained that "constant telephone monitoring was carried out by means of calls, text messages and photographs, so as to ensure compliance with the timetable established in the sleep-restriction condition. The subjects also had to warn the experimenter when they went to bed, when they woke up and when they got out of bed. The participants were asked to keep their telephone near the bed with the ringtone activated during the night, to allow the experimenter to wake up them at the pre-established time, if she or he did not receive the text message the participant had to send upon awakening" (Tempesta et al 2020 p4). Actigraphs were also worn to check for daytime naps as well as general activity levels.

..., and was the last Norwegian institution to stop using the practice in 1974" (Tranoy and Blomberg 2005 p108).

In total, 2500 individuals were lobotomised in Norway, which compared to 40 000 in the USA and 17 000 in Great Britain (Tranoy and Blomberg 2005).

5.5. SPOUSAL INCOME

In 1970 in the USA, 4% of wives earned more than their husbands, but fifty years later, it is about a quarter (Syrda 2020). "As the percentage of wives out-earning their husbands grows, the traditional social norm of the male breadwinner is challenged and income comparisons in marriage are substantially changed. The consequences of 'gender role reversals' in marriages associated with wives' higher earnings span multiple dimensions, including physical and mental health, life satisfaction, divorce and marital fidelity, marital bargaining power, and other behaviours and actions, ranging from housework division to labour market activity" (Syrda 2020 p976).

Syrda (2020) concentrated on male psychological distress in such situations using US data from the Panel Study of Income Dynamics (PSID). This is alongitudinal study including 6035 married heterosexual couples (2001-15).

Psychological distress was measured by the "K-6 non-specific psychological distress scale" (Kessler et al 2020), which includes six items (each rated from "never" (0) to "most of the time" (4)) - sad, nervous, restless, hopeless, everything was an effort, and worthless - in the past month.

A "significantly U-shaped" relationship was found between wife's relative income (WRI) and husband's psychological distress. Psychological distress was high for male sole breadwinners, lowest where wives earned 40% of total household income, and high again if the wife was the sole breadwinner. "Interestingly, the relationship between wife's relative income and husband's psychological distress is not found among couples where wives out-earned husbands at the beginning of their marriage pointing to importance of marital selection" (Syrda 2020 p976).

In terms of theoretical explanations for the husband's distress, these included imbalance in power in the relationship, or the traditional "male breadwinner" construct and masculinity (Syrda 2020).

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