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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. SOCIAL PSYCHOLOGY AND NEOLIBERALISM

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1.1. NEOLIBERALISM

Bettache and Chiu (2019) began: "On the one hand, neoliberalism, originally an economic theory, has evolved into a socio-political ideology and extended its hegemonic influence to all areas of life, including the production of psychological knowledge in academia and the practice of psychology in various domains. On the other hand, neoliberalism has been criticised as the root of all problems in contemporary societies" (p8) ¹.

Economic growth, free markets, consumer choice, and self-governance are key ideas. "The psychological axiom in neoliberalism asserts that freedom from interference by others is a universal human desire. It also asserts that economic inequality benefits individuals because it inspires personal agency and fosters the development of the entrepreneurial self, which privileges productivity, innovation, and wealth creation" (Bettache and Chiu 2019 p13) ².

Beattie (2019) commented on the psychological effects of neoliberalism. He stated: "Neoliberalism is an economic experiment, but it is unavoidably a

¹ One newspaper columnist in the UK in 2016 argued that "neoliberalism is so pervasive 'that we seldom even recognise it as an ideology', although we may unwittingly 'internalise and reproduce its creeds' about, for instance, the wisdom of tax cuts for the wealthy, corporate hegemony, and the privatization of public institutions, and — more generally — the inherent superiority of market forces over governmental and other not-for-profit forms of collective organisation and planning" (Azevedo et al 2019 p83).

² Neoliberalism has been associated with the "New Optimism" (appendix 1B).

psychological experiment as well. Its underlying economic theory includes a basic conception of psychology: that collectively, human beings thrive under conditions of free competition, a meritocracy of wealth in which rewards go to each according to his ability" (p89). He considered the latter point in particular.

Wealth inequality means power inequality. "The possession of power inhibits the ability to adopt the perspective of others or understand how they see the world, intuit the emotions of others or take into account their knowledge... 'Even small, experimentally induced power levels increase hypocrisy, moral exceptionalism, egocentricity and lack of empathy for others' (Robertson 2013)" (Beattie 2019 p102).

While the absence of power (and wealth) has negative psychological effects. "Job insecurity or precariousness increases the risk of poor mental health, even for the securely employed in a workplace that also employs insecure workers" (Beattie 2019 p102) (appendix 1A).

Perez and Salter (2019) criticised neoliberalism in relation to race/ethnicity, particularly by emphasising "individuals as responsible for racial conflict as opposed to the system (p267). "The neoliberal utopia is a world without racial division, because the fully privatised, free market is presumably colour blind. The market is like a level playing field that rewards individuals based primarily on their merits or market values. Failing is the result of not trying hard enough, not because of one's race or structural inequality in the system. This perspective discourages government-sponsored social programmes such as affirmative action that may address structural racial inequality. It also reduces justifiable critiques on racism to oversensitivity of 'snowflakes'" (Bettache and Chiu 2019 p17).

The system involves, for instance, "structural violence" (ie: "violence committed as engaging in or discouraging engagement in legal, social, and political actions that discriminately impact people of colour (POC) and undermine racial equality"; Perez and Salter 2019 p270), which can be seen in the example of the Anti-Drug Abuse Act of 1986 in the USA. This sets out the sentences for drug offences, and, in particular, for the possession of cocaine. Individuals caught with 1 gram of crack cocaine receive five years in prison, but 100 gram of powder cocaine for the same sentence. "These drugs are chemically similar; however, their usage is heavily racialised with White Americans typically consuming powder cocaine and Black Americans crack cocaine. This act created a significant racial disparity in the criminal justice system and contributed to larger proportions of Blacks in prison systems" (Perez and Salter 2019 p270).

Acceptance of neoliberal ideology varies between individuals, and the Neoliberal Beliefs Inventory (NBI) (Bay-Cheng et al 2015) (table 1.1) was developed to measure this.

- People who complain about discrimination are often just blaming other people for their own problems.
- People should be allowed to compete to ensure that the best person wins.
- Anybody can get ahead in the world if they learn to play the game.
- Social programmes sponsored by the government provide false incentives and unearned rewards.

(Source: Beattie et al 2019 table 2 pp35-36)

Table 1.1 - Example of items from the NBI.

But there are also cultural differences in the acceptance as Beattie et al (2019) (appendix 1C) found: "For example, in the United States, people who subscribe to neoliberal beliefs tend to possess personal qualities characteristic of homo economicus: these individuals are narrowly self-interested and consistently strive to raise their socio-economic standing and dominance in the society. For example, they tend to score high on self-interest and narcissism, embrace agentic values, endorse the social dominance orientation, and feel pressured to compete for the sake of avoiding social disapproval. In contrast, in India, people who embrace neoliberalism tend to blend qualities of homo economicus with those of homo reciprocans (reciprocity and co-operation). For example, these individuals tend to score high on both self-maximisation and pro-social orientation and embrace both agentic and communal values. Furthermore, in India, endorsement of neoliberalism is not connected to the preference for inequality and has only a weak association with the social dominance orientation" (Beattie and Chiu 2019 p14).

While in China, acceptance of free market ideology reduces interpersonal trust (Zhang and Xin 2019; appendix 1D), but the focus of the negative sentiments is upon the establishment elites in Germany (Hartwich and Becker 2019; appendix 1E).

Jasko et al (2019) investigated the response to neoliberalism through political activism in Poland (appendix 1F).

Aspects of neoliberal ideology also influence other beliefs, as seen in these two studies. Dutt and Kohfeldt (2019) recruited 270 US participants online to complete the NBI, and questions about Central American asylum seekers. "Higher levels of neoliberal ideology were

related to greater exclusion of Central American asylum seekers from one's moral community, as well as less willingness to engage in efforts to support the rights of asylum seekers, and greater ethnocentrism" (Dutt and Kohlfeldt 2019 p145).

Panno et al (2019) analysed the ANES 2016 Time Series Study data, which covered face-to-face and online surveys with US citizens between September 2016 and January 2017. Questions measured attitudes towards Donald Trump, political attitudes generally, climate change scepticism, and aversion to wealth redistribution.

"More favourable attitudes towards Trump were associated with climate change scepticism. Furthermore..., this association was stronger among those more interested in politics. Finally, the association between Trump favourability and climate change scepticism followed both a direct and an indirect path, through neoliberal elements, such as negative attitudes towards Government-led redistribution policies" (Panno et al 2019 p162). Wealth redistribution, which is strongly criticised by supporters of neoliberalism, thus underlies negative attitudes towards climate change, at least in the USA (appendix 1G).

1.2. WIDER INFLUENCE OF NEOLIBERALISM

In terms of the wider influence of neoliberal ideas, Gjorgjioska and Tomicic (2019) argued that neoliberalism has influenced academia (in particular, psychology) in two important ways:

i) Encouraging "the production of knowledge that subscribes to positivist principles" (Gjorgjioska and Tomicic 2019).

Positivism is "based upon the realist ontological position according to which objects have an existence independent of the researcher and external realities can be known objectively" (Gjorgjioska and Tomicic 2019 p170). The alternative is "interpretivism", or a more subjective basis to knowledge. Positivist research focuses on facts, universal laws, and the generalisation of findings.

Applying this point to academia, government funding is limited for research or it comes from private sources, and so definite (more objective) findings are more attractive.

ii) Emphasised individualism in its different forms.

For example, funding is also more likely to go to projects that fit the individual-focused nature of neoliberalism (ie: playing down social explanations). While, at another level, academics are concerned with their individual success (eg: publications in "impact

factor journals").

Gjorgjioska and Tomicic (2019) ended with a quote from Sugarman (2015): "Only by interrogating neoliberalism, psychologists' relationship to it, how it affects what people are and might become, and whether it is good for human well-being can we understand the ethics of psychological disciplinary and professional practices in the context of a neoliberal political order and if we are living up to our social responsibility".

Adams et al (2019) outlined four themes to describe how neoliberalism has impacted on psychological experience:

i) Radical abstraction - "a sense of freedom from constraint" which mirrors the movement of capital with globalisation. "At the cultural-psychological level, the emphases on deterritorialisation and fluidity manifest as form of mobility and radical independence from local context" (Adams et al 2019 p193).

On the positive side, individuals have greater opportunities beyond their local contexts, and the mobility encourages openness. On the negative side, cultural standardisation as "mobile actors seek and create familiar products (eg: chain stories ...). Standardisation erases local identity—including the sort of cultural knowledge that provides an epistemic foundation to question the status quo and to imagine alternatives... – as it transforms cultural patterns for ease of consumption and contributes to the cultural dominance of hegemonic global forms" (Adams et al 2019 p193).

ii) Entrepreneurial self - "homo oeconomicus": an entrepreneur of himself" (Foucault 2008). This is manifest as individualism (or hyper- or ultra-individualism).

iii) Growth imperative - pursuit of personal growth self-development that mirrors economic growth. This goes with choice, which "allows people to individuate themselves, to reveal their uniqueness, and to exercise control with the aim of getting exactly what they want from any situation. With choice, individuals become the arbiters of what looks, tastes, feels, or indeed is good and true" (Adams et al 2019 p195). An excess of choice, however, can lead to dissatisfaction with decisions, and even victim blaming (Adams et al 2019).

iv) Affect management - an emphasis on feelings (over rationality). "Positive affect is particularly important, both as a goal of choice and as evidence that one has made the right choice" (Adams et al 2019 p196).

Adams et al (2019) applied their four themes of neoliberalism to academic psychology:

a) Radical abstraction - eg: assumption that studies with WEIRD (Western, educated, industrial, rich and democratic) individuals (Heinrich et al 2010) are applicable universally. Markus and Kitayama (1994) accused social psychology of "a collective fear of the collective".

b) Entrepreneurial self - eg: "psychological essentialism": "an understanding of mind and behaviour as the product of core individual attributes that are the defining or authentic foundation of a person's life trajectory" (Adams et al 2019 p202). One upshot of this is "the industry of psychological testing" (Adams et al 2019).

c) Growth imperative - "Many theories within social psychology consider personal growth and development to be the pinnacle of human experience, a mark of optimal well-being" (Adams et al 2019 pp203-204).

d) Affect management - eg: "the self-esteem movement": "A central theme of this movement was that feeling good about oneself - rather than, for example, attending to one's shortcomings to better direct efforts at self-improvement - is the key to successful achievement, relationships, health, and life in general. Another central theme has been that self-esteem and happiness are matters of choice and personal responsibility. They are individual rather than group projects, and a person owes it to herself to ignore feedback from haters who would undermine her self-esteem" (Adams et al 2019 pp205-206).

Adams et al (2019) advocated decolonising psychology - ie: "to articulate new intellectual traditions free from the connection to neoliberal individualist selfways" (p207). A "theory from the South" (TFTS) approach (Comaroff and Comaroff 2012) emphasises the Majority-World or Global South as central, rather than as an add-on to Western academic work. For example, challenge the view that what is found with WEIRD participants is natural to humanity.

Dougherty (2019) linked the prescribing of anti-psychotic medication (neuroleptics) (particularly in the USA) to neoliberalism through Foucault's (2009) concepts of "governmentality" and "biopower". Referring to the last fifty years, he summed up: "As patients were emptied into communities, psychiatric care became less about the ease of managing madness within hospital walls. Instead, constructs of wellness now explicitly centre notions of

how citizens are to behave in communities, wherein the rubric for normalcy is the idealized neoliberal subject. This resonates with visions for rehabilitation and recovery in the United States, where less dependency on services is seen as a moral obligation... Together, neoliberalism seeks to reform mad/disabled subjects in poverty through the use of neuroleptics; this is the psychological management of poverty under neoliberalism" (p231) ³.

Peters (2019) explained: "A neoliberal medicalised framework shapes society's understanding of distress as a disease or disorder and places the responsibility on individuals to 'fix' themselves, situating the problem within a person, rather than in a socio-political context" (p238).

Peters (2019) applied this idea to sexual violence survivors in the USA, where a "medical neoliberal framework of post-sexual assault experiences ignores racial and social inequities that create an environment conducive to sexual violence, thereby preventing larger social change from occurring" (p242). She explored this in interviews with six psychotherapists working at rape crisis centres (RCCs) in the north-east of the country. Four "master themes" were elicited using interpretative phenomenological analysis.

i) "Wielding the double-edged sword of the medical model" - Benefits and harms to using the "Post-Traumatic Stress Disorder" (PTSD) criteria and label, for instance, to make sense of the individuals' post-sexual assault experiences. On the positive side, it helps survivors feel "I'm not crazy" as they struggle with symptoms like flashbacks, but negatively, the suffering could be minimised as "Interviewee 4" said: "I decide, what are the symptoms that she is having, or how is she going to fit in this book [PTSD criteria]" (p247).

ii) "Navigating the healing process with survivors" - Supporting survivors along the "healing journey", particularly with group counselling, say, beyond the

³ "Compared to the preceding totalitarian rule of monarchs, Foucault observed governmentality in liberal democracies as concerned with limited and concealed governmental practices to allow for a political economy to flourish. This is accomplished through two means. First, there is the construction of the neoliberal subject; a psychological construct of the individual that aligns with free-market principles. As Dardot and Laval (2014) aptly describe: '[Neoliberalism] enjoins everyone to live in a world of generalised competition; it calls upon wage-earning classes and populations to engage in economic struggle against one another; it aligns social relations with the model of the market; it promotes the justification of ever greater inequalities; it even transforms the individual, now called on to conceive and conduct him- or herself as an enterprise'... Second, a mode of governance in liberal democracies is through the constructing, disciplining and modifying of bodies; termed 'biopower'" (Dougherty 2019 p217).

benefits of individual counselling. Also a greater understanding of "the way that our culture perpetuates this kind of stuff [sexual violence]" ("Interviewee 3"; p249).

iii) "Stay in your lane: The role of the RCC" - RCC counselling is aimed at dealing with the short-term post-assault therapy, but there are wider issues that RCCs cannot ignore (eg: power dynamics, particularly for marginalised populations; a social movement to end sexual violence).

iv) "Understanding and honouring survivor shame" - "Participants spoke about how the normalisation of sexual violence by society makes perpetration more likely and is connected to survivors' minimising their experiences of sexual violence" (Peters 2019 p251).

Peters (2019) summed up: "A neoliberal medicalised discourse, which treats health and wellness as commodities..., runs the risk of focusing on symptoms without addressing the societal context and intersecting forms of oppression. In this way, it can inadvertently promote a capitalist patriarchal agenda" (p252). The interviewees at the RCCs faced tensions in their work (eg: individual counselling vs group counselling, and social support). So, "a neoliberal, biopsychiatric model may conceal social inequities, pathologise survivors, and lead to an overemphasis of medication. Yet, many survivors have also benefited from validation, reduced stigma, and easier access to services due to the medical model. In order to more fully appreciate the diversity of survivors' experiences and the context within which they are reacting to sexual violence, a deconstruction of medical neoliberalism, rather than a unilateral dismissal, is essential" (Peters 2019 p259).

1.3. APPENDIX 1A - PRECARITY AND INEQUALITY

1.3.1. Health Insurance Precarity

Merid (2019) has coined the term "health insurance precarity" to describe "a fundamental uncertainty of one's prospects for survival should one become uninsurable" (p3) in the USA.

This idea comes from the political battle around the Patient Protection and Affordable Care Act (ACA) introduced by President Obama in 2010, and subsequently repealed. A key aspect of the ACA was health insurance coverage for individuals with pre-existing conditions.

Health activism has emerged as a reaction to the repealing of the ACA, with campaigns like "Fight For Our

Health" (FFOH) initiated by the Service Employees International Union. Merid (2019) analysed the materials produced by FFOH. A key aspect of these materials was "affecting narratives about illness and death" ⁴.

Merid (2019) continued: "Storytelling through personal illness narratives is a particularly apt mechanism for the communication of the social vulnerability that attends life with a pre-existing condition... The individual with a pre-existing condition living with the fear of becoming uninsurable negotiates a distinct kind of potential threat on life. What makes the stories told by this campaign compelling is that while they are personal illness narratives situated in particular illness experiences, they prompt a recognition of just how distributed this vulnerability is; in other words, the vulnerability of one body is intimately and inextricably tied to the vulnerability of all bodies. Our humanity is in this recognition of the precarity of the other, of their vulnerability, as much as it is in ours" (p11).

1.3.2. Economic Insecurity and Pain

In six studies Chou et al (2016) tested the hypothesis that "objective and subjective economic insecurity directly increase the experience of physical pain" (443), and that perceived lack of control is key.

Study 1 - This was a study of household consumption of over-the-counter painkillers and the head of the household's employment status using 2008 US data. Employment status was scored from 0 (both heads employed) to 2 (both heads unemployed). Painkiller use was calculated from purchase data of 33 720 households studied by market researchers. After controlling for

⁴ "Prior to the enactment of the ACA, insurers could refuse to insure, or severely restrict coverage for, anyone deemed to have a "declinable medical condition" (Claxton et al. 2016 p1). These declinable conditions comprised a range of diagnoses including but not limited to HIV/AIDS; congestive heart failure, heart disease, and stroke; a range of cancer diagnoses; and any pending surgeries or hospitalisations... To determine whether or not an applicant was found to have declinable medical conditions and could be refused insurance, applicants were compelled to produce an extensive account of their medical history and authorise the insurance company to do its own research, lest any declinable conditions be forgotten — yet another cause for a refusal of coverage. As part of this review process, insurers were also able to refuse or limit coverage if applicants had ever taken declinable medications or held ineligible occupations. Declinable medications included treatments for a range of diagnoses which, Claxton et al. (2016) explain, were charted in health insurers' field manuals to detail the many routes to a denial of care. Declinable medications included medications for cancer like Nolvadex and Tamoxifen, medications for HIV/AIDS like Interferon, anti-psychotics like Haldol and Clozapine, and anti-arthritis like Cyclosporine, among many others... Likewise, applicants who worked in occupations insurers deemed to be too risky could also be denied care. Active military personnel, firefighters and EMTs [emergency medical technicians], nuclear industry workers, cab drivers, pilots, and aviation and air transportation workers were included in this category" (Merid 2019 p17).

variables, like cold and flu medications, and size of household, the households with two unemployed heads purchased significantly more painkillers than the other households.

Study 2 - This study involved 293 US residents recruited online. Their State of residence was categorised for economic insecurity (based on unemployment rate) as well as the individual's employment status. Participants had to rate their level of physical pain "right now" from 1 (no pain) to 5 (very intense pain). Both measures of economic insecurity were associated with physical pain (ie: greater insecurity and greater pain reported).

Both these studies are correlational, while the researchers needed to establish causality.

Study 3 - This was an experiment with 231 online-recruited participants, who were asked to write a short essay recalling an economically uncertain time of life (high insecurity condition) or a certain time (low insecurity condition). Subsequently, participants reported their head, chest and stomach pain on a ten-point scale. This was an independent-participants design experiment meaning that individuals performed one condition only.

Participants in the high insecurity condition reported significantly more pain than in the low insecurity condition (after controlling for age, gender, mood, and current employment status). This established "a direct causal relationship between economic insecurity and physical pain" (Chou et al 2016 p447).

Study 4 - This study investigated whether perceived lack of control mediated the relationship between economic insecurity and pain with 195 online-recruited US participants. Economic insecurity was categorised by State of residence as in Study 2, and physical pain was rated on a five-point scale. Participants also completed a five-item questionnaire about perceived lack of control (eg: "Other people determine most of what I can and cannot do").

Participants from States scored as high insecurity reported more physical pain, and more perceived lack of control than other participants.

Study 5 - This attempted to establish causality for the perceived lack of control and physical pain with 100 participants (recruited from Amazon Mechanical Turk as before). Participants were randomly divided into two conditions for a recall task - a situation in their life where they felt a lack of control or in complete control. Their overall pain level was subsequently rated from 0-

100.

Participants in the lack of control condition reported significantly more pain (mean 13.75 vs 6.57).

Study 6 - This study was different as it involved 114 University of Virginia undergraduates in a face-to-face experiment. Participants read about economic security or insecurity before a pain tolerance test. This was the length of time they would keep their hand in a bucket of ice water. A baseline measure had previously been taken.

Participants in the high economic insecurity condition showed a significant reduction in pain tolerance between baseline and after reading (ie: hand in water around 15 seconds less), whereas the other condition showed no change.

Subsequently, the researchers pooled their data from all the studies (except Study 5), and found support for their hypothesis that "economic insecurity induces physical pain" (Chou et al 2016 p451).

Chou et al (2016) stated: "Our findings highlight the importance of the distinction between subjective and objective economic insecurity. Much research attention has been directed to comparing the haves and have-nots... Although objective measures of wealth are important, our study shows that individuals' subjective interpretation of their own economic security has crucial consequences above and beyond those of objective economic status" (p451).

Though perceived lack of control is important, the researchers were not able to explain the mechanisms behind the findings. Also does subjective economic insecurity exacerbate existing pain or cause it from scratch?

The studies involving online participants were dependent on individuals who use Amazon Mechanical Turk, and who volunteered for the research for a small fee (eg: \$1). Is it possible that individuals who "work online" have greater pain issues than the general population? Put simply, they are not representative. Table 1.2 summarises the information given by the researchers.

| Study | Gender | Mean age (standard deviation) (years) | Paid (\$) |
|-------|--------------------------|---------------------------------------|-----------|
| 2 | female: 128 male: 165 | 34.42 (11.46) | 1 |
| 3 | female: 99 male: 132 | 33.60 (11.32) | 1 |
| 4 | female: 88 male: 107 | 33.33 (9.43) | 1 |
| 5 | female: 49 male: 51 | 31.05 (9.80) | 0.41 |

Table 1.2 - Details of participants recruited via Amazon Mechanical Turk.

1.3.3. Agreeableness and Economic Hardship

Financial hardship usually results from saving too little and spending too much. Studies have tried to find the personality traits more likely to show these behaviours. For example, the trait of neuroticism and compulsive buying versus conscientiousness and increased savings (Matz and Gladstone 2018).

Matz and Gladstone (2018) concentrated on the trait of agreeableness, which has been linked to financial problems. But why? Agreeable individuals show pro-social behaviour, and so may be more willing to give to others, for instance.

Matz and Gladstone (2018) proposed an explanation based on "negotiating style" (ie: dealing with conflict and co-operation in interpersonal situations). "For example, individuals with a pro-social orientation make fewer demands and more concessions than their more competitive peers... and are more likely to adopt a co-operative negotiation style that benefits the other party... As a result, agreeable individuals end up with poorer economic outcomes from negotiations than do their disagreeable counterparts" (Matz and Gladstone 2018 pp1-2).

Matz and Gladstone (2018) sought evidence for this proposal from seven studies:

Study 1 - 636 participants in the UK were recruited online to complete questionnaires on personality, savings and debt, importance of money, and negotiating styles. Overall, agreeableness was negatively correlated with savings, but there was no relationship with debt. Agreeable individuals assigned less value to money.

Study 2 - Through two BBC television programmes, 3155 UK individuals were recruited to complete the same questionnaires as in the previous study. The findings

from Study 1 were replicated.

Study 3 - Data were analysed on 4170 UK households' financial behaviours from a national survey. Agreeableness was found to be negatively associated with financial outcomes for lower income households, but not for higher income households.

Study 4 - A survey was completed by 549 customers of a UK-based bank. The findings confirmed those of Study 3.

Study 5 - Here the researchers analysed data from 2429 adults born in Britain in a single week in 1970 (British Cohort Study). The findings of the previous two studies were replicated.

The researchers noted: "The results of Study 5 provide some preliminary evidence that the relationship between agreeableness and negative financial outcomes may follow a causal path. For low-income participants' the level of agreeableness at the age of 16 was related to significantly lower levels of savings 25 years later at the age of 42. Although this design cannot establish causality directly, the ability to observe the temporal order of events makes it more powerful than purely cross-sectional designs" (Matz and Gladstone 2018 p10).

Study 6 - The dataset from Study 2 and publicly available data (n = 332 951) were used to look for geographical differences in agreeableness in the UK, and the link to insolvency rates. It was found that "at the geographic level, higher levels of agreeableness are more strongly associated with higher bankruptcy rates for those living in areas with lower average incomes, compared with those areas populated by individuals with higher average incomes" (Matz and Gladstone 2018 p12).

Study 7 - This study was a replication of the previous one using US data (n = 2 468 897).

Matz and Gladstone (2018) summed up the findings of the seven studies: "It has previously been suggested that the trusting and relationship-focused character of more agreeable people will lead them to be poor negotiators and more vulnerable to being exploited by others. We do not find support for this proposition. Instead, we provide correlational evidence consistent with the hypothesis that the relationship can be explained in part by agreeable people assigning a lower subjective value to money. The precise underlying mechanisms and processes which link agreeableness to a person's subjective valuation of money and their financial behaviours require further study to elucidate" (p15).

These studies involved a variety of data and samples

(table 1.3). The self-reports of savings and debt relied on honesty of responses, as with any study using this method. The data used were only quantitative.

Agreeableness was measured by two means:

- Validated personality questionnaire - Big-Five Inventory-44 (BFI-44) (John and Srivastava 1999) (Studies 1, 2, 6 and 7) or BFI-10 (Rammstedt and John 2007) (Studies 3 and 4).
- Items like "I am friendly" and "I am helpful" (Study 5).

| Study No. | Data and Sample | Evaluation Point |
|-----------|--|---|
| 1 | Participants from UK online recruitment site similar to Amazon Mechanical Turk | Only individuals who used website - not representative sample of general population |
| 2 & 6 | BBC TV viewers | As above |
| 3 | Survey by UK charity | Nationally representative sample of UK households |
| 4 | UK-based bank customers via email | Only individuals with that bank and who responded to email |
| 5 | British Cohort Study | Longitudinal cohort - nationally representative sample at beginning of study |
| 7 | US data from researchers and different sources | No guarantee of representativeness of general population |

Table 1.3 - Data and samples used in studies by Matz and Gladstone (2018).

1.3.4. Working Hours and Depression

Modern working patterns (eg: long work hours and weekend working) are linked to depressive symptoms. Weston et al (2019) analysed data from the UK Household Longitudinal Study (UKHLS) ("Understanding Society"), which began with 40 000 households in 2009. Data for 11 215 men and 12 188 women were available.

Work patterns were categorised as 35-40 hours per week (standard), 41-54 hours (long), or 55 hours and over (extra-long), and whether weekend working involved (never, some, most/all). Of the men, 37% were categorised as long, 12% as extra-long, and 23% worked most/all weekends, while the percentages were 19, 4, and 20 respectively for women.

Depressive symptoms were self-reported by a

psychometric questionnaire.

Women working extra-long hours, and/or most/all weekends reported more depressive symptoms than standard hours and no weekend work. For men, those working most/all weekends reported more symptoms. The researchers controlled for demographic, socio-economic, and lifestyle factors.

1.4. APPENDIX 1B - "NEW OPTIMISM"

The "New Optimism" is a term used to describe the view that human progress is accelerating and the world is getting better rather than worse (eg: Pinker 2018). Hickel (2019) argued that it is neoliberalism that is being celebrated for such improvements.

As to whether poverty is reducing as is argued, it depends on the poverty line used. For example, with a figure of "\$1.90 per day", there are fewer people globally below that, but this is very low (Hickel 2019). Higher figures have been proposed, like "\$7.40 per day", and these show that poverty is increasing (Hickel 2019) ⁵.

Also how economic inequality is presented is important. For example, one country sees average income rise from £1000 to £2000 (a 100% increase), while in another country it rises from £50 000 to £60 000 (a 20% increase). The income of the first country has grown faster, but the inequality gap between the countries has increased. "By any common-self definition, inequality has worsened" (Hickel 2019 p71).

1.5. APPENDIX 1C - BEATTIE ET AL (2019)

Beattie et al (2019) compared responses to the NBI by three samples - 136 university students in Hong Kong, 177 adults in India, and 202 adults in the USA, both recruited online via Amazon Mechanical Turk. As well as the NBI, participants completed questionnaires covering political beliefs (eg: conservatism), self-interest, and narcissism, among others.

The highest average NBI scores were in India (mean 3.99 out of 5), followed by the USA (mean 3.61), and then Hong Kong (mean 3.13). There were differences in the pattern of other beliefs that were associated with high NBI scores in the three countries. Conservatism was endorsed in all three countries, but self-interest was

⁵ The USA has the highest level of economic inequality of developed countries, and this has worsened in the last half a century. The richest 0.1% of the population have seen a quadruple in income share, while the bottom 90% have seen a decline (Stiglitz 2018).

only chosen in the USA, for example.

The researchers explained that "'the neoliberal' in Hong Kong has a more conservative economic ideology and a higher SDO⁶; is more likely to endorse a self-maximising theory of self-other relations (looking out for oneself); and is more narcissistic, focuses more on getting ahead than getting along, evinces a preference for lighter skin tones, and feels pressure to strive toward personal success driven by fears of losing out, being overlooked, and being rejected by others" (Beattie et al 2019 p42).

While "the neoliberal" in India "identifies more with her/his own ethnicity, has higher self-esteem but is not appreciably more narcissistic, considers her/himself to be higher on the socio-economic hierarchy, has a strong self-orientation but also cares about others doing well, equally values both getting ahead and getting along, and feels both the need to strive toward success driven by fears of losing out, being overlooked, and rejection, but also feels that if her/his efforts meet with failure, s/he will be loved, supported, and accepted by others" (Beattie et al 2019 p43).

Finally, "the neoliberal" in the USA has "a more conservative economic and social ideology, identifies more with her/his ethnic group, has a greater preference for inequality, low taxes, and a minimal social safety net, and privileges economic over social benefits" (Beattie et al 2019 p43).

Azevedo et al (2019) also investigated the beliefs that were associated with neoliberalism among three samples of Americans and one from the UK. In both countries, but stronger in the US samples, high neoliberal attitudes were associated with right-wing authoritarianism, and economic system justification (ie: support for inequality).

1.6. APPENDIX 1D - ZHANG AND XIN (2019)

Zhang and Xin (2019) reported three studies with Chinese participants. In the first study, 96 full-time employees were "free-market primed" or not. This involved solving anagrams for free-market related words (eg: profit, buy, paid) or neutral words (eg: park, window, animal) before completing an investment game that measured interpersonal trust (table 1.4). Individuals who solved the free market-related words showed less trust (mean 5.18 out of 10 vs 6.59 sent).

⁶ Social dominance orientation - eg: "Some groups of people are simply inferior to other groups".

- "Now, suppose that you and a stranger X each had ¥10. You can choose to send some of your ¥10 to X, ¥10 at most and ¥0 at least. X would receive triple of the amount you send. After that, X can choose to return some money to you. The maximum X can return equals to the amount of she/he receives (ie: triple of the amount you send), and the minimum is ¥0. For example, if you send X ¥7, X will receive ¥21, and she/he can return any amount between ¥0 and ¥21 to you".
- The amount sent represents the level of trust.

(Source: Zhang and Xin 2019 pp293-294)

Table 1.4 - Investment game instructions.

Study 2 with 67 more participants who read a series of statements before playing the investment game. In the pro-free market condition, the statements include, "every market participant is self-interested", compared to "there is an institutional system to ensure trade safety in the market" in the pro-rules condition. The participants showed less trust in the former condition (mean 4.82 vs 6.62 sent).

Zhang and Xin's (2019) Study 3 analysed data on China for 1998 to 2015. An annual index of trust showed a decline as an index of marketisation (ie: the level of free market development) increased.

1.7. APPENDIX 1E - HARTWICH AND BECKER (2019)

So, "high inequality, which is usually one of the consequences of neoliberal policies, causes a deterioration of the social fabric by making people perceive their societies as lacking in fairness and solidarity" (Hartwich and Becker 2019 p116). One consequence is prejudice towards outgroups, which may be elites or immigrants. Hartwich and Becker (2019) investigated this prejudice with samples from Germany and the UK.

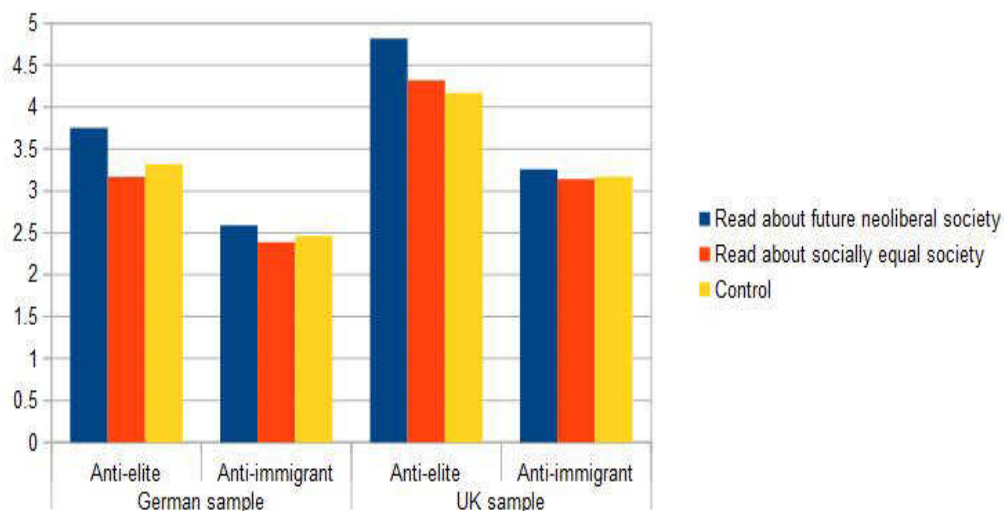
In the former case, 198 participants, recruited "on the streets of a medium sized German city", read about a future neoliberal society or a socially equal one (or none in the control condition), as well as completing attitude questionnaires. For example, an anti-elite statement was, "The German people are facing a corrupt elite", and anti-immigrant one was, "When there aren't enough jobs for everyone, immigrants should be sent back home".

Participants who read about the future neoliberal society expressed significantly higher anti-elite, but not anti-immigrant, views than the other two conditions.

The UK sample of 173 participants was recruited via an online crowdsourcing platform, and they read on e of

the three future scenarios as the German sample. The findings were similar (figure 1.1).

Hartwich and Becker (2019) concluded that their "research suggests that while neoliberalism is linked to lower social cohesion and increased outgroup derogation, this is not primarily directed against disadvantaged social groups but against those at the top" (p113). Based on the responses to the other questions, the researchers felt that this prejudice was mediated by anomie ("a perceived disintegration and deregulation of society"), and negative psychological reactions (feelings of threat, unfairness, and hopelessness) (Hartwich and Becker 2019).



(Data from Hartwich and Becker 2019 tables 1 p121 and 3 p125).

Figure 1.1 - Mean anti-elite and anti-immigrant scores (out of 7, where a higher score = greater prejudice).

1.8. APPENDIX 1F - JASKO ET AL (2019)

Challenging neoliberalism through political activism involves the individual going beyond the individualism encouraged by neoliberalism. Jasko et al (2019) explored collective action in six studies.

Study 1 - Online data from 84 members of a radical left-wing political party in Poland in 2015 as questionnaires were completed on:

- Significance loss (participants' experience in relation to the political system) - eg: "I feel represented by political parties that are currently in parliament".
- Cause importance (values of their party).

- Willingness to self-sacrifice - eg: "I would be prepared to endure intense suffering if it meant defending these ideals" ⁷.
- Activist intentions - willingness to engage in five actions for the party (eg: organising a meeting).
- Significance gain (positive gains from involvement in the party - eg: feel proud).

It was found that "the more important the values of the political party were for its members, the more personally significant they felt due to their engagement in actions for the cause. Moreover, personal significance gained from past involvement was related to greater willingness to self-sacrifice for the party's ideals and intentions to participate in future, demanding actions for the party. These results suggest that intentions to maintain commitment to the political cause are predicted by how significant participation in activism makes people feel. At the same time, loss of significance experienced because of mainstream, neoliberal politics was not significantly related to activists' willingness to self-sacrifice for the party and it was positively, but weakly, related to activist intentions" (Jasko et al 2019 p322).

Study 2 - The same questionnaires were completed online by 1409 supporters of a Polish anti-government campaign in 2016. The findings supported Study 1.

Study 3 - An online sample of 158 participants who were pro-abortion in Poland, after the government has proposed new abortion restrictions in 2016. The participants were seen as feminist activists, and the findings were the same as the previous studies.

Study 4 - Data were collected during street protests against the above mentioned anti-abortion law on October 3rd 2016 (n = 258). The similar findings provided generalisability for the previous studies (ie: online/future behaviours and face-to-face/immediate action).

Study 5 - This involved 396 environmental activists in Poland in 2017 recruited online. Similar findings were observed for these supporters of a campaign to save an ancient forest from being cut down.

Study 6 - The sample was 156 street protesters in

⁷ Taken from a 10-item scale on the readiness to self-sacrifice developed by Belanger et al (2014).

Poland, recruited online, who supported a hunger strike by doctors to increase government funding for healthcare. The previous findings were replicated.

Altogether, the willingness to sacrifice for the cause was related to the personal significance gained by the participants in the cause. "The sense of pride, meaning, and happiness derived from actions for the cause predicted their willingness to stay engaged in the cause in the future" (Jasko et al 2019 p340).

These findings fitted with the "significance quest theory" (Kruglanski et al 2014). "According to the theory, people have a fundamental need to feel valued, important, and to live a meaningful life. Circumstances that induce relative deprivation, humiliation, rejection, and unfair treatment influence the extent to which this need is frustrated. When people feel disrespected, humiliated, or rejected they experience an aversive state of loss of significance, which motivates them to reduce it. One way to restore personal significance is to engage in extreme social behaviour aimed at affirming commitment to important cultural values" (Jasko et al 2019 p316).

Jasko et al (2019) made the observation that "the existing, neoliberal social order can be challenged not only because of desperation, anger, and resentment but also, and maybe even in a more powerful way, because of the feelings of personal significance that those who challenge the system derive from their engagement" (p341).

The studies were all based on self-reported data, and mostly asked about hypothetical future involvement in the cause rather than actual behaviour (except Study 4). The data were correlational not causal.

All the studies were "conducted with activists living in Poland, who were engaged in progressive causes. From a theoretical point of view, it would be interesting to verify observed relationships in the context of conservative causes and with samples from different cultural and political backgrounds" (Jasko et al 2019 p343).

1.8.1. Gender Differences

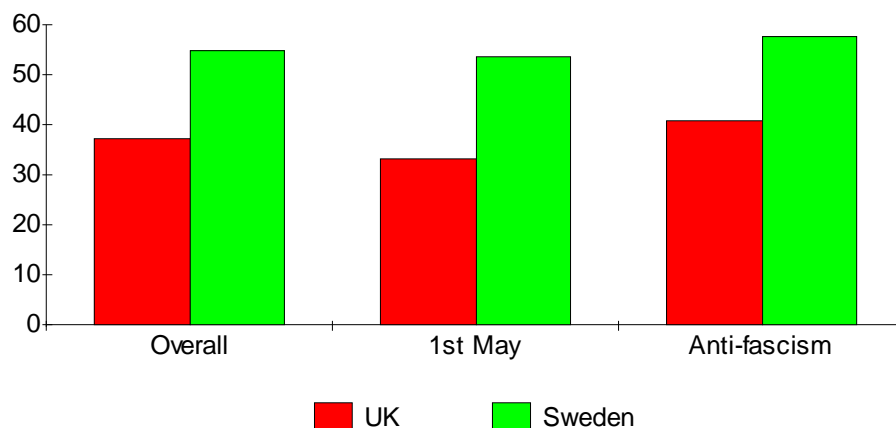
Walby (2009) distinguished between neoliberal public gender regimes and social democratic public gender regimes. The latter includes more women in public decision-making, greater gender equality in the workplace, stronger equal opportunity legislation, and higher state expenditure on public day care. Sweden could be an example of this, whereas the UK is typical of the neoliberal public gender regime (Roth and Saunders 2019).

Roth and Saunders (2019) investigated the differences in these two countries of women's involvement

in street protests for "mixed-sex social movements" (worker rights and anti-racism) (as opposed to "women's movements"). Dodson (2015) had argued that gender differences in protest participation are reduced in gender egalitarian countries. This produced Roth and Saunders's (2019) hypothesis of "a higher proportion of labour and anti-racism demonstrators in Sweden are female compared to the UK" (p576).

Data were analysed on 1st May marches in 2010 (worker/labour rights) and anti-fascism demonstrations in the same year (anti-racism) in London and Stockholm. In the UK, around one-third of the participants in the protests were women compared to over half in Sweden (figure 1.2).

The data were self-reported involvement in the protests based on surveys after the events collected by other researchers (eg: "Caught in the Act of Protest" project ⁸).



(Data from Roth and Saunders 2019 table 1 p579)

Figure 1.2 - Percentage of women at demonstrations.

1.8.2. Class Perception

In recent surveys in China, for example, between 40-80% of respondents described themselves as middle class compared to 3-25% based on objective measures (Miao 2017). This discrepancy shows that "being labelled middle class by objective indicators does not necessarily reflect a subjective sense of belonging, either to the class label itself, or with their class peers; nor does the belief in belonging to the middle class necessarily reflect the economic reality. There is a clear mismatch not only between class categorisation and class identity,

⁸ <http://www.protestsurvey.eu/>.

but also between class position and class experience" (Miao 2017 p630).

Miao (2017) provided evidence of the discrepancy in a survey of 181 "objectively middle class" individuals in one city in China (based on household income, occupation, or education). Around half subjectively rated themselves as middle class, while the others described themselves as "salaried class". For the respondents, the distinction was "not the amount of one's income that determines one's class identity, as advocated by the majority of scholarly research on the middle class, but the type of income: from where and how one receives one's income is more important than how much. Whereas the working wage could afford one an average lifestyle, being middle class requires something more: the financial stability of having extra sources of income that are not dependent upon one's day-to-day work, and the cultured lifestyle that can only be built upon a steady and stable economic foundation" (Miao 2017 p643).

1.9. APPENDIX 1G - TWO BEHAVIOURS

1.9.1. Envy

Envy of others' lives (or social comparison) can be a painful experience. But is the other person's superior experience more painful to the observer once it has happened or before it happens?

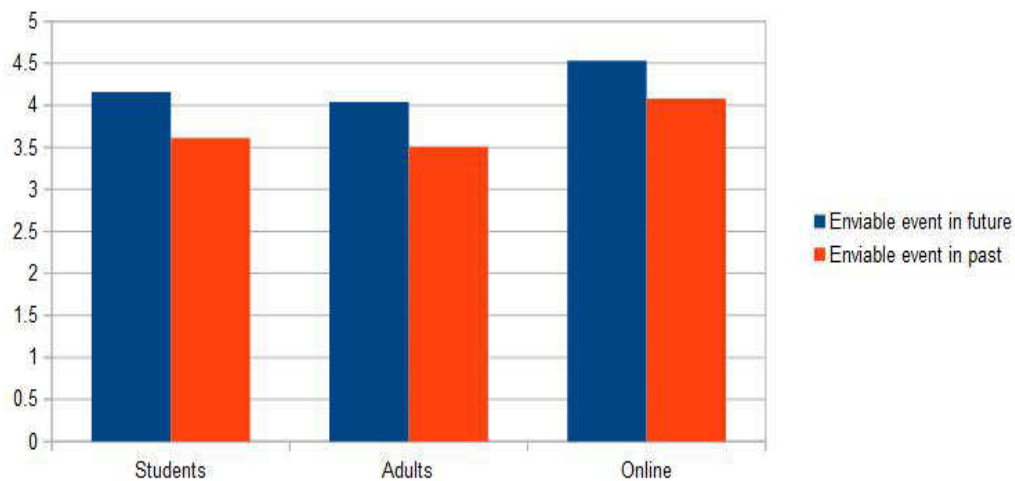
Kristal et al (2019) performed four studies to answer this question.

Study 1 - Three samples were used here: 203 students in Chicago, 217 adults in downtown Chicago, and 200 online participants. They were asked to think of a close friend in five enviable situations (eg: dream holiday). The scenarios were imagined as "the days and weeks before the event will occur" or "the days or weeks after this event occurs". This was the independent variable - the time of the enviable event. Participants rated their feelings of envy (dependent variable). "Otherwise identical experiences were perceived as significantly less enviable after they happened than before they happened" (Kristal et al 2019 p645) (figure 1.3).

This study established that envy is less for events that have already happened than beforehand.

Study 2 - This study used a great experience on Valentine's Day as the enviable event for 3024 online participants (in two forms of the study in February 2017).

Using a cross-sectional design, each day of February different participants rated their envy, which rose as



(Data from Kristal et al 2019 table 1 p645)

Figure 1.3 - Mean ratings of envy (out of 7) in Study 1.

Valentine's Day approached, and abruptly dropped afterwards (mean 3.12 vs 2.66).

Using a longitudinal design, the same participants rated their envy on February the 13th, 14th (Valentine's Day), and 15th. Envy rose between the 13th and 14th, but significantly dropped on the 15th (mean 3.45, 3.71 and 3.05 respectively).

To sum up: "As Valentine's Day loomed in the future, people were sensitive to distance and experienced increasing envy toward other people with desirable plans. But after those same individuals had that same desirable experience, people's envy dropped and plateaued the moment it became part of the past" (Kristal et al 2019 pp648-649).

Study 3 - This study distinguished between malicious envy (wishing to bring others down) and benign envy (wishing to raise the self up). Three groups of online participants (n = 1012) imagined a friend's enviable experience about to happen or just happened before completing more detailed ratings of their feelings. Malicious envy was captured by statements like, "makes me feel ill will for the person", and benign envy by statements like, "makes me want to compliment the person".

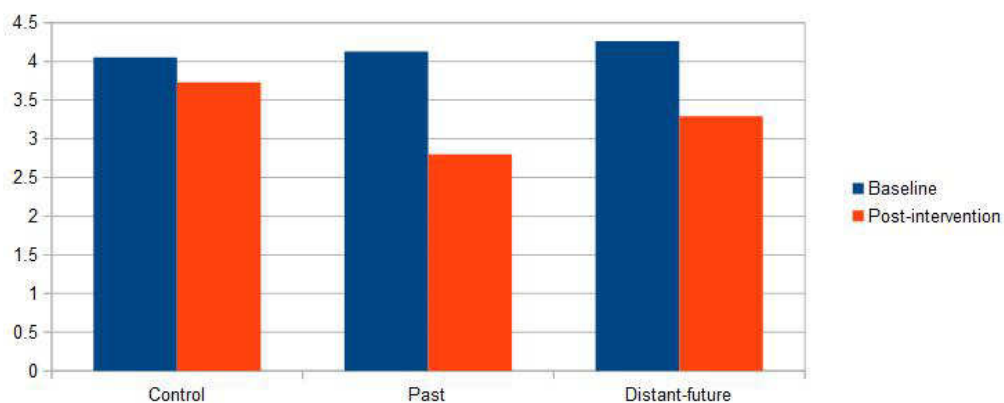
Malicious envy followed the pattern of previous studies (ie: less after the event - mean 3.06 vs 3.57), whereas benign envy did not change (mean 3.80 after vs 3.62 before).

Study 4 - Involving 322 Chicago students, this study

asked participants to imagine a friend, classmate or family member having an enviable event in the near future. A baseline rating of envy was taken. Then the participants performed one of three conditions:

- "Past" condition - Instructions: "Now mentally fast forward in time, about 1 year from now. That is, consider how this event will feel when it is in your past. Focus on how the event will make you feel from this perspective". Then "Ok, back to the present. How does thinking about the event now make you feel, here and now?" (p651).
- "Distant-future" condition - Same instructions, but one year before the event.
- Control condition - Repeat the first part of the experiment.

"Participants who reconstructed an envied event as having already occurred in the past reported significantly less envy than they felt originally. Less expectedly, this drop was also observed among all conditions: Participants who reconstructed the event as occurring in the distant future, and even control participants, reported significantly less envy than they felt originally. This suggests that other aspects of the task (eg: having more time to reflect) may have contributed to the effect" (Kristal et al 2019 p652) (figure 1.4). This study showed how envy could be reduced by imagining feelings after the event.



(Data from Kristal et al 2019 table 2 p653)

Figure 1.4 - Mean ratings of envy (out of 7) in Study 4.

This study involved many participants (in total, 4978), but it did depend on their ability to imagine

enviable events.

1.9.2. Civic Honesty

Cohn et al (2019) studied "civic honesty", where individuals voluntarily refrain from a selfish behaviour to the benefit of others/society. In their field experiments, the researchers "lost" 17 303 wallets in 355 cities in forty countries to see if they would be returned to the owner. The transparent wallet contained no money or the equivalent to around US \$13, and a business card with the owner's details.

In each case, a research assistant approached an employee at a counter of a public institution (eg: bank, hotel, museum), and said: "Hi, I found this on the street around the corner. Somebody must have lost it. I'm in a hurry and have to go. Can you please take care of it?" (p71). Contact within 100 days was used as the measure of honesty.

The wallet was significantly more likely to be returned when it contained money (51% of trials) than no money (40%). There was little variation between countries on average.

In three countries, an extra condition was added ("Big Money"), where the wallet contained the equivalent of over US \$90. The mean rate of return of the wallet was 72% here compared to 61% for smaller money and 44% for no money.

Interviews with selected participants suggested that the findings "can be explained by a combination of altruistic concerns and an aversion to viewing oneself as a thief, which increase with the material benefits of dishonesty" (Cohn et al 2019 p70).

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2. TREATMENT-RESISTANT MOOD DISORDERS

- 2.1. Introduction
- 2.2. Problem of TRD
- 2.3. Identifying TRD individuals
- 2.4. Treatment
- 2.5. Bipolar depression
- 2.6. Appendix 2A - Randomised controlled trials
(RCTs)
- 2.7. Appendix 2B - Recovery
- 2.8. Appendix 2C - Ketamine
- 2.9. References

2.1. INTRODUCTION

The main forms of mood disorders are major depressive disorder (MDD) (unipolar depression) and bipolar disorder (BP), and both have treatment-resistant versions. This is where "patients fail to obtain an optimal outcome after both first- and second-line treatments" (Lingford-Hughes et al 2019 pA3).

Treatment-resistant depression (TRD) is associated with negative outcomes, like higher mortality (Lingford-Hughes et al 2019).

There are traditionally three courses of action with TRD and anti-depressants (ADs) (Lingford-Hughes et al 2019):

i) Increase the dose of the AD being taken - Some ADs show increased efficacy at higher doses, others do not.

ii) Change to another AD - Remission rates for the third or 4th choice AD, for example, have been shown to be low.

iii) Add a second AD to the first (augmentation) - The evidence is divided about combinations vs AD monotherapy. For example, a large clinical trial (appendix 2A) showed no difference in effectiveness (Rush et al 2011), while a meta-analysis found that some combinations were better than a single AD alone (Henssler et al 2016).

One meta-analysis (Bauer et al 2014) found that lithium augmentation in ten randomised controlled trials was three times better than placebo. "It should also be noted that although lithium has been most often associated with the treatment of bipolar disorder, it has a good evidence base showing clear-cut benefits to the patient when used in unipolar depression" (Lingford-Hughes et al 2019 pA3).

2.2. PROBLEM OF TRD

Malhi et al (2019) considered "the problem of TRD" by looking at a number of "failures" (appendix 2B):

a) Diagnosis - The fact that "illnesses are longitudinal but that diagnostic systems operate cross-sectionally" (Malhi et al 2019 p1). An individual showing depressive symptoms will receive a diagnosis of unipolar depression at a point in time, but this may be a phase of BP. "But, if a manic episode is yet to occur in the course of the illness, and patients with bipolar disorder are managed as if they have major (unipolar) depression, anti-depressants alone are likely to be ineffective and may even exacerbate the illness" (Malhi et al 2019 p1).

b) Diagnosis - There is "a great deal of uncertainty inherent in a diagnostic system that depends on symptom observation and self-report, and which has substantial overlap in diagnostic criteria across disorders" (Malhi et al 2019 p1). The upshot is misdiagnosis, and prescription of ADs which are not appropriate (eg: for borderline personality disorder).

c) Diagnosis - Diagnostic systems like DSM-5 struggle with distinguishing "mixed states", and again ADs may not be appropriate.

d) Diagnosis - "Real-world patients" present with their own symptoms which do not align with the categories and criteria created by psychiatrists. In other words, the individuals are "made to fit" into an available diagnosis, like a "bed of Procrustes". "As a result, it is not uncommon for patients to end up being treated for a disorder that they do not quite have, with treatments that do not have proven efficacy for their specific symptomatology. It is thus not surprising that they fail to respond to treatment" (Malhi et al 2019 p1).

e) Diagnosis - Diagnosis is based on a set number of symptoms derived from clinical experience and research, but "this means that the underlying pathophysiology of the disorder is not considered when making a diagnosis (largely because, for depression and most psychiatric illnesses, this is not known). While the clinical picture of a patient is important, the lack of a reliable, objective indicator of depression has resulted in a heterogeneous patient population" (Malhi et al 2019 p2).

For example, if five symptoms from a list of nine is required for diagnosis of a condition, there are many different combinations possible, such that two individuals with the same diagnosis will have little in common. Add to that other variables like age of onset, degree of inheritance (hereditary loading), and co-

morbidity. "In sum, the combinations of symptoms and patterns that come under the label of 'depression' is myriad, and this needs to be taken into account when considering the treatment options available" (Malhi et al 2019 p2).

f) Treatment - Clinical trials usually involve patients with "pristine" symptoms, and so do not reflect "the heterogeneity of real-world presentations" (Malhi et al 2019 p2). Put another way, the findings of clinical trials may not be generalisable.

"Collectively, findings from research to date suggest that 'anti-depressants' are effective for a specific, homogeneous sub-set of depression. Therefore, labelling those who fail to respond to these medications as treatment resistant is disingenuous, and embarking on strategies such as switching and augmentation with medications that have also not been tested on heterogeneous populations is unlikely to benefit the patient" (Malhi et al 2019 p2).

The answer for Malhi et al (2019) is that "the definition of TRD needs to be revised with an emphasis on diagnosis rather than treatment" (p3).

2.3. IDENTIFYING TRD INDIVIDUALS

Identifying as soon as possible individuals with depression who are not responsive to an AD is important. "Clinical guidelines currently recommend 4-8 weeks of treatment before considering a change in treatment in patients who show no improvement, although the evidence base for this recommendation is limited" (de Vries et al 2019 p4).

Evidence of improvement in symptoms can be detected within the first week of starting ADs, and such "early improvement is associated with later response or remission" (de Vries et al 2019 p4). But studies disagree on whether early improvement is always a sign of later remission (eg: around half of participants without early improvements showed remission in symptoms after twelve weeks of an AD; Uher et al 2011). Many early improvers do not show longer term benefits (de Vries et al 2019).

One problem is that studies tend to concentrate on total depression score as a sign of improvement. de Vries et al (2019) focused on early improvers in individual symptoms of depression as a predictor of later remission using data from Clinical Study Data Request (CSDR). This is a data-sharing platform from clinical trials by the pharmaceutical companies, GlaxoSmithKline, and Lilly. Only second-generation ADs (SGAs) were included (eg: selective serotonin reuptake inhibitors; SSRIs).

Data from thirty clinical trials of ADs were

available, covering over 10 000 participants. All trials covered four weeks of treatment, and ten trials lasted twelve weeks or more. The data were meta-analysed.

Early improvement in individual symptoms (eg: depressed mood; guilt; insomnia) (ie: within two weeks of starting treatment) predicted later remission of depression (defined as at least 50% improvement compared to baseline measures) better than early improvement in total depression score (using the Hamilton Rating Scale for Depression; HRSD). The difference was small, and early improvement of any kind was key.

Individuals with no early improvement in either measure were less likely to show later remission. However, "it does not rule out later response or remission with certainty. Therefore, adapting anti-depressant treatment because of limited improvement in the first 2 weeks would be premature for many patients" (de Vries et al 2019 p9).

Finding candidate biomarkers of depression has growing interest. These are physiological changes that are associated with a mental disorder, like MDD. Changes in the immune system are one area of interest (Chamberlain et al 2019).

Chamberlain et al (2019) concentrated on C-reactive protein (CRP), which is evidence of infection, inflammation and tissue damage producing an immune system response ⁹. Haapakoski et al (2015) reported a moderate increase in CRP in individuals with MDD in a meta-analysis of twenty studies (but there was great variety in the individual studies; Chamberlain et al 2019) ¹⁰.

Chamberlain et al (2019) tested the hypothesis that individuals with TRD would have abnormally increased CRP. An active immune response can effect serotonin, which is the basis of some ADs, and thus influence TRD ¹¹.

Four groups of UK participants were studied - untreated MDD (depressed but not taking medication; n = 48), treatment-resistant (depressed and taking medication; n = 102), treatment-responsive (taking medication and no longer depressed; n = 48), and controls (no history of MDD; n = 54). CRP was measured from a blood sample.

Mean CRP was significantly higher in participants with MDD than controls, and more so in the treatment-

⁹ Individuals who reported been bullied (at least once) as adolescents, for instance, had 1.5 times higher CRP levels in early adulthood than peers who were neither victims or perpetrators of bullying (Copeland et al 2014).

¹⁰ Individuals who experienced childhood trauma have higher CRP levels as adults (Chamberlain et al 2019).

¹¹ Also experiments that injected CRP into, usually animals, found an increase in symptoms associated with depression (eg: insomnia; agitation; fatigue) (Chamberlain et al 2019).

resistant group ¹². This fits with the idea of "a clinically and immunologically diagnosable sub-syndrome of 'inflamed depression'" (Chamberlain et al 2019).

Predicting TRD-individuals from genes is a possibility. Fabbri et al (2019) reported details of a genome-wide association study of common gene variants in 1346 adults with MDD recruited by the "European Group for the Study of Resistant Depression" (GSRD) ¹³. TRD was defined as lack of response to at least two adequate anti-depressant treatments.

These data were combined with those of 4041 participants with MDD in the "Sequenced Treatment Alternatives to Relieve Depression" (Star*D) ¹⁴, and 867 individuals of the "Genome-Based Therapeutic Drugs for Depression (GENDEP)" ¹⁵ studies.

Over seven million gene variants were analysed in the GSRD data, and no variant was associated with TRD or symptom improvement overall. However, analysis of the combined data produced "several suggestive findings" related to synapse functioning in the brain.

2.4. TREATMENT

With TRD to traditional medication, a novel AD may be needed, and ketamine (appendix 2C), used for chronic pain management, may be a possibility.

Domany et al (2019) reported a RCT in Tel Avi, Israel. Forty-one individuals, who had not responded to two ADs, were recruited for the 28-day study. They were randomised to treatment or placebo for 21 days with seven days follow-up. Thirty-three participants completed the trial. There was a significant decline in depression score from baseline at Day 21 in the ketamine group, and no change in the placebo group. The benefits were maintained at follow-up seven days after stopping the treatment.

This study faced the problem of blinding the condition to the participants. Ketamine has a bitter taste, which participants may notice, or, more importantly, the placebo group would not have. However, the "participants were not informed of a taste difference, and we have no reason to assume that they knew of such a difference" (Domany et al 2019 p25). Also an active placebo (ie: another drug) had to be used because of the rapid physiological effects of ketamine

¹² The researchers controlled for obesity, which is associated with increased CRP (Chamberlain et al 2019).

¹³ A collaborative project involving eight centres in Europe in six countries (Kaspar 2012).

¹⁴ US-based study (<https://www.nimh.nih.gov/funding/clinical-research/practical/stard/index.shtml>).

¹⁵ European-based study (<http://gendep.iop.kcl.ac.uk/index.php>).

(eg: blood pressure changes).

The physiological effects mean that ketamine is potent, and "should be used with caution in neuropsychiatric diseases. This is especially true when employing this medication in the out-patient setting" (Domany et al 2019 p24).

The researchers concluded that their "proof-of-concept study suggests that repeated oral ketamine could provide a safe, feasible and effective intervention for patients with TRD in a community setting. Our results, although promising, cannot yet be applied to clinical practice without larger, randomised studies. Such studies are needed to address questions such as optimal dosing regimens, patient selection and treatment duration to properly assess the safety of long-term ketamine usage, the risk of misuse and the restricted means appropriate for at-home prescription. Furthermore, a longer follow-up phase should be considered. Finally, it seems plausible to examine the possible role of oral ketamine in the treatment of acute suicidal ideation as well as additional psychopathologies" (Domany et al 2019 p25).

Strawbridge et al (2019) reviewed 28 RCTs on augmentation therapies with TRD (defined as "unremitted depression despite at least two courses of treatment of adequate dose and duration undertaken in the current episode"; p43). Three trials involved psychological therapies as the augmentation, and the others pharmacology.

Any augmentation therapy produced an improvement in symptoms compared to placebo pill or psychological controls (eg: waiting list for therapy). The effect size (ES) (ie: from the pooled data from all the studies) was calculated, which is the standardised mean difference (the statistic "Hedges' g") comparing pre-treatment and post-treatment depression scores. The ES for a pill placebo was 0.78 and 0.94 for psychological controls compared to 1.19 for all pharmacological augmentation therapies and 1.43 for psychological therapies.

However, there was great variety ("severe heterogeneity") in the findings of the different studies. There was also variability in the response to the pill placebo. This showed that outcomes are "influenced by a multitude of factors which differed across trials (including but not limited to the maintenance of blinding, analysis undertaken, inclusion criteria relating to co-morbidities, severity etc)" (Strawbridge et al 2019 p48).

Drugs targeting the biochemical N methyl-D-aspartate (NMDA) (eg: ketamine; minocycline) in the brain were most effective, while CBT was the best augmentation psychological therapy.

Strawbridge et al (2019) observed that "for most people with TRD, a combination of pharmacological and

psychological approaches may be the most effective treatment both in terms of acute response and relapse prevention" (p49).

2.5. BIPOLAR DEPRESSION

TRD as part of BD (treatment-resistant bipolar depression; TRBD) is not well studied, but may well be higher than TRD generally (Hidalgo-Mazzei et al 2019). There is also multi-therapy-resistant bipolar depression (MTRBD), where an individual does not respond to pharmacological, psychological, or physical therapies (Hidalgo-Mazzei et al 2019).

Hidalgo-Mazzei et al (2019) reported on UK expert panels on TRBD and MTRBD. A consensus definition of TRBD included the failure to show sustained remission of symptoms for at least eight consecutive weeks, and does not respond to at least two medications. A consensus definition of MTRBD included the failure to respond to a drug (taken for at least eight weeks), a completed programme of therapy, and electro-convulsive therapy (ECT).

2.6. APPENDIX 2A - RANDOMISED CONTROLLED TRIALS (RCTs)

Duncan et al (2018) argued for a special case for psychiatry in relation to medicine generally:

"Conventional approaches to evidence that prioritise randomised controlled trials appear increasingly inadequate for the evaluation of complex mental health interventions" (quoted in Burns 2019).

Burns (2019) rebuffed this point: "The exaggerated distinctions presented between research in psychiatry and that in the rest of medicine are in a long tradition of special pleading that does our discipline no favours" (p52).

The authors responded (Welch et al 2019) that they "would be happy to see more RCTs in psychiatry, but only as one form of evidence among others" (p52). They continued: "Rather than privileging a method designed to estimate singular 'average treatment effects' and whether a treatment does or does not 'work', we would argue that a more sensible way to proceed is to develop approaches intrinsically attuned to detecting variation and difference and, most importantly, understanding what gives rise to it" (Welch et al 2019 p52).

2.7. APPENDIX 2B - RECOVERY

Bauman (2002) described the self-responsibility placed on the individual in modern societies: "If they

fall ill, it is because they were not resolute or industrious in following a health regime. If they stay unemployed, it is because they failed to learn the skills of winning an interview or because they did not try hard enough" (quoted in Brown 2019 p2). This is sometimes called "responsibilisation" (based on the work of Michel Foucault) - ie: "that there are specific 'technologies of the self' at work to make up the modern individual, complete with the sense of 'choice' and 'self-determination' that is at the heart of neoliberal politics" (Brown 2019 p2).

Put simply, the State requires the individual "to acknowledge and assume a degree of responsibility for managing their own risks" (Brown 2019 p2).

Applying this idea to mental health care, "clients", "service users" or "patients" are responsible for maintaining their medication regimes, and recovery involves adjusting to circumstances (ignoring social inequalities) (Brown 2019).

Brown (2019) explored the experience of responsibilisation with thirty-two individuals using mental health services in central England. Two aspects of autonomy and responsibility were distinguished:

1. Didactic responsibilisation - The imposition of responsibility upon the individuals by health care professionals, as described by "Sarah": "A nurse said to me that you won't get any better unless you take responsibility for getting well" (p7).

Responsibilisation required the individual "to think or act in in a certain way - for recovery to be effective" (Brown 2019 p7), as described by "Naomi": "Now it is that I've got to keep an eye on my symptoms and contact them [the team] when I get worse. But sometimes I do and it seems like they're never there" (p7).

Brown and Baker (2012) observed that the "responsible citizen is not one who can genuinely claim autonomy, but rather one who conducts himself or herself as directed or nudged by a variety of experts and government agencies" (quoted in Brown 2019).

2. From responsibilisation to civic engagement - The interviewees reported positive experiences outside the mental health services, and this social engagement was more autonomous (eg: joining local allotment society or amateur dramatic group). "These opportunities for responsibility in non-therapeutic settings included a sense of accomplishment or what have been called 'mastery experiences' which were encouraging of further efforts" (Brown 2019 p11).

Put simply, individuals actually took responsibility and felt better in the latter case, whereas the authorities emphasised the first aspect, even if it was

potentially counter-productive. "Acting responsibly generally involved enacting the part of being a good patient and doing what one was told, even though it seemed absurd (even paradoxical) at the time and participants felt, in some cases that they would be better served by other courses of action" (Brown 2019 p12).

Brown (2019) summed up about responsabilisation - it is "not necessarily about reductions in mental health morbidity of any practical magnitude but is about instituting particular kinds of relations between the individual, the state and the 'expertise' of advisers, practitioners and health educators" (p15).

Anti-psychotic medications have side effects, and an unexpected one is conformity.

Simonsen et al (2019) showed forty individuals diagnosed with schizophrenia and forty "healthy controls" 153 photographs of female faces to rate for trustworthiness (on an eight-point scale). Then the participants were shown how other people rated the faces (group opinion). One hour later, the participants were asked to rate the faces again. Conformity was measured by a change in rating between the first and second phase towards the "group opinion".

The individuals with schizophrenia were more likely to conform than the controls, and "the degree of attitude change in patients was dose-dependent: the higher the anti-psychotic dose, the more change towards group opinion was seen" (Simonsen et al 2019 p8). The explanation for the findings could be linked to changes in dopamine (due to schizophrenia and/or the anti-psychotic medication), and/or cognitive impairments in schizophrenia (eg: prefrontal cortex and decision-making) (Simonsen et al 2019).

Methodological considerations of this study include:

- i) The study took place on the Faroe Islands.
- ii) The "group opinion" was created by a computer using the following criteria - one-third of the faces were scored the same as the participant's, one-third was 2-3 points lower than the participant's scores, and one-third 2-3 points higher.
- iii) No control group of drug-naive patients, or individuals without "group opinion".
- iv) The "group opinion" was shown immediate after the first rating of faces, and then there was an hour of general cognitive tasks before the re-rating the faces. Tiredness or boredom may have occurred or individuals forgot the "group opinion" score.

v) Controls were matched to the patients by age, gender, childhood residence, and "(when possible) to commenced educational level and parental socio-economic status" (Simonsen et al 2019 p3).

vi) Patients were using different anti-psychotic medications (as well as other medications), and the doses were converted into chlorpromazine equivalents.

vii) Patients were ICD-10-diagnosed with schizophrenia or schizoaffective disorder from the Psychiatric Centre of the National Hospital. So, those not diagnosed were missed (eg: not known to authorities).

viii) Exclusion of psychoactive substance users (based on urine test) in both groups.

ix) The conformity task was computer-based, and had been used in previous research (eg: Klucharev et al 2009).

x) This study was a quasi-experiment (rather than an experiment) because there was no randomisation of participants.

2.8. APPENDIX 2C - KETAMINE

The US Food and Drug Administration in March 2019 approved the use of ketamine ("Esketamine") with depression (Morgan 2019).

There are a number of issues with this new drug for depression (Morgan 2019):

- First novel drug for depression in over fifty years.
- Fear of addiction as with illicit ketamine use.
- Concern over side effects of regular ketamine use (eg: bladder dysfunction; psychosis).
- Drug trials by Janssen (the company producing it) have reported immediate benefits with severe depression.
- Regular doses needed and individuals may stop responding.
- Follow-up in drug trials have lasted one year.

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3. COMMUNICATING KNOWLEDGE

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3.1. INTRODUCTION

Scrimshaw (2019) focused on the gap between how many scientist communicate their messages, and how many non-scientists "hear" them (ie: understand and interpret). She noted three challenges to "clear communications" by scientists:

i) Wording and explanations that are "not intelligible to the general public, and even to those in other areas of science" (Scrimshaw 2019 p7650).

There is pressure on scientists to communicate in scientific language, and those who communicate in clear non-scientific language to the general public are often criticised by their peers. For example, Luntz (2007) advised the use of small words and small sentences.

ii) Scientific communication is heard through a series of filters, like culture, socio-economic status, and literacy.

Scheufele (2013) advised framing the message to the audience.

iii) The value of "facts" are less important than "feelings", particularly as individuals are getting information from a wider array of sources today.

Fischhoff (2019) proposed a theory of science communication based on three questions:

- Are the right staff involved?

- Are they talking effectively with each other within the organisation?
- Are they talking effectively with stakeholders outside the organisation?

In relation to staff, four kinds of expertise are needed: subject matter experts (to discover the facts); decision experts (to identify the facts relevant to decision makers); communication experts (to know how to communicate to a general audience); programme designers (to put into practice a programme based on the evidence) (Fischhoff 2019).

3.2. REPRESENTATIONAL GAPS

There can be gaps between the different knowledge bases of senders and receivers of scientific communication. These representational gaps (rGaps) (Cronin and Weingart 2007) "occur when senders make assumptions that receivers do not, creating conflict over the meaning and value of the information communicated. Such conflict could, if managed, promote learning and innovation as communicators reconcile their assumptions. More often, however, rGaps cause conflict to transform from a debate that informs to an argument that divides" (Cronin and Weingart 2019 p7642).

Key to rGaps are implicit perspectives and assumptions. "They are typically implicit and taken for granted. That is, people are rarely cognisant of the assumptions that they make and thus, struggle to recognise how such assumptions limit their thought" (Cronin and Weingart 2019 p7643).

These assumptions can be examined with puzzles like this: "Bill has married 20 women, but divorced none, and he is not a polygamist" (Cronin and Weingart 2019). "If you assume that Bill is married to the women, it is easier to suggest complex explanations, such as the marriages were so short that they did not count or it is one woman with 20 personalities, than it is to change this assumption to find the simpler explanation – Bill is a priest, rabbi, or other officiate" (Cronin and Weingart 2019 p7643).

Cognitive integration is "the degree to which one can translate between perspectives and thus, understand the intended meaning of what others communicate" (Cronin and Weingart 2019 p7644). It is improved by three processes (Cronin and Weingart 2019):

i) Enrichment - A sender makes assumptions that a receiver cannot make because of lack of knowledge (as in an expert communicating with a novice). Enrichment

involves teaching the receiver the relevant assumptions. "Since perspectives are automatic and implicit, it can be easy for an expert to overlook all of the assumptions that the novice is not going to make when they interpret a communication. As such, novices fail to grasp the importance of the information" (Cronin and Weingart 2019 p7644).

ii) Expansion - Both the sender and receiver have expert knowledge, but it is different to each other, and this creates the rGap. This is overcome by both parties learning new shared knowledge.

iii) Reconciliation - "Sometimes rGaps emerge because the sender and receiver draw conflicting assumptions about the same information. Such rGaps are common when people's knowledge also leads them to make value judgements. This situation requires reconciliation of the underlying knowledge to align assumptions. This is hard, because perspectives emerge from people's knowledge and experience as the 'right' way to understand a situation. Right is a value judgment, and people's values resist change" (Cronin and Weingart 2019 p7645).

Expressions of conflict can be categorised along two dimensions - the directness of the conflict, and the intensity of feeling - which gives four possible situations (Cronin and Weingart 2019):

- High directness/low intensity - Debate (productive discussion of points of contention).
- Low directness/low intensity - Disguised conflict (created by rGaps when "people do intentionally disguise their conflict through avoidance, deflection, or even passive aggressive behaviour" (Cronin and Weingart 2019 p7646)).
- High directness/low intensity - Argue (negative feelings between the parties).
- Low directness/high intensity - Undermine (ie: discredit the opposing party).

Cronin and Weingart (2019) argued for encouraging debate by making rGaps explicit (low to high directness), by respecting opposing views (dealing with intensity), and by building trust.

3.3. UNCERTAINTY

"Policy analysis" is "a shorthand used to describe

scientific evaluations of the impacts of past public policies and predictions of the outcomes of potential future policies" (Manski 2019 p7634). This is often done with exact predictions ("incredible certitude"), "while expressions of uncertainty are rare" (Manski 2019). Manski (2019) saw this as a problem: "The longstanding failure of policy analysis to communicate uncertainty may seem a minor concern in the current political environment. Nevertheless, I think that it is important that policy analysis communicate uncertainty honestly to enable trustworthy assessment of what we do and do not know" (p7635).

Policy analysis involves applying assumptions to the data, and the stronger the assumptions, the greater the certitude. But the stronger the assumptions, less credible/believable the conclusions. Manski (2003) called this the "law of decreasing credibility".

Manski (2019) outlined various "types" of certitude:

a) "Conventional certitude" - "A prediction that is generally accepted as true but is not necessarily true" (Manski 2019 p7635) - eg: many economic and financial predictions.

b) "Duelling certitudes" - contradictory predictions based on different assumptions - eg: relationship between death penalty and homicide rates in US states.

c) "Conflating science and advocacy" - adjusting assumptions to gain a predetermined conclusion.

d) "Wishful extrapolation" - "A common form of wishful extrapolation assumes that a future or hypothetical situation would be identical to an observed one in some respect" (Manski 2019 p7637).

e) "Illogical certitude" - unfounded conclusions based on logical errors.

f) "Media over-reach" - "premature or exaggerated public reporting" (Manski 2019).

Manski (2019) added different "types" of uncertainty (with particular reference to predictions and government statistics):

- Transitory - "Transitory statistical uncertainty arises, because data collection takes time. Agencies may release a preliminary statistic with incomplete data and revise as new data arrives. Uncertainty diminishes as data accumulates" (p7638).
- Permanent - "Permanent statistical uncertainty arises

from incompleteness or inadequacy of data collection that is not resolved over time. Sources include sampling error due to finite sample size and non-sampling error due to non-response and misreporting" (p7639).

- Conceptual - "Conceptual uncertainty arises from incomplete understanding of the information that official statistics provide about economic concepts or from lack of clarity in the concepts themselves. Conceptual uncertainty concerns the interpretation of statistics rather than their magnitudes" (Manski 2019 p7640).

3.3.1. Gene Drives

The manipulation of genes (eg: "gene drives"), in say an organism that spreads a disease (eg: mosquito and malaria), has moved from a dream to a potential reality in recent years. Brossard et al (2019) explained: "Deciding to use gene drives to control and suppress pests will involve more than a technical assessment of the risks involved, and responsible decision-making regarding their use will require concerted efforts from multiple actors. Gene drives represent a classic case of 'post-normal science' [Ravetz 1999] for which purely technical expertise is not enough to address the complexities surrounding a scientific issue that has not only technical but also social, ethical, and legal dimensions. Unlike 'normal' scientific issues for which risk assessment can be based for the most part on scientific inputs, post-normal science has to rely on a multitude of perspectives when assessing risks and benefits" (p7692).

So, there is an important role for science journalists, in particular, in communicating the complex issues and dealing with the misconceptions. "Corralling and correcting misconceptions – and disseminating facts – is especially critical with a topic like gene drives because it is not only complicated, but untested. There are many unknowns, and unknowns can be viewed as carrying big risks. How researchers and practitioners use gene drives in their first attempts to manipulate the DNA of organisms could have a lasting, potentially permanent, impact on society's view of this technology" (Brossard et al 2019 p7693).

"Good journalism" will communicate the facts and issues in "a responsible and fair manner" - "It says what is known and what is unknown about the science" (Brossard et al 2019 p7693). Headlines will be important in not raising false hopes or false alarms, while articles include credible voices on both sides of a debate. "So a journalist's job is to seek out and ask questions of

proponents and opponents, and to accurately reflect the tensions and dissensions. Respected journalism is not promotional and it is not unsubstantiated; its purpose is to investigate, challenge, and explain" (Brossard et al 2019 p7693).

3.3.2. Social Science Topics

Davis (2019) commented: "Social scientists face similar challenges to natural scientists when they seek to convey research findings and their implications to a broad audience. Although findings may have important implications for policy and practice, those implications can be counter-intuitive, controversial, or just too complex to be accessible for non-specialists" (p7698).

He used the example of the decline of large public companies in the USA in the last fifty years. This decline, he argued, is "associated with a declining middle class, lower upward mobility, greater inequality, a fraying social safety net, and a lessened ability to exercise democratic control over the economy" (Davis 2019 p7700).

Issues like this are "inherently political", and so studies "may not be seen by the public or policymakers as neutral" (Davis 2019 p7700). This is an added challenge to the communication process, though some topics in science have similar problems (eg: climate science; appendix 3A).

For example, in 2016, a poll asked Americans how the stock market had fared during Obama's presidency. Three-quarters of those respondents who had voted for him in 2012 said an upward trend, while half who voted for the other candidate said a downward trend. There was an upward trend in fact (Davis 2019).

Davis (2019) reflected on the communication channels available for social scientists:

- Academic journals and books - specialist audiences only.
- "Popular" books - "the number of books published in any given year in the United States is in the hundreds of thousands; the number actually read, considerably fewer. Given contemporary patterns of readership, books are a challenging way to get ideas into the hands of the public" (Davis 2019 p7701).
- Short online articles or posts - Davis (2019) explained, sadly: "For better or worse, there are now countless online publishers with fairly divergent publication models. I have sampled a fair number of these outlets as an author and have found that if ones

goal is respectful dialogue, it is very, very difficult to accomplish this online. Selective outlets with paywalls typically get limited readership. Accessible outlets without paywalls often attract large numbers of trolls with limited reading comprehension and an incapacity to read beyond the first paragraph before penning their rebuttal" (p7701).

- Curated online sites - Davis (2019) admitted to some success here.

3.4. NOT A COMMUNICATION ISSUE

Iyengar and Massey (2019) argued that the problem for scientists is not with communication, but "the widespread dissemination of misleading and biased information" (p7656) ¹⁶.

Concentrating on the USA, these authors outlined the changes in the media landscape in the last few years, including the rise of ideologically inspired radio and television stations, and the Internet and social media ¹⁷
¹⁸.

Lazer et al (2018) outlined three overlapping forms of misleading information on the Internet:

- Fake news - "fabricated information designed to mimic mainstream media content, but which in reality is designed to spread lies rather than truth" (Iyengar and Massey 2019 p7657).
- Misinformation - "false or misleading information put into circulation to cause alarm and confusion" (Iyengar and Massey 2019 p7657).
- Fake information - intended to deceive.

Iyengar and Massey (2019) added to the mix, political polarisation in the USA, which the "echo chambers" of the Internet perpetuate. So, "a major

¹⁶ Eg: child vaccination (appendix 3B).

¹⁷ "Social mega-trends" (Lewandowsky et al 2017) in the USA have aided the spread of misinformation, including (Scheufele and Krause 2019):

- Growing economic inequalities.
- Increasing political polarisation.
- Declining trust in science.
- Changing media landscape - eg: summed up by a website founder: "Survival . . depends on giving readers what they really want, how they want it, when they want it, and on not spending too much money producing what they don't want" (quoted in Scheufele and Krause 2019).

¹⁸ Scheufele and Krause (2019) made the point that "American media have not always striven for 'objectivity'. Early print media delivered unabashedly slanted and misleading information during the 'party press' era of the early 19th century" (p7666).

consequence of polarisation is that partisans have become more motivated to reject information and arguments that clash with their worldview. Rather than process information dispassionately, they resort to motivated reasoning with the goal of protecting their beliefs and values from external threat. The upshot is that when evidence clashes with individuals' partisan loyalties, it is either dismissed or distorted, thereby impeding the diffusion of scientific findings" (Iyengar and Massey 2019 p7658).

Iyengar and Massey (2019) ended with a downbeat, but pragmatic comment: "At this point, probably the best that can be done is for scientists and their scientific associations to anticipate campaigns of misinformation and disinformation and to proactively develop online strategies and internet platforms to counteract them when they occur" (p7660).

Scheufele and Krause (2019) concentrated on the individual factors in misinformation:

a) An individual's (in)ability to recognise misinformation - The importance of "media literacy" (ie: "the ability to access, analyse, evaluate and create messages in a variety of forms"; Livingstone 2004 quoted in Scheufele and Krause 2019).

b) The individual's motivations to recognise misinformation or not - For example, "individuals are more likely to accept information that appears to follow a logical narrative, that comes from a source they perceive to be 'credible', that is consistent with their pre-existing values and beliefs, and that seems to be something other people believe. The psychological unease or inconvenience of encountering worldview-challenging information can produce a desire to minimise feelings of 'cognitive dissonance', which can lead to biased perception and information processing that complicates the recognition and rejection of falsehoods" (Scheufele and Krause 2019 p7664).

3.5. WORKING TOGETHER

Bruine de Bruin and Morgan (2019) observed that "some natural scientists and engineers do not perceive a need to involve psychologists or other behavioural scientists because they already feel (unwarranted) confidence about their intuitions of what drives human behaviour. They may be subject to what has been referred to as 'false consensus effects', such that they perceive their own behaviour as typical for people in general – even when it is not. Indeed, they may fail to realise

that they are no longer able to think or act like non-experts, at least where it pertains to problems in their own field of expertise" (p7676).

Morgan et al (2002) talked of a "mental models" approach, that "recognises that people may have a mental model or a set of beliefs about climate change and other topics, which may differ from those of domain experts" (Bruine de Bruin and Morgan 2019 p7677). Consequently, an interdisciplinary collaboration between natural and social scientists is needed to communicate scientific content. Such an approach should have shared goals, methodology, efforts, and benefits for both types of scientists (Bruine de Bruin and Fischhoff 2017).

Bruine de Bruin and Morgan (2019) outlined an interdisciplinary project to communicate about carbon capture and deep geological sequestration (CCS), which captures CO₂ from coal- and gas-fired power stations before it is released into the atmosphere. A key finding from the social scientists was that non-experts were overwhelmed by technological information produced by scientists. Communication materials were drafted that both simplified the information about CCS, but showed its risks and benefits in comparison with the risks and benefits of all power sources (eg: nuclear) (eg: Fleishman et al 2010).

3.5.1. Automated and Autonomous Vehicles

Hancock et al (2019) took the example of the development of automated and autonomous vehicles (AVs) ("self-driving cars"). These authors asked: "How will the public be kept apprised of their evolving capacities, and what will be the impact of science and the communication of scientific advances across the varying forms of social media on these developments?" (Hancock et al 2019 p7684).

The relevant issues include:

i) There is the potential for enormous changes in society (eg: the end of the human taxi driver), but "considerable uncertainty remains about the the manner in which such innovations will make both short- and long-term impacts" (Hancock et al 2019 p7685).

ii) The public do not receive an objective assessment of the pros and cons. "For example, Google search terms for autonomous vehicles spike when bad news is published, such as following Uber's fatal collision between a test vehicle and a pedestrian in March 2018. The public hears details regarding accidents, but these details are not balanced by more in-depth communications regarding the underlying technical causes or the systems-

level advantages of self-driving technology in particular cases and overall. These advantageous aspects include such dimensions as energy savings, overall traffic flow efficiency, mobility for the disabled, and improvements in social cohesion, to name only a few. Indeed, a recent report has observed that the general reaction to autonomous vehicle crashes is likely to be over-emphasised compared with the reaction to collisions in human-operated vehicles and that recent survey data indicate that confidence in AVs is actually slipping" (Hancock et al 2019 p7685).

iii) Information is needed for the public to make rational choices, as in safety. In the USA, for example, over 35 000 people die each year in motor vehicle crashes, but how safe should AVs be? "Should AVs be twice as safe, which would mean they kill only 18 000 people per year, or should they be 10 times as safe? Does it matter who specifically is killed, or is this simply a matter of absolute numbers? Who should be regarded as responsible in conditions between AVs and human-controlled vehicles?" (Hancock et al 2019 p7685).

This is linked to moral questions like: "Should a driverless car swerve and injure one pedestrian if the alternative is to continue straight ahead and injure greater numbers? Should a driverless car protect the occupant above all else or sacrifice the human on board for the greater good in such circumstances?" (Hancock et al 2019 p7685).

Hancock et al (2019) ended their article: "Much ink and much ire has been expended in championing automation as a flawless answer to the continuing carnage of road traffic injuries and deaths. Although it is a laudable goal within itself, it is doubtful whether such a grandiose claim is actually testable or realisable. Similar objections can be raised for the claims of greater efficiency, since the pertinent question here is at what level should this efficiency be measured – at the systemic level, or is the claim advanced for each vehicle and person on the roadway? It may well be that all AVs will adhere to the speed limit, but then how does the anxious husband get his pregnant wife to the emergency room? Questions regarding exceptional social conditions go well beyond algorithmic oversight of lateral and longitudinal control. They illustrate one very stark fact: When we change the face of transportation in the manner that is being proposed, we will change the nature of society itself. Whether we are prepared for such a radical evolutionary step remains to be seen" (p7690).

3.6. EPIDEMIC DETECTION AND FORECASTING

Epidemiological modelling involves forecasting the total number of cases in a disease outbreak, and thus informing intervention strategies (Thompson and Brooks-Pollard 2019a).

Forecasting can be used during the initial phase of an outbreak to predict whether it will fade out or become a major epidemic. If the latter, modelling can forecast the total number of cases (Thompson and Brooks-Pollard 2019a).

Thompson and Brooks-Pollard (2019b) presented a series of questions for decision-makers before and early in an outbreak, including:

- How vulnerable is the population to the disease?
- How to use surveillance of the disease?
- What interventions can be used?
- What data are available to help forecasting?

Then questions when the epidemic is ongoing, like how is the pathogen spreading, and how effective are current control efforts? (Thompson and Brooks-Pollard 2019b). Finally, at the end of the outbreak: "can the epidemic be declared over, or do hidden cases remain in the population?" (Thompson and Brooks-Pollard 2019b p2).

Grefenstette et al (2017) outlined an epidemic modelling package called FRED (a Framework for Reconstructing Epidemic Dynamics). The spread of a disease can be described by a S.E.I.R pattern:

- S - susceptible (individuals who could get the disease).
- E - exposed (those infected but not infectious to others).
- I - infectious.
- R - recovered (or removed).

The number of days in each state can be varied to show the spread of the disease in a population.

Grefenstette et al (2017) used FRED to assess school closure policies during an influenza outbreak in an exemplar county in Pennsylvania. The assumption was made that 30% of transmission occur in the household, 33% in the general community, and the remainder in schools and workplaces.

School closure was varied from 2 to eight weeks. Closure led to a reduction in the number of cases, and reopening the school produced an increase in cases. This meant that the total number of cases was similar however

long the school closed according to the modelling.

The researchers then applied their model to the whole USA and the same influenza outbreak. The model showed that counties with smaller populations would have higher rates of illness (known as the attack rate - "the total percentage of people that became infected through the course of the epidemic"; Grefenstette et al 2017 p10). The reason suggested is that smaller communities have stronger contact patterns. "These results suggest that health officials may want to consider the likely effect of interventions in the context of the local population structure" (Grefenstette et al 2017 p10).

Next the researchers applied the model and scenario to the workplace, and varied the amount of paid sick days. Based on a county in Pennsylvania's data, around three-quarters of the workplace attack rate was due to "presenteeism" ("going to work when symptomatic"; Grefenstette et al 2017). Increasing paid sick days by 1-2 days (ie: extra "flu days") reduced infections by a quarter to a third, especially at smaller workplaces.

Epidemiological modelling using real population data produced interesting findings for public health officials, including greater infection rates in smaller communities or workplaces because of more personal contact.

International surveillance of diseases depends upon accurate reporting from individual countries ¹⁹. Grubaugh et al's (2018) analysis, for example, suggested that thousands of Zika virus cases were unreported in Cuba in 2017 ²⁰.

The Cuban authorities did not report many cases to the Pan American Health Organisation (PAHO) (Baraniuk 2019).

The last reported case from the Caribbean in August 2017, but a spike in cases from travellers returning from the Caribbean showed that between June 2017 and October 2018 more than 98% of these cases came from Cuba (90 of 91 in the USA and 63 of 64 in Europe) (Grubaugh et al 2018).

Grubaugh et al (2018) analysed the travel details of 155 people in the USA and Europe in 2016-18 ²¹, who had contacted Zika, and most had been to Cuba.

Further analysis of the virus (ie: its genome)

¹⁹ "Tracking the spread of epidemics requires accurate case reporting and strong international collaboration. Failure to do so leaves us vulnerable to surveillance 'blind spots', with the potential for prolonging epidemics and increasing their geographic spread" (Grubaugh et al 2018 p2).

²⁰ The Zika virus was first detected in Brazil in May 2015, but probably started 18 months prior, and by mid 2017 new cases were no longer being reported to PAHO (Grubaugh et al 2018).

²¹ Data from the Florida Department of Health, and the European Centre for Disease Prevention and Control.

suggested that its arrival in Cuba in 2016 was due to travellers from Latin America bringing it (Baraniuk 2019).

3.6.1. Data

Terms like "digital modernity" (Lyon 2017) and "infoglut" (Andrejevic 2013) have been used to describe "the embedding of data producing technologies in people's everyday lives and practices" (Smith 2018 p1).

Smith (2018) was interested in "how digitech and data practices work to mediate relationships between body, self and society, specifically by focusing on how data get under the skin as a means of sensing and experiencing the external world and as biographical and reflective resources. More specifically, I am interested in theorising how the subjective experience of 'becoming with' (Haraway 2008) digital devices and data inflects on impressions of these technologies: specifically, their increasing legitimacy, primacy and taken for grantedness" (p2).

He coined the term "data doxa" to describe "the way in which digital data - and the devices and platforms that stage data - have come to be perceived in Western societies as normal, necessary and enabling" (Smith 2018 p2).

Smith (2018) noted some aspects of this, including:

- Fetishisation of data - The idea that "Big Data" can "afford a higher level of insight than human intuition" (p8).
- Habit - Interactions with data involve credentials (ie: signifiers of personal identity) which become habit, and overlook their capacity to track us.
- Enchantment - "Digital infrastructures encourage and normalise data sharing (for the purposes of knowledge production and profit-making) and they frame data flows as mediums of stimulation for the sharer and viewer alike. The very architecture of social media is engineered to ingrain in users an impulse to self-reveal and to voyeuristically spectate, so that the content of consequent newsfeeds and targeted advertising can be customised to suit the niche tastes of the user in accordance with their posting practices" (Smith 2018 p11).

Is anonymised medical data personally identifiable? A cautionary tale comes from the USA in the mid-1990s, when a researcher (Latanya Sweeney) was able to find the medical records of the State Governor of Massachusetts in an open database (with name, address, and health

insurance account not recorded) using zip code, birth date, and gender (Whyte 2019).

3.7. APPENDIX 3A - CLIMATE CHANGE

Kwok (2019) reported on efforts by ecologist, Josh Lawlor, and "EarthGames" to use video games to teach individuals about climate change. "EarthGames" is a group encouraging the development of environment-themed games (eg: "Climate Quest"; "AdaptNation").

Rooney-Varga et al (2018) evaluated "World Climate", where players role-play United Nations negotiations over climate agreements and their receive computer feedback about their decisions (eg: atmospheric CO2; sea temperature and levels) (figure 3.1). Over 2000 participants in eight countries played the game and completed surveys before and after. There were significant changes in three areas:

- Knowledge of causes and impacts of climate change.
- Feelings of urgency, and hope about human behaviour change.
- A desire to learn more about climate change.

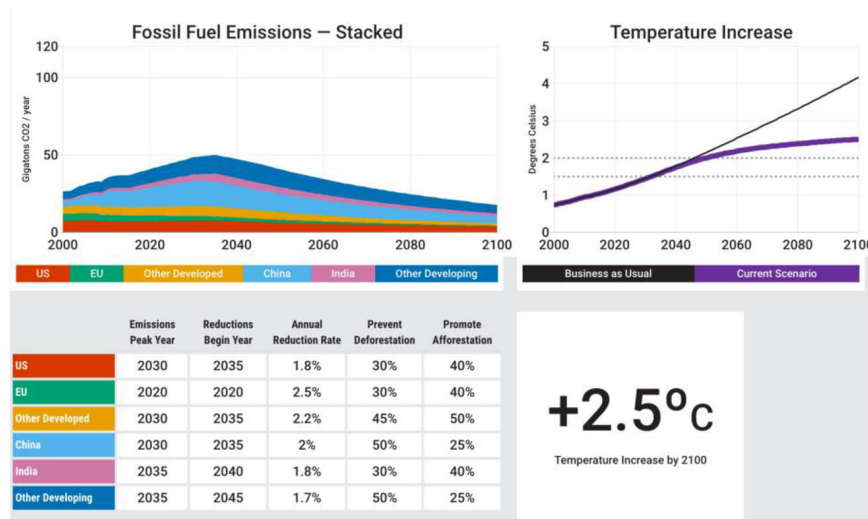
Rooney-Varga et al (2018) concluded: "The results indicate that 'World Climate' offers a climate change communication tool that enables people to learn and feel for themselves, which together have the potential to motivate action informed by science" (p1) (figure 3.2).

3.8. APPENDIX 3B - VACCINE HESITANCY AND REFUSAL

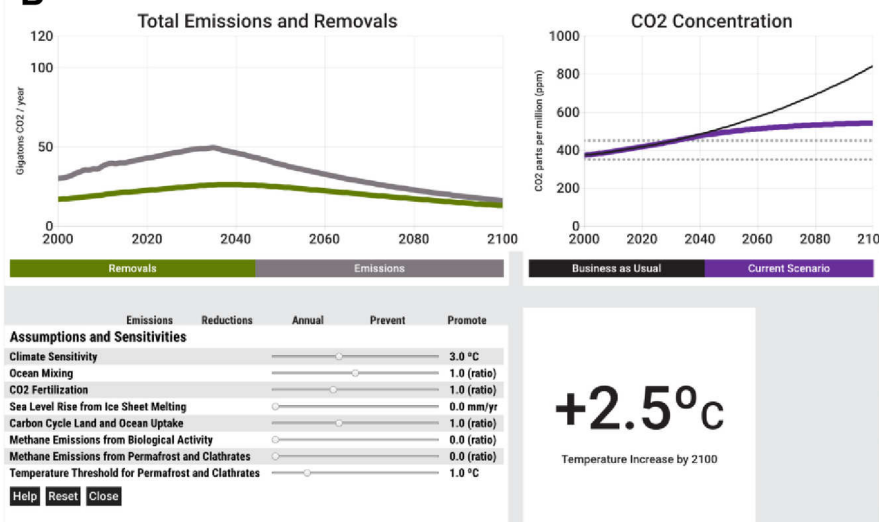
The WHO in 2018 estimated that vaccination prevented 2-3 m deaths worldwide per year, but that another 1.5 m could be prevented with more vaccination (Kennedy 2019). Usually, this means vaccinating more children in low-income countries, but, in the last two decades, "vaccine hesitancy" (VH) in richer countries has become an issue (appendix 3C).

This is seen most strongly with the measles, mumps and rubella (MMR) vaccine (and the discredited link to autism). The reaction to VH by the medical profession is summed up by Poland and Jacobson (2011): "the spectrum of anti-vaccinationists ranges from people who are simply ignorant about science (or 'innumerate'— unable to understand and incorporate concepts of risk and probability into science-grounded decision making) to a radical fringe element who use deliberate mistruths, intimidation, falsified data, and threats of violence in efforts to prevent the use of vaccines and to silence critics" (quoted in Kennedy 2019).

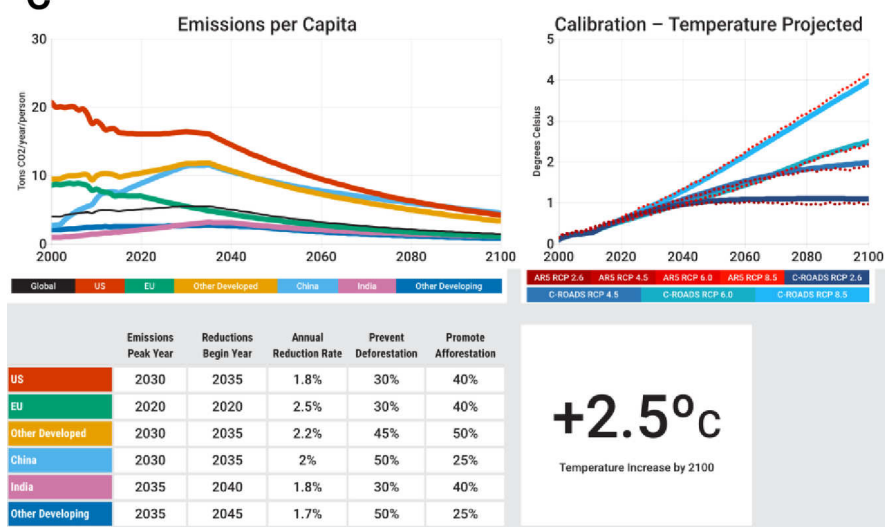
A



B



C



(Source: Rooney-Varga et al 2018 figure 2)

Figure 3.1 – Screenshots from "World Climate" game.



(Source: Rooney-Varga et al 2018 figure 5)

Figure 3.2 - Post-game responses to 3 questions: (A) how engaging the "World Climate" simulation was as a learning experience; (B) the effects the simulation had on motivation to address climate change; (C) desire to learn more about climate change science, solutions, politics, economics, and policies.

Kennedy (2019) suggested that VH should be seen as associated with populist (or anti-establishment) politics. The theoretical challenges to science from critical epistemologies, say, which argued that the scientific method is unable to uncover objective truths has helped in creating the layperson's distrust of scientific expertise. Collins and Evans (2008) talked of "technological or scientific populism".

Kennedy (2019) analysed data from fourteen Western European countries to show the link between political and scientific populism. Data on populist parties came from

the 2014 European Parliament elections, while data on VH came from the "Vaccine Confidence Project" (Larson et al 2016). This research interviewed 500 men and 500 women in each of 67 countries in 2015 using three items. VH was scored as "disagree" or "strongly disagree" to such statements.

Three positive correlations were found (two statistically significant) (table 3.1).

| VH ITEM | CORRELATION | SIGNIFICANCE |
|---|-------------|---------------------------|
| Vaccines are important for children to have | +0.79 | p<0.001 |
| Overall I think vaccines are effective | +0.72 | p<0.01 |
| Overall I think vaccines are safe | +0.50 | not significant at p<0.05 |

Table 3.1 - Positive correlations between voting for populist parties and VH items.

Kennedy (2019) concluded that VH in Western Europe "must be understood within its specific socio-political context. It seems to be driven by similar dynamics to those of political populists – ie: a profound distrust in elites and experts among disenfranchised and marginalised people" (p515).

3.8.1. Mother's Choice

Reich (2014) explored the notions of individual choice for mothers who refused recommended vaccines for their children in interviews with twenty-five women in Colorado, USA (a state with high vaccine refusal).

Cultural expectations of mothering, particularly for richer/middle-class women, produces "a gendered model that advises mothers to expend a tremendous amount of time, energy and money in raising their children"(Hays 1996 quoted in Reich 2014). At the same time, mothers fear for their children's downward mobility in future competitions, according to Lareau (2003). Add to these strands, the "rhetoric of choice", particularly in health decisions. "Culturally, mothers are responsible for the physical, emotional, and psychological health of their children; healthy children symbolically represent good mothering and, inversely, mother-blame proliferates when children are sick" (Reich 2014 p681).

Though choice is often limited to "educated, partnered, and privileged women" (Reich 2014). "The case of vaccine refusal as "choice" raises important questions about gender, class, and social responsibility, including

how and whether individuals sacrifice or protect personal freedoms for communal solidarity and inclusion [...] As privilege facilitates choice, it also potentially jeopardises the health and well-being of other children who lack resources or whose families are more constrained in their options" (Reich 2014 p684).

Reich (2014) showed these ideas in four themes that emerged from her interviews:

i) Mothers "seeing themselves as experts on their children, weigh perceived risks of infection against those of vaccines, and dismiss claims that vaccines are necessary" (p688).

Eg: "The decision I made is that, yeah, pertussis is dangerous, you know, but if my child gets the measles it's not the end of the world. So it was sort of not just weighing the risk of the vaccine, but weighing the risk of the vaccine versus the risk of... it's like chickenpox [which is not serious]" ("Katie"; p689).

ii) Mothers "see their intensive mothering practices – particularly around feeding, nutrition, and natural living – as alternate and superior means of supporting immunity" (p688).

Eg: "I think, just, you know, you have this tiny little infant that's just been born, I'm breastfeeding already which is providing the immunisation from my breast milk... and she wasn't gonna be in any environments when she would potentially be exposed to any of these things, so why would we do that [vaccinate]?" ("Astrid"; p693).

iii) Mothers "attempt to control risk through management of social exposure, as they envision disease risk to lie in 'foreign' bodies outside their networks" (p688).

Reich (2014) referred to the idea of "imagined gated communities". For example, "Heather" saw little risk of infection as her children did not go to daycare/nursery. "Most mothers, like Heather, identify childcare staff and children who attend as potential vectors of infection. They communicate their pride in avoiding such places and their commitment to care for their children's bodies themselves as evidence of maternal accomplishment, even as they rely on privilege to protect their children from these settings" (Reich 2014 p695).

iv) The mothers "evaluate – and often reject – assertions that their choices undermine community health, while ignoring how their children benefit from the immunity of others" (p688).

Unvaccinated children were often described by

parents of vaccinated children as "free-riders", which "Katie" did not like at a pre-school meeting: "a couple parents were getting up and going off about it and how [opting out of vaccines] was putting their children at risk. I was very upset about it" (p698). The response was to emphasise the importance of individual choice in relation to their children (Reich 2014).

3.8.2. Recent Studies

The belief in the link between MMR and autism can be seen as having three "levels" depending on the strength of support for it:

- a) The vaccine is a risk for all children.
- b) The vaccine is a risk only for susceptible children.
- c) The vaccine is a risk for the development of the regressive form of autism for those children who develop autism.

Most studies have addressed (a) above - for example, a Danish cohort study with over half a million children (Madsen et al 2002).

Hviid et al (2019) reported another Danish cohort study to address (b) and (c) above. It involved all children born in Denmark of Danish-born mothers between 1999 and 2010 (n = 650 943). The main MMR vaccine is given at fifteen months old in Denmark. In total, 6517 children were diagnosed with autism.

In relation to the "levels" above:

- a) There was no risk found of autism after vaccination for children generally.
- b) "Susceptible children" were defined primarily by having a sibling with autism (ie: genetic susceptibility), and vaccination did not increase the risk for autism in this group.
- c) No evidence for a risk for the regressive form of autism.

3.8.3. Herd Protection

The vaccination of children against a particular infection not only benefits the children themselves, but also protects unvaccinated children and adults via vaccine herd protection (Ali et al 2019).

This has been shown to be the case with cholera vaccination in Bangladesh, where Ali et al (2019) analysed data for 1985-6. During this period, a clinical

trial compared areas of the country with the oral vaccine or placebo.

The vaccinated children aged 2-15 years old benefited unvaccinated adults, especially women. For example, in an area where half of the children or more had been vaccinated, the risk of cholera for all unvaccinated adults was halved, but this was nearly three-quarters less for women and only a third for men.

Ali et al (2019) noted a difference in transmission patterns which may have explained less herd protection for adult men: "Whereas women and children are more likely to acquire cholera from person-to-person transmission in the home, adults males are thought to acquire cholera outside the home, often in the context of occupations such as fishing" (pp232-233).

3.8.4. Appendix 3C - Compulsory Immunisation

"Following declining trends of routine coverage levels arisen from anti-vaccination movements and 'hesitant compliers' [Enkel et al 2018], the Italian and French governments made MMR vaccination compulsory for children before they enter primary school. Similarly, the state of South Australia, following the example of the state of Victoria, proposed a new regulation to forbid the enrolment of unvaccinated children in kindergartens and daycare centres, also called the 'No jab, No play' policy" (Trentini et al 2019 p2).

Should policies of "no jab no school" been introduced widely in Developed countries? Trentini et al (2019) modelled measles immunity for the next thirty years, based on current immunisation uptake patterns, in seven countries (USA, South Korea, Singapore, Australia, Italy, UK, and Ireland). It was calculated that individuals at risk of measles would increase by 50% by 2050 with current immunisation policies and uptake.

The authors commented: "Our results suggest that most of countries would strongly benefit from the introduction of compulsory vaccination at school entry in addition to current routine immunisation programmes. In particular, we found that this strategy would allow the UK, Ireland and the USA to reach stable herd immunity levels in the next decades and therefore the achievement of persisting measles elimination" (Trentini et al 2019 p6).

Sonia Saxena commented: "Making vaccination mandatory might have unintended consequences. It risks disenfranchising parents and carers, as well as risking a rise in unvaccinated children being excluded from school - which could carry stigma for children whose parents do not comply" (quoted in Staff and agency 2019).

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4. RISK-TAKING AND IMPULSIVE BEHAVIOUR

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4.1. INTRODUCTION

In order to cope with changing environments, individuals need to be able to respond. On part of that is the willingness to take risks, and there is also the speed of taking decisions. These are risk-taking behaviour (RTB) and impulsive behaviour (IB).

Recent research has shown that "these are not simply descriptive distinctions, as we now know that discrete aspects of impulsive behaviour are mediated by different brain circuitries and neurochemistries, and that variations in these different forms of impulsive behaviour often do not correlate. Moreover, a large range of psychiatric disorders, spanning obsessive-compulsive disorder, where behaviour becomes ridged and non-spontaneous, to the nonsensical risk-taking seen in gambling and drug taking, are classified as having an impulsive component. Yet, these too present with different patterns of impulsive behavioural abnormalities, leading to distinct therapeutic strategies for different impulse control disorders" (Isles et al 2019 p1).

Impulsivity is defined as "behaviour without adequate thought, the tendency to act with less forethought than do most individuals of equal ability and knowledge, or a predisposition toward rapid, unplanned reactions to internal or external stimuli without regard to the negative consequences of these reactions" (International Society for Research on Impulsivity quoted in Vassileva and Conrad 2019).

4.2. RISK PREFERENCE AND TOLERANCE

"Risk preference" (or "risk attitude", "risk tolerance" or "sensitivity to risk") is often viewed as a personal characteristic (Hertwig et al 2019).

It is measured in two main ways - behavioural (eg: choice between a safe and a risky bet) (more common in economics) ("revealed-preference tradition"), and self-

reported (more common in psychology) ("stated-preference tradition") (Hertwig et al 2019).

Hertwig et al (2019) distinguished three problems ("gaps") with these forms of measurement:

i) Description-experience gap - Making decisions from the probability information given (description) or their "experience". Laboratory studies using behavioural measures tend to study the former, whereas everyday decisions are more biased (eg: dependent on certain information more than other, like recent outcomes).

ii) Behaviour-self-report gap - Where studies have used both measures, different conclusions arise from each measure. For example, self-report measures capture stable preferences, while behaviour measures involve transient states (Hertwig et al 2019).

iii) Temporal stability gap - Are risk preferences stable over time? Mata et al (2018), for example, found that choices of monetary gambles with five-year intervals (test-retest) had a correlation of 0.2, whereas for self-reports it was 0.5 (Hertwig et al 2019).

Many theories of decision-making under risk (eg: Savage 1954) assume that individuals "act as if they maximised (subjective) expected utility" (Bossaerts et al 2019). In other words, individuals calculate the probabilities of options and make "objective" decisions (sometimes called the "axioms of rationality"; Bossaerts et al 2019).

But research suggests that individuals are not making rational decisions. For example, values and beliefs may influence decisions, or individuals may not have "well-defined preferences" about a choice of options. In fact, the more complex the situation and choices, the less likely individuals will use a rational assessment of the probabilities of each option (Bossaerts et al 2019).

Wilkins and Bhattacharya (2019) offered an evolutionary explanation for risk tolerance at the level of the gene.

The parent-of-origin effect proposes that certain genes (imprinted genes) behave differently in offspring if inherited from the mother or the father. For example, genes from the father will "place greater demand on maternal resources" (eg: bigger baby), but from the mother are "growth-restricting" (Wilkins and Bhattacharya 2019). This fits with the principle of sexual selection that females do not want to give all their resources to one offspring, but save some for future children. But males can mate with multiple women, and so survival of

the mother of this offspring is not as important. This is sometimes called the "Kinship Theory of Imprinting" (Moore and Haig 1991), and it describes an "intra-genomic conflict", in Wilkins and Bhattacharya's (2019) words, "between maternally and paternally inherited alleles over the organismal phenotype" (p1).

Another aspect of sexual selection is female choosiness, and males' willingness to mate with any female available, which translates into the former being willing to wait for the future (larger) reward (even if waiting is risky), but males wait the (small) reward now.

To sum up, paternal versions of imprinted genes lead to less willingness to wait (risk averse), while maternal versions favour waiting for the larger reward (risk tolerant) (Wilkins and Bhattacharya 2019).

Genetic manipulation in mice has found support for this idea (eg: "Nesp" gene expressed in hypothalamus; Dent et al 2016) (Wilkins and Bhattacharya 2019).

4.2.1. Evolution and Self-Control

Hayden (2019) began: "Poor self-control is inimical to mental and physical health and to life success; it is associated with poverty, obesity, loneliness and other unwanted states. It is both a symptom and a cause of diseases that increase mortality, such as addiction, depression and obsessive-compulsive disorder. Because failures of self-control are costly, the ability to exert self-control can confer evolutionary benefits and ought to be subject to strongly negative selection pressure. The ubiquity of poor self-control, then, poses an important riddle: why has natural selection not endowed us with perfect self-control?" (p1).

Hayden (2019) answered his question with an evolutionary explanation. One issue is that modern problems related to poor self-control, like drug and alcohol addiction, "are simply a very novel danger to which we have not yet evolved a solution. Overcoming the temptation to consume drugs and alcohol then requires making use of general-purpose cognitive faculties" (Hayden 2019 p4). Add to that strong tendencies towards impulsive behaviours (eg: eating a lot now).

These "general-purpose cognitive faculties" include "automatisation" (or habit). Regular behaviours are performed with little conscious control, which leaves "awareness free to wander or perform other cognitively demanding activities" (Hayden 2019 p4). But automatic responses can be rigid, and not responsive to change. "The self-control failure is not selected for in the conventional sense, but it is selected for indirectly, in the sense that it is the unavoidable price worth paying in exchange for the benefits of automatisation. Self-control failures are a by-product of processes that

produce more efficient but less flexible decisions" (Hayden 2019 p5).

Other approaches to self-control include (Hayden 2019):

a) Hot vs cold systems - Poor self-control is the failure of the cold system (reason) to over-rule the hot system (impulse) (eg: James 1890/1950).

b) Economic decisions - The failure of cognitive processes to evaluate the larger reward in the future against the smaller reward now.

c) Patience model - "Patience is a time-centric view of self-control, and it equates poor self-control with an unwillingness to wait extended periods of time to obtain better rewards. The patience perspective generally equates poor self-control with action and good self-control with inaction" (Hayden 2019 p2).

d) Limited internal resources - Self-control requires effort, and the limited resources to maintain it are used up, thus the loss of self-control.

4.3. ADOLESCENT DECISION-MAKING

RTB and IB are seen as peaking in adolescence/early adulthood (ie: 10-30 years old). "Criminal behaviour is higher in adolescents than in any other age group. Over half of new sexually transmitted infections diagnosed are in individuals aged 15-24. Mortality rates increase markedly from childhood to adolescence, with about three quarters of deaths attributable to preventable risky or impulsive actions (eg: reckless driving, suicide)" (Rosenbaum and Hartley 2019 p1).

However, there are individual differences, and research findings vary depending on definitions and ways of measuring behaviours (Rosenbaum and Hartley 2019).

One of the ways to experimentally test risky and impulsive behaviours is with value-based decisions from behavioural economics. For example, offering the choice of (a) a 80% chance of 10 units/20% chance of 0 vs (b) 8 units. Known as "decisions under risk", this assesses risk performance and perception with a gamble or a sure choice. While a choice of 5 units now or 15 units in three months, say, assesses impulsivity ("decisions over time")²². "Properties of the decision problems (eg: the

²² The preference for "smaller-sooner rewards" over "larger-later rewards" was first studied formally in 1937 (Lopez-Guzman et al 2019).

magnitude, valence, probability or delay of the decision outcome) can be varied systematically to isolate the influence of specific aspects of the choice context on decision making" (Rosenbaum and Hartley 2019 p2).

Studies comparing adolescents and adults on "decisions under risk" are inconsistent. Some find that adolescents choose the higher amount irrelevant of its riskiness, while other studies do not (Rosenbaum and Hartley 2019).

Adult choices are influenced by contextual factors like the framing of the options. If, for example, the choice as (a) and (b) above is frame as a loss, individuals are more likely to gamble than when framed as a gain. This is known as "loss aversion" (Rosenbaum and Hartley 2019).

"Decisions under ambiguity" is where the probabilities of the options are not known, which is more like real-life. Adults have an "aversion to ambiguity", which adolescents may not have (as again the studies are inconsistent) (Rosenbaum and Hartley 2019).

"Decisions from experience" is a method where participants are not told the probabilities of outcomes, but must learn them from making decisions. Here, adults, more than adolescents, tend to underweigh rare outcomes (ie: pay less attention to), which is the opposite to decisions where probabilities are known beforehand (Rosenbaum and Hartley 2019). An example of the test used here is the Iowa Gambling Task (IGT). Participants are presented with four decks of cards to choose cards from. They start with no information about the probabilities of gains and losses from choosing from each deck. Two decks are set up to produce a net gain ("good decks") (based on 50% of cards provide small gains and 10% small losses), while the other two decks ("bad decks") produce a net loss (50% of cards are large losses and 10% large gains). Once the participant has learned the pattern, choosing cards from the "good decks" is the surer decision, while the "bad decks" cards are riskier choices. The ability to learn is linked to the ventromedial prefrontal cortex. The cortex is developing in adolescence, which may account for the poorer ability of adolescents with the IGT (Rosenbaum and Hartley 2019).

In terms of "decisions over time", the choice of the immediate reward declines from childhood to adulthood, "reflecting increasing patience", and "causal learning of the relationship between actions and delayed rewards or negative outcomes", for example (Rosenbaum and Hartley 2019).

Rosenbaum and Hartley (2019) ended: "Consideration of the contextual factors that are likely to play a role in specific real-world choice contexts may also help to distinguish between environments in which adolescents

are likely to make adult-like choices (eg: contexts in which future outcomes are easy to call to mind, or potential rewarding outcomes are infrequent) and those in which they may be vulnerable to increased risky and impulsive choice" (p8).

4.4. FOOD CHOICES

IB in relation to eating can contribute to obesity. Called "food-scheduling behaviour", it involves the decision of when to eat next. "Animals tend to make risk-averse selections for small and certain food rewards (on the one hand) over larger uncertain food rewards (on the other hand). However, animals also tend to show risk-seeking selections for food rewards that might be available very quickly or following longer delays" (Stokes et al 2019 p2). Ultimately, obtaining food quickly has evolved as the dominant motivation. Thus, experiments have shown that rats, for example, prefer variable interval food rewards (ie: immediate or delayed) rather than fixed interval (ie: same time delay each occasion) (Stokes et al 2019).

Stokes et al (2019) explored this idea in two experiments with adult humans. Experiment 1 involved sixty non-severely obese females (mostly students) from a city in Wales in a discrete-choice procedure. Two coloured boxes were presented on a computer screen - green and blue. Choosing the blue one meant a small reward always 15 seconds later (fixed interval reward; FIR), while choosing the green box led to a reward at a variable delay of immediately (0 seconds) or thirty seconds (variable interval reward; VIR). The participants made 39 selections, and the rewards were small sweets (eg: jelly beans) or savouries (eg: twiglets).

"Overall, participants showed marginal preferences for the variable compared to the fixed delay option" (Stokes et al 2019 p4). An immediate VIR encouraged subsequent choice of the VIR option. The reinforcement of the immediate availability of food and a tendency towards "quick food" can be applied to explain obesity in the Western world using the mismatch idea (evolutionary food-seeking behaviours in a food-rich environment).

Stokes et al's (2019) second experiment expanded their first with 25 male and 45 female psychology students at a Welsh university. The participants underwent the same discrete-choice procedure as above after exposure to the smell of chocolate or not in the waiting room. The food reward was squares of chocolate this time. The preference for a VIR found in Experiment 1 was confirmed overall, especially after an immediate reward. Smelling chocolate beforehand encouraged

participants to continue choosing the VIR after a thirty-second delay of the reward. This showed the importance of environmental food cues in reinforcing choices (Stokes et al 2019).

Humby et al (2019) reported similar work, with mice and the manipulation of serotonin in the brain²³. Forty-four male mice were taught to touch a computer screen to gain a reward, and then to choose between two screens - touching one produced a reward after a 15-second delay (FIR), and the other gave a VIR immediately or after thirty-seconds delay. There was a significant preference for the latter.

Subsequently, the mice were tested after receiving drugs that increased or decreased serotonin in the brain. Reducing the serotonin lowered the preference for the VIR, while increasing it exaggerated the preference²⁴.

4.5. PRE-COMMITMENT

IB can manifest itself as a failure to perform effort-requiring health behaviours, like taking the car rather than walking to the nearby shops. Such decisions involve effort requirements, and delay to reward versus instant gratification. "Our preference for effort-free or instant rewards can be overcome through self-regulatory measures, such as active inhibition of choosing instant/effort-free gratification - a cognitive process termed 'willpower'. An alternative strategy, named 'pre-commitment', entails strategic modulations of one's (future) choice set, such as removing tempting, but ultimately inferior, choice options, adding unattractive consequences to such alternatives or inflating their costs" (Studer et al 2019 p2).

Studer et al (2019) explored pre-commitment in an experiment with 59 healthy middle-aged German men, who were given a choice of an effortless small reward (SR) or an effortful larger reward (LR). The reward was the opportunity to view an erotic image of a woman. The effortful task was squeezing a hand-held dynamometer 2, 4 or 6 times. The LR was a previously rated preferred image and the SR was a least preferred one. In the pre-commitment trials, the participants stated beforehand their choice of the LR or not (which was either forced or voluntary), whereas in the standard trials, they made the decision at the time. Participants performed thirty

²³ Serotonin is a neurotransmitter linked to motivation and reward behaviours.

²⁴ Technically, the researchers were focusing on a particular serotonin receptor - 5-HT_{2C} - found in areas of the brain related to impulse control. "Knockout mice" without this receptor become obese from excessive eating (eg: Tecott et al 1995).

standard and 30 pre-commitment trials.

Participants were more likely to perform the LR after a voluntary pre-commitment than in a standard trial.

In a variation of this design, a time delay was used instead of effort with the LR involving a wait of 4, 7 or 10 seconds to see the image. Voluntary pre-commitment was again effective for the LR.

In the experiments voluntary pre-commitment to the LR option meant that the SR one was removed.

Pre-commitment has proved effective in real-life situations, like gym use. Royer et al (2015) found that attendance at a company gym was 25% greater in the pre-commitment than control group. Pre-commitment here involved the opportunity to earn money from gym use (Studer et al 2019).

In summary, where individuals face a SR and LR option and IB tends towards the former, pre-commitment strategies involve altering the choices such that the LR option is more attractive (eg: greater financial reward) and/or the SR option is less attractive (eg: removal of the option).

4.6. PSYCHOPATHOLOGY AND IB

Vassileva and Conrad (2019) began: "Impulsivity is implicated in virtually all substance-related and addictive disorders and many other forms of psychopathology" (p1).

Specifically, in relation to substance use disorders (SUDs), IB is both an antecedent risk factor, and a consequence (Vassileva and Conrad 2019).

Dalley and Ersche (2019) described two processes in IB here - (i) suppression of inappropriate actions, and (ii) reflection on the consequences of rash behaviour.

The former is "waiting impulsivity", which is measured in experimental work as the ability to resist until signalled to act. In non-human animals, waiting is taught by reinforcement of an action only after a set delay after the signal to act. This is sometimes called the "5-choice serial reaction time task" (5CSRTT) (Dalley and Ersche 2019).

The equivalent with humans is the "four-choice serial reaction time task" (4CSRTT) (Dalley and Ersche 2019). A participant holds down a computer key with their dominant hand, and when a target appears in one of four areas of the screen, they release the key and touch the screen with that hand. Instructions can be given to respond immediately or after a set delay, or respond to some targets but not others.

In terms of the neurophysiology, Volkow and Balar (2015) described "NOW" and "LATER" brain circuits that are involved in immediate or delayed responding (Dalley and Ersche 2019).

Another way of distinguishing IB is "rapid-response impulsivity" (poor inhibition control), and "choice impulsivity" (Lopez-Guzman et al 2019). The latter includes inability to delay gratification, and "reflection impulsivity", which is "the tendency to make a premature decision without sufficiently evaluating information or considering its accuracy" (Lopez-Guzman et al 2019 p1).

"Choice impulsivity" is tested by tasks like the "information sampling task" or "information gathering task", where decisions are made before collecting all the relevant information (Lopez-Guzman et al 2019).

Barratt (1993) described the personality characteristic of impulsivity (ie: trait impulsivity) as having sub-components (delineating, attentional, motor, and non-planning impulsivity) (ie: it is a multi-dimensional concept). But "many personality scales were developed when impulsivity was considered a unitary construct and therefore fail to fully differentiate between these facets" (Vassileva and Conrad 2019 p2).

Vassileva and Conrad (2019) continued with their criticisms: "Despite a widely accepted notion of personality traits reflecting lasting and consistent individual differences, there is unequivocal evidence that personality traits tend to change across the lifespan, with some traits (eg: conscientiousness, extraversion) being more stable than others (eg: neuroticism). For the most part, the measurement of personality traits involves central tendency variables, is often limited to a single assessment, and rarely involves methods that capture within-person variability" (p3).

The alternative is state impulsivity - ie: "distinct performance-based neurobehavioural manifestations, reflecting individual differences in valuation and decision-making that could be more sensitive to fluctuating momentary lapses in impulse control, influenced by environmental context and the current state of the individual" (Vassileva and Conrad 2019 p4).

Another aspect of the concept of IB is as a continuum (Vassileva and Conrad 2019).

There is evidence of different aspects of impulsivity and different substance use, and between mono-dependent and polysubstance users. For example, self-reported measures of trait impulsivity have distinguished between stimulant and alcohol misuse, or between misuse of prescription stimulants and sedatives

(Vassileva and Conrad 2019).

Mono-dependent heroin and amphetamine users have also been found to be different on impulsivity (and other characteristics). "Amphetamine dependence was (uniquely) predicted by higher impulsive sensation seeking (disinhibition and excitement seeking) and higher hostility, whereas heroin dependence was uniquely predicted by lower sensation seeking, lower trait motor impulsivity, higher negative urgency, higher callous/unemotional levels of psychopathy, and higher depression and trait anxiety" (Vassileva and Conrad 2019 p7).

However, all SUDs have a common factor of delay discounting (Vassileva and Conrad 2019).

Lijffijt et al (2019) distinguished between:

a) Reward-delay or delay-discounting impulsivity (DDI; impulsive choice) - "an exaggeration of the normal decrease of perceived value of a future (higher) reward over an immediate (smaller) reward" (Lijffijt et al 2019 p2).

b) Rapid-response impulsivity (RRI; impulsive action) - with impaired response inhibition producing responses before adequately processing a stimulus, and inability to adapt behaviour to changing contexts" (Lijffijt et al 2019 p2).

Concentrating on bipolar disorder, RRI is increased during mania, or in individuals with a co-morbidity of SUD (as compared to healthy controls) (Lijffijt et al 2019).

IB is also relevant to suicide. "Impulsivity is woven into suicidal behaviour. Impulsive versus planned attempts is a false dichotomy: trait impulsivity was higher in individuals with both a plan and an attempt than with either an attempt or plan alone. Impulsive individuals are more likely to act on a plan, and state-dependent increases in impulsivity during ongoing depressive episodes potentially increase suicide risk" (Lijffijt et al 2019 pp5-6).

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5. EXPERIENCING THE PAST, MAKING SENSE OF THE PRESENT, AND IMAGINING THE FUTURE

- 5.1. Advice to self and regrets
- 5.2. Nostalgia
 - 5.2.1. Meaningfulness
 - 5.2.2. Anticipatory nostalgia
- 5.3. Ageing skateboarders
- 5.4. Future
- 5.5. Theodiversity
- 5.6. Appendix 5A - Legare and Souza (2014)
- 5.7. References

5.1. ADVICE TO SELF AND REGRETS

Kowalski and McCord (2019) considered the question: What if we could offer advice to our younger self? "While the advice that one might offer one's younger self would not necessarily reflect regrets, it is possible that it could fall into domains similar to those that have been captured in research on regrets, and, indeed, one would anticipate that there would be a relationship between the advice offered to one's younger self and regret" (Kowalski and McCord 2019 p1).

A meta-analysis by Roese and Summerville (2019), for example, had distinguished key life domains of regret with the most important being education, career, romance, and parenting. These areas can be linked to the "opportunity principle", where negative choices could still be rectified. For example, a failure to stay in education when younger can be overcome by adult education courses. "From this perspective, regret decreases as people age because of diminished opportunities" (Kowalski and McCord 2019 p2).

An alternative perspective is that regret increases with age because of lost opportunity, which is defined by Beike et al (2009) as "an undesired outcome that could have been avoided or prevented at the time of its occurrence (high past opportunity) but can no longer be remedied at the present time (low future opportunity)" (quoted in Kowalski and McCord 2019).

So, regret is accompanied by negative emotions here. But it can motivate change, "like pain, counterfactual thought ²⁵ about a regrettable past may serve instructional and motivational purposes - telling us that something is wrong and moving us to do something about it" (Landeman et al 1995 quoted in Kowalski and McCord 2019).

Returning to advice to the younger self, Kowalski

²⁵ Eg: If I had not married that person, my life would have been so much better.

and McCord (2019) observed that this should also motivate change, if followed. They stated: "if the advice was followed, one would hypothesise that it would close the discrepancy between one's actual self and one's ideal self and/or one's ought self. In other words, following advice to one's younger self should align a person more with their desired self or selves" (Kowalski and McCord 2019 p2).

This fits with self-discrepancy theory (Higgins 1987). The self is viewed as three elements - actual (current view of the self), ideal (the self the individual would like to be), and ought (who the person thinks they should be). Discrepancies between these elements produces emotional responses. For example, a discrepancy between the actual and ideal selves is seen as failure to achieve dreams and leads to disappointment and depression, while an actual-ought discrepancy can produce fear and anxiety (Kowalski and McCord 2019).

Kowalski and McCord (2019) investigated regret, advice to the younger self, and self-discrepancy theory in two online studies. In Study 1, 189 US adults aged 30 to 76 years old were asked to give three pieces of advice to their younger self. Then they were asked if following this advice would have brought them closer to the ideal or ought self. Further questions asked about regret and emotions (eg: depression).

The type of advice was independently coded, and seventeen categories emerged, with the most important being "relationships" (mentioned by nearly one-fifth of participants), "education" (10%), and "selfhood" (10%) (eg: "be kind to yourself"). Four-fifths said that following the self would bring them closer to the ideal self, and the remainder to the ought self. Regret was reported by around two-thirds of respondents.

Study 2 was a replication with 273 more US adults.

The data in both studies were retrospective reports. Also they did not consider the amount of advice. "For example, one would expect older adults to offer more pieces of advice to their younger self than younger adults" (Kowalski and McCord 2019 p18).

5.2. NOSTALGIA

Nostalgia has been described as "a mixture of happiness and longing" (Burrell 2016), and a "sentimental longing for one's past" (Sedikes and Wildschut 2018). Earlier views of personal nostalgia saw it as "an inability to accept the loss of the past..., to move forward, to appreciate life in the present, or to confront reality" (Batcho and Shikh 2016 p75). More recently, the emphasise is on the psychological benefits of it. These included increased positive mood, forged

bonds with others (social connectedness), and enhanced self-esteem (Routledge et al 2012).

Four-fifths of questioned undergraduates in one study reported nostalgia at least once a week (Wildschut et al 2006).

Nostalgic memory is about the emotion, not what actually happened. An over-positive view of the past held by a group ("collective nostalgia") can strengthen in-group bonds, but increase discrimination (Burrell 2016).

"Historical nostalgia" is longing for a past that never was, while "vicarious nostalgia" is wishing for someone else's past (Burrell 2016).

Leunissen et al (2018) found evidence of "organisational nostalgia" with US participants, and its association with work meaning (eg: "I know my work makes a positive difference in the world").

5.2.1. Meaningfulness

Nostalgia correlates with meaning in life. Routledge et al (2011) found that thinking of nostalgic song lyrics increased perceptions of meaning in life compared to non-nostalgic songs.

It confers meaning to an individual's life in two ways - via social connectedness, and self-continuity (Sedikides and Wildschut 2018).

Routledge et al (2012) explored the link with meaning-making in three experiments.

Experiment 1 - This experiment compared nostalgic thinking with another mode of thinking (anticipating desired future states) with twenty-four US undergraduates. Participants were asked to think of a nostalgic event or a desired future event (eg: getting married) before completing the Presence of Meaning in Life sub-scale of the Meaning of Life Questionnaire (Steger et al 2006). This involves a seven-point scale in response to five items, including "I have a good sense of what makes my life meaningful". A higher score indicates a more meaningful perception of life.

The mean score in the nostalgia condition was 5.65 compared to 4.63. "Nostalgia, relative to thinking about a desired future event, heightened a sense of meaning" (Routledge et al 2012 p455).

Experiment 2 - This study added to Experiment 1 with a control condition (thinking about a recent positive experience), and another way of measuring meaning (ie: searching for meaning). "In short, if nostalgia bolsters meaning, it should decrease the need to further search for meaning" (Routledge et al 2012 p455). This was

measured with the Search for Meaning in Life sub-scale of the Meaning in Life Questionnaire, which includes five items, like "I am looking for something that makes my life feel meaningful". Forty-three more undergraduates performed in one of the three conditions.

Participants in the nostalgia condition scored significantly lower on the search for meaning than the other two conditions.

Experiment 3 - This study investigated the role of nostalgia to mitigate threats to meaning. Thirty-four more undergraduates were shown absurd art, which is viewed as challenging meaning (based on previous work), or traditional art before thinking about a nostalgic event or a recent positive one. This gave four conditions - absurd art/nostalgia; absurd art/positive event; traditional art/nostalgia; traditional art/positive event. Meaning was measured in the same way as Experiment 1.

The positive event conditions varied in their meaning scores with a significantly lower one after viewing absurd art (2.97 vs 4.26). This was taken as evidence that absurd art threatened meaning. But the nostalgia conditions varied non-significantly (mean 4.70 traditional art vs 5.11 absurd art), which suggested that "being challenged to explain absurd art compromised meaning, and nostalgia mitigated this effect" (Routledge et al 2012 p457).

Nostalgia also helps with mortality-prompted threats (Sedikides and Wildschut 2018).

5.2.2. Anticipatory Nostalgia

"Personal nostalgia is missing what has already been lost, whereas anticipatory nostalgia involves missing what has not yet been lost. Triggered by an imagined future, anticipatory nostalgia entails a conflict between an actual present and a hypothetical future one. Anticipatory nostalgia is contingent upon first mentally creating the condition that gives rise to the missing, because the 'someday past' is still present. Anticipatory nostalgia entails the experience of the present along with an imagined future and an imagined past" (Batcho and Shikh 2016 p75).

Batcho and Shikh (2016) investigated anticipatory nostalgia in four studies.

Study 1 - 147 US students completed the Nostalgia Inventory (Batcho 1995), which rates the missing of twenty items on a nine-point scale (eg: "someone you loved"; "not knowing sad or evil things"), and the newly designed Survey of Anticipatory Nostalgia. This involves

the items of the Nostalgia Inventory rewritten (eg: "someone you love will leave someday"; "society will change").

There was a moderate correlation between the two questionnaires, which "is consistent with the hypothesis that anticipatory nostalgia is related to but distinguishable from personal nostalgia" (Batcho and Shikh 2016 p76).

Study 2 - 169 more students completed the same questionnaires as Study 1 as well as measures of mood, and social connectedness.

Personal nostalgia correlated with happiness, but not sadness, while anticipatory nostalgia was the opposite.

Study 3 - 123 more students completed the questionnaires on nostalgia, and wrote a short essay about the past, present or future positive or negative experiences.

"As expected, personal nostalgia was related to remembering the past, whereas anticipatory nostalgia was aligned with thinking of the future. Personal nostalgia was related to sadness and to the positive reaction of being fully engaged, whereas anticipatory nostalgia was associated with distancing to avoid future hurt and finding it difficult to enjoy the present" (Batcho and Shikh 2016 p79). Analysing the essays, anticipatory nostalgia focused on missing the current lifestyle not childhood, and participants did not want to be children again, however much they missed the nest bits.

Study 4 - 117 students completed the nostalgia questionnaires as well as the Childhood Survey (Batcho et al 2011), where sixteen favourable (eg: birthday parties) and sixteen unfavourable (eg: being bullied) items are scored. Then participants performed an ambiguous task to see how they interpreted positive and negative events. The task was judging six photographs of clouds on different dimensions (eg: "make people feel happy"; "suggest that a storm is coming").

Personal and anticipatory nostalgia were linked to different aspects of the Childhood Survey. "Whereas personal nostalgia was predicted by favourable social emotional childhood experiences, anticipatory nostalgia was predicted by unfavourable solitary emotional childhood experiences" (Batcho and Shikh 2016 p82).

Analysis of the response to the photographs showed a pattern. "Personal nostalgia predicted the likelihood of the photographs making people happy and reminding people of childhood. Anticipatory nostalgia predicted the likelihood of the photographs making people sad, suggesting that a storm was approaching, and suggesting the importance of weather science. The likelihood of a

storm and the importance of weather science both reflect a focus on the future" (Batcho and Shikh 2016 p82).

Altogether, personal nostalgia was associated with more positive emotions, and engagement with the present, while anticipatory nostalgia was more negative, and "those prone to anticipatory nostalgia found it harder to enjoy the present and experienced distancing to avoid hurt when it ends" (Batcho and Shikh 2016 p83).

5.3. AGEING SKATEBOARDERS

Featherstone and Hepworth (1995) observed: "Whilst the biological processes of ageing, old age and death cannot in the last resort be avoided, the meanings which we give to these processes and the evaluations we make of people as they grow physically older are social constructions which reflect the beliefs and values found in a specific culture at a particular period in history" (quoted in Willing et al 2019).

This "social construction of ageing" is seen particularly in the case of older individuals involved in "youth culture", as in Willing et al's (2019) study of skateboarding. Skateboarding "began and is still typically envisaged as a youth culture", so how do individuals make sense of "'being a skater' as a core identity beyond youth" (Willing et al 2019 p504).

The researchers analysed a YouTube video called "The Tired Video" posted in 2014, which reported on older skaters (above the age of 30 years old). It was made by a company that sells skateboarding equipment, and as part of an attempt to reach the "greying" market in skating (Willing et al 2019).

Four key themes were identified in the 128 scenes of the 11 minutes and forty seconds of the video.

i) Modification - How individuals adapt to their changing physical abilities.

ii) Dedication - The continued desire and persistence to be able to do the skateboarding tricks.

iii) Humour - Self-mockery of failings.

iv) Homage - Acts "to position the skaters in the video as 'insiders' and 'elders' of a sort whom skaters can laugh with, rather than outsiders to be laughed at" (Willing et al 2019 p510).

Two other ideas were important for the researchers. One was the positive presentation of ageing skaters rather than the emphasis on loss. "The Tired Video has the potential to act as a 'reminder' or 'reflection' to

skaters of what skateboarding actually entails and looks like for most who age, and also an occasion to consider the agency of skaters who are 'not-so-good' any more physically yet create strategies to actively extend and maintain their identities and lifestyles 'successfully' as they age" (Willing et al 2019 p515).

Also the video showed how a "lifestyle sport" with a short history deals with its "'coming of age' where it no longer accurately fits the description of being a youth culture alone" (Willing et al 2019 p515).

A number of popular cultural forms, often described as "youth culture" appearing in recent years are populated by individuals beyond 25 years old, like punk music. Bennett (2006) reported on "ageing punks" who wore less spectacular clothing, and they "legitimised this toning down of their visual image by claiming that with age, they had absorbed the qualities of the scene and lifestyle to the extent that there was no need to visually display their punk credentials on the surface of the body in the more visually dramatic ways often associated with their younger peers" (Willing et al 2019 p512).

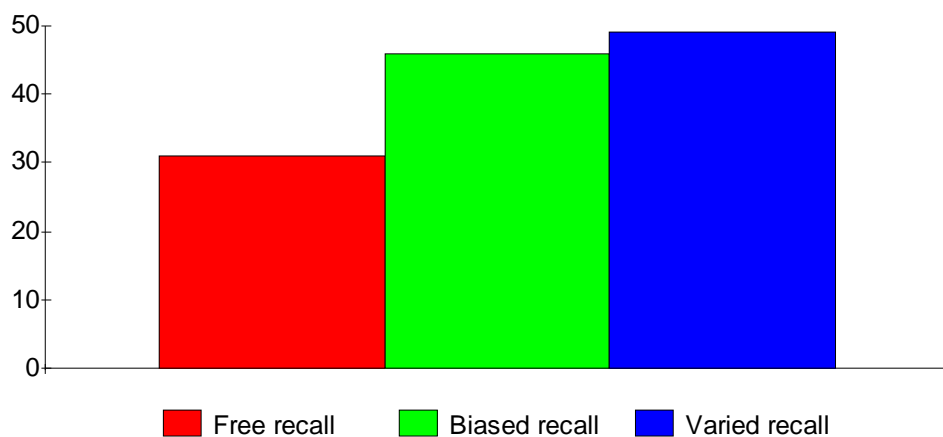
5.4. FUTURE

Morewedge et al (2005) began: "A substantial body of research suggests that people tend to overestimate the intensity and duration of their affective reactions to future events... People expect to feel worse after negative events and better after positive events than they actually end up feeling, and this is true even when the future events are similar to ones they have experienced in the past" (p626). This is called "impact bias" (Morewedge et al 2005).

Forecasting personal future feelings depends on the recall of relevant past events. Morewedge et al (2005) investigated this process in three studies.

Study 1 - Sixty-two travellers waiting at a subway station in the USA were asked to "describe an instance in which you missed your train" (free recall condition), or to "describe the worst instance in which you missed your train" (biased recall condition), or to "describe three instances in which you missed your train" (varied recall condition). Then they were all asked to predict how they would feel "if you missed your train today".

The free recall condition predicted significantly more negative emotions if they missed the future train than the other two conditions (figure 5.1).

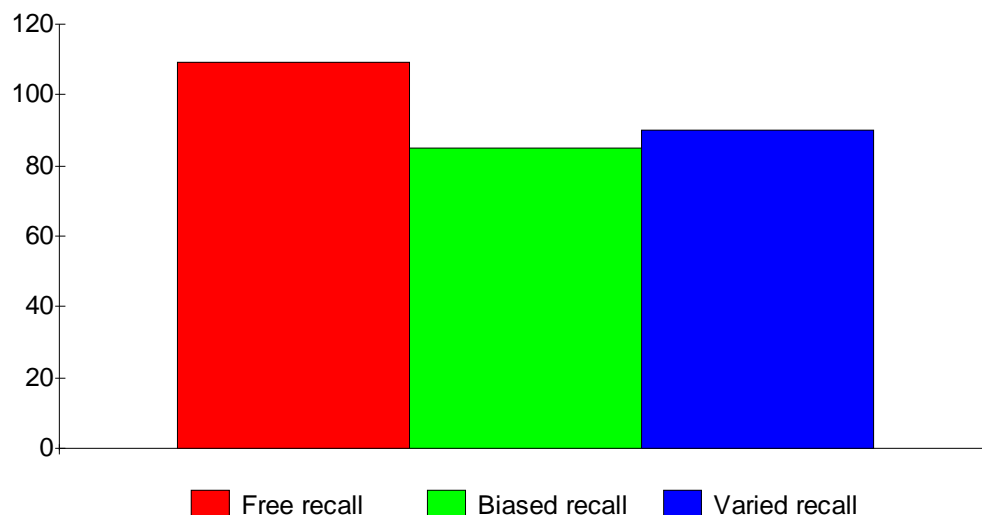


(Data from Morewedge et al 2005 table 1 p627)

Figure 5.1 - Mean prediction of feelings if missed future train (out of 128, where a lower score is more negative).

Study 2 - This experiment used the same three conditions as above with 54 football fans before a game. The recall task was about a game their team had won, and the prediction was how good today's game would make them feel.

Participants in the free recall condition predicted significantly more positive future feelings (figure 5.2).



(Data from Morewedge et al 2005 table 1 p627)

Figure 5.2 - Mean prediction of feelings about the game to come (out of 128, where a higher score is more positive).

Study 3 - This experiment involved 117 baseball fans prior to a game in three conditions. The free recall condition was thinking about a game won, while the biased recall condition was the best win seen, and there was a no-recall control condition. All participants were asked to predict their enjoyment of the upcoming game.

Free recallers predicted significantly more enjoyment than biased recallers, but not than the control condition.

The studies showed that in the free recall conditions "highly available but unrepresentative memories of the past" were remembered, and this influenced the prediction of the future via the "impact bias". the biased recall conditions focused on specific events, and so individuals had a more representative picture of the past, and consequently of their prediction of the future. So, in Study 1, recalling the worst instance gave them a better perspective on the past (ie: only one train was that late) than general recall of late trains than came to mind.

On the other hand, thinking about positive past events in the free recall condition can lead to a more positive view of the future.

Morewedge et al (2005) ended: "It is not difficult to understand why people make mistakes when trying to forecast their affective reactions to novel events, but researchers have struggled to explain why people often seem to make the same mistakes when forecasting their affective reactions to events they have experienced before. The tendency to recall and rely on atypical instances may help explain this otherwise puzzling phenomenon. If people remember last year's family vacation by recalling its rare moments of satisfaction, then they may make predictions and plans accordingly, only to find themselves once again eating stale sandwiches at an overcrowded campground and wondering how they managed to learn so little from their previous visit" (p629).

5.5. THEODIVERSITY

"Theodiversity" is a term used to describe the "diversity in religious beliefs, behaviours, rituals and traditions" (Norenzayan 2016 p466) among humans today and throughout history.

One estimate is 10 000 different religious traditions in the world today, which vary from "gods with no power" to "the Big God of the Abrahamic faiths who knows everything, cares deeply about how people treat each other, punishes violations of norms no matter where they occur, and instils fear and awe among adherents"

(Norenzayan 2016 p466).

Norenzayan (2016) outlined two "critical features" of theodiversity:

i) Biological and psychological regularities that underlie the diversity.

These include:

a) Cognitive processes - eg: "teleological bias" ("the domain-general intuition that people, things, and events reflect purpose and design"; Norenzayan 2016 p469); anthropomorphism ("the cognitive tendency to project human-like traits to the non-human world"; Norenzayan 2016 p470); "mentalising" ("a suite of cognitive tendencies to detect and infer the content of other minds"; Norenzayan 2016 p470). Together these and other cognitive processes place meaning on the world.

b) Motivational processes - eg: "hazard precaution" (Boyer and Lienard 2006). This is a motivation triggered when there is a threat (real or symbolic) to safety or purity, and could underlie ritual patterns. Legare and Souza (2014), for example, found that individuals who thought about randomness perceived rituals as a more effective way to gain control (appendix 5A).

c) Cultural learning processes - eg: the transmission of beliefs via "credibility enhancing displays" (Henrich 2009). These are "extravagant, sometimes costly behaviours that cultural models display, conveying underlying beliefs to cultural learners" (Norenzayan 2016 p471). Imitation is an important behaviour seen in children from a young age.

ii) Theodiversity helps in the understanding of "the cultural history of many psychological processes" (Norenzayan 2016p467).

Part of this is the move "from small gods to big gods", which Norenzayan (2016) described thus: "In small-scale societies, where face-to-face interactions are the norm, people build co-operative communities that draw on kin altruism, reciprocity, and a rich repertoire of local cultural norms that enforce co-operation... – without needing to lean on watchful, interventionist gods. But as societies scale up and groups get too large, anonymity rapidly invades interactions, and free riding threatens to undermine co-operation. Similarly, societies with greater exposure to ecological threats, such as water scarcity and climatic instability, face collective action problems that, if not curbed by cultural norms, can be fatal to the survival of the group... These conditions therefore promote widespread belief in watchful gods and other norm-enforcing practices that contribute to

maintaining large-scale pro-sociality" (p473).

Another aspect is the attribution of cause and blame as in the focus on intention or consequence of an action. Laurin and Plaks (2014), for instance, found that religions classed as "orthopraxy" (eg: Hinduism) (with the emphasis on practice and ritual) were more critical of unintended bad behaviour (ie: consequences) than religions classed as "orthodoxy" (eg: Protestant Christianity) (with the emphasis on belief and dogma) (Norenzayan 2016). But, in other research (Cohen and Rozin 2001), Protestants were harsher on intentions (irrelevant of the consequences) than Jews ²⁶ (Norenzayan 2016).

Whitehouse (2019) asked whether religion has been good or bad for humanity. Answers usually depend on how "good" or "bad" is defined. For example, if co-operation in society is seen as good and non-co-operation as bad, then religion encourages the former. Though societies vary in what they see as "co-operation" (Whitehouse 2019).

"Seshat" is a database set up to collect information on societies around the world and throughout history (eg: Turchin et al 2012).

Using its data, studies (eg: Turchin et al 2018) suggested that the development of "moralising ideologies" in the "Axial Age" (1st Millennium BC) ²⁷, for instance, was not linked to the rise of sizeable co-operative civilisations (Whitehouse 2019).

But the development of shared rituals is important for social cohesion (Whitehouse 2019).

5.6. APPENDIX 5A - LEGARE AND SOUZA (2014)

Legare and Souza (2014) stated: "Re-establishing feelings of control after experiencing uncertainty has long been considered a fundamental motive for human behaviour. We propose that rituals (ie: socially stipulated, causally opaque practices) provide a means for coping with the aversive feelings associated with randomness due to the perception of a connection between ritual action and a desired outcome" (p152).

Technically, rituals provide an "illusion of control" (Langer 1975). This is where "people believe or respond as if contingencies between their behaviour and the outcome exist, even if the outcomes are random" (Legare and Souza 2014 p155).

Legare and Souza (2014) performed two experiments -

²⁶ Judaism is classed as a orthopraxy religion (Norenzayan 2016).

²⁷ The time of many of the great religious founders (eg: Buddha, Confucius).

one in Brazil and one in the USA. In the former study, the researchers made use of a common ritual called "simpatia", used to solve everyday problems (eg: illness; attracting a romantic partner). The researchers described a common simpatia: "In the first day of last quarter phase of the moon, take the milk from a coconut and give it to the affected person to drink. After that, ask the person to spit three times in the hole made in the coconut. Following this, light up a brand-new white candle and drop the wax around the hole until the hole is sealed. Take the coconut to a far away beach or river" (p154).

In the experiment, forty residents of the city of Belo Horizonte in Brazil were randomly allocated to the two conditions. Initially, a task of solving sixteen scrambled sentences was presented. The independent variable was the wording of the sentence - related to randomness (words like chaotic) or negativity (eg: lazy). Then the participants were told about six simpatias paired with specific problems, and asked to rate the effectiveness of the ritual in solving the problem (on a ten-point scale where 1 = effective). This was the dependent variable. Participants in the "randomness" condition rated the simpatias as significantly more effective than the "negativity" condition.

In the second experiment, the materials were adapted for use with 94 US undergraduates. A control condition was added where the unscrambled sentences produced neutral words. The rituals were rated as significantly more effective in the "randomness" condition again (figure 5.3).

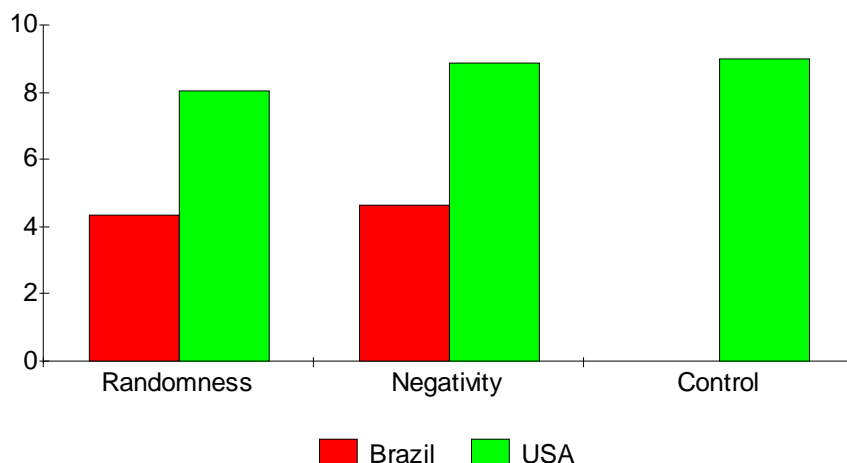


Figure 5.3 - Mean rating of effectiveness of simpatias (out of 10, where 1 = effective).

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6. URBAN LIVING, AND SOCIAL FACTORS AND MENTAL DISORDERS

- 6.1. Environmental factors
- 6.2. Mechanisms
- 6.3. Specific factors
- 6.4. Psychosis and migration
- 6.5. Air pollution
 - 6.5.1. Pollution inequity
- 6.6. Appendix 6A - Debt
- 6.7. References

6.1. ENVIRONMENTAL FACTORS

Van Os et al (2010) described psychotic disorders as "disorders of adaptation to social context to emphasise the role of social factors in their development (eg: growing up in an urban area; the position of a minority group; developmental trauma). These social factors have "all been shown to induce altered dopamine neurotransmission and sensitisation of mesolimbic dopamine neurons in early adulthood, resulted in augmented expression of psychotic-related phenotypes" (Van Os et al 2010 p207). Note that the social factors are seen as interacting with genetic factors.

Commenting on causality, Van Os et al (2010) stated: "In humans, experimental support for causality, in the sense of randomised allocation to exposure, is only possible for acute outcomes such as induction of transient delusions or hallucinations or cognitive impairment following experimental cannabis use, experimental stress or other experimental situations. Causality from observational studies maybe inferred using criteria of consistency of the association, temporal order (that is, the exposure precedes the outcome and reverse causality is ruled out, for example early psychotic symptoms causing cannabis use rather than the other way round), evidence for dose-response (more exposure results in progressively greater risk) and a plausible link to underlying biological and cognitive mechanisms" (p204).

Table 6.1 summarises the type of research evidence for different social factors, according to Van Os et al (2010).

Soderstrom (2019) reflected on a "specific sense of embodied precarity" experience by individuals with a diagnosis of schizophrenia living in the city. The study involved twenty participants walking around Lausanne in Switzerland talking to the researchers ("walk-alongs").

The term "precarity" "conjures life worlds that are infected with uncertainty and instability" (Waite 2009),

| FACTOR | TYPE OF EVIDENCE |
|-------------------------|--|
| Urban environment | Meta-analysis. Longitudinal studies of natural experiments - eg: moving from urban to rural environment in childhood reduces risk of psychosis compared to staying in urban areas. |
| Minority group position | Meta-analysis suggests that "it is not ethnic group per se that increases risk but rather the degree to which one occupies a minority position, or stands out in relation to the wider social community" (Van Os et al 2010 p204). |
| Developmental trauma | Systematic reviews of natural experiments and (semi-) prospective studies, and control of confounders (eg: asking patients about past traumas). |
| Cannabis use | Meta-analysis of case-control, longitudinal and cross-sectional studies. Randomised experimental studies show transitory psychotic symptoms in healthy volunteers. |

Table 6.1 - Type of evidence on key social factors and psychosis.

while Ettlinger (2007) believes it "inhabits everything from the global political economy to the vicissitudes of employment, health, social relations, self perception" (quoted in Soderstrom 2019).

Applied to individuals diagnosed with schizophrenia: "Episodes of crisis create serious impairment and become chronic for a third of the persons living with such a diagnosis. Hallucinations and delusions that can be present even under medication, the fear of new severe crises, efforts to avoid stress factors, are part of everyday life. Other dimensions of precarity are related to these health issues: low income, unemployment, poor housing conditions or homelessness are often consequences (and also important causes) of the onset of schizophrenia... The same is true in relation to social isolation and loss of social capital... Therefore, precarity as experienced by persons living with a diagnosis of schizophrenia is very frequently multi-dimensional and intersectional, and dimensions of precarity are often mutually reinforcing in their effects. They are 'synergistic, not additive' (Cromby 2015)" (Soderstrom 2019 p81).

Soderstrom (2019) noted certain behaviours by the participants in response to the city, which including "home-making" ("creating zones of comfort"; Soderstrom et al 2017), and "programming trajectories" (ie: planning journeys carefully). For example, "Benoit" explained the latter strategy: "Here I cut the city to take a quieter

side-street with less density [...] I avoid noise and density: the more people you have, the noisier it gets. [...] Because with the voices that speak to us in our head it makes an additional noise, it depends how many you have in your head. If you add the external noise, after three or four hours, even with medication, I have to leave. So here, on purpose, I cut the density of the city" (p85).

6.2. MECHANISMS

The urban environment is "one of the (proxy) environment risk factors for psychotic disorder" (Frissen et al 2017 quoted in Manning 2019). But how and why?

The "why" relates to the factors about the urban environment that are involved (eg: stress of urban life; competition and "social defeat"), and the "how" is identification of mechanisms to explain the process. Illari and Williamson (2012) stated: "A mechanism for a phenomenon consists of entities and activities organised in such a way that they are responsible for the phenomenon" (quoted in Manning 2019).

Keyes and Galea (2017) argued for a "causal architecture" to understand the underlying mechanisms, while Krieger (2011) recommended an "ecosocial theory" to describe social, ecological and historical factors (beyond the individual-level causes) ²⁸.

Manning (2019) considered seven mechanisms (or strategies) to explain urban life and mental disorders:

i) "Include everything" - Network Episode Model (NEM III R) (eg: Pescosolido 2006). This model combines both biology and sociology in the following way:

"(1) Consider and articulate the full set of contextual levels documented to have impact.
(2) Offer an underlying mechanism or 'engine of action' that connects levels.
(3) Employ a metaphor and analytic language familiar to both social and natural science.
(4) Understand the need for and use the full range of methodological tools" (Pescosolido 2006 quoted in Manning 2019).

ii) "Cut through on a clear path" - Socio-economic status (SES) or social class as the "fundamental cause" (Link and Phelan 1995), or, more precisely, inequalities experienced through SES (eg: disadvantage, deprivation,

²⁸ Read et al (2009) criticised the biological approach as the "bio-bio-bio model".

discrimination; appendix 6A).

iii) "Social psychology of small groups" - Processes that occur through small groups including "everyday" stereotyping and discrimination, which produces "social defeat".

iv) Lack of social capital - eg: little peer support; poor quality neighbourhood; low parental involvement with children.

v) "Interaction ritual chains" (Collins 2005) - Negative (and positive) emotions are passed through social by emotional contagion and through everyday interactions.

vi) "Biology led mechanism" - Concentration on the physiological stress reactions caused by urban life. Stress builds up until some individuals reach a "cracking point", for instance.

vii) A positive approach - Manning (2019) emphasised that "mechanisms are not merely aggregates of factors, or elements of scaffolds, but that they capture 'emergent' properties that are organised in very specific ways" (p17). Investigating the factors and how they interact and emerge in lived experience, particularly in a negative way in the urban environment, can be helpful.

Manning (2019) ended: "But where does this leave us? It is far easier to question the factors, elements, mechanisms, associations etc of others than to create something new. What is stress? Social capital? Socio-economic status? How do the microbiome, vagal nerves, and the HPA [hypothalamic-pituitary-adrenal] axis interact? What is and how does trauma work? Even if we understood these processes completely, what could we do? One way we might think about this is by turning in the other direction, away from the damages that urban life inflicts, towards an 'urban utopianism based around four registers of solidarity woven around the collective basics of everyday urban life. These are "repair", "relatedness", "rights" and "re-enchantment"' (Amin 2006 p1009). Perhaps these could be the inspiration for new ways of thinking" (p18).

6.3. SPECIFIC FACTORS

Selten and Cantor-Graae (2005) argued that "social defeat" can have negative mental health consequences. They noted that a male rat (the intruder) placed in the cage of a resident male is attacked and becomes submissive. This defeat produces changes in dopamine in the brain of the intruder (and these changes in the long-

term can affect mental health).

Luhrmann (2007) developed this idea to explain higher rates of psychosis among the homeless, for example. Put simply, "the daily experience of survival with serious psychotic illness is one of repeated social failure" (Luhrmann 2007 p149).

Luhrmann (2007) outlined the experience of homeless women at a drop-in centre in Chicago with its everyday humiliations (eg: negotiating the "tangle of shelters, clinics, soup kitchens, and charities" and the "relentless patter of demeaning encounters"). Luhrmann (2007) explained: "It may be because of these humiliations, large and small, that homelessness becomes such a corrosive, punitive identity. Whatever the cause, the identity is toxic. It is clear that the women hate the label, and that they associate homelessness with a profound sense of loss and failure. Partly it is the experience of homelessness that they hate. As one homeless woman told me, 'Homelessness is hell. You ever wondered what hell is like? This is it'. But they also hate the very idea of homelessness, which evokes a crushing sense of failure" (pp159-160).

6.4. PSYCHOSIS AND MIGRATION

Psychosis rates are higher among migrants and minority ethnic populations as compared to the indigenous population. "A common question about these findings is whether they are valid or whether they are a function of methodological artefact or misdiagnosis" (Morgan et al 2010 p656).

Morgan et al (2010) addressed the possible answers:

i) Methodological artefact - "As studies have become more robust (with comprehensive case finding, accurate population denominator data, and standardised procedures for diagnosis), most practical methodological concerns have been addressed" (Morgan et al 2010 p656).

ii) Misdiagnosis - For example, individuals are diagnosed with psychosis when "expressing culturally appropriate emotional distress in response to difficult life circumstances" (Morgan et al 2010 p656). Misdiagnosis is always a possibility, but it cannot explain the differences in rates of psychosis fully.

iii) True - In this case, how to explain the differences in rates. Morgan et al (2010) considered the following individual explanations:

a) Selective migration - Individuals with a predisposition for psychosis are more likely to migrate. Unlikely, as "intuitively it seems reasonable to expect

that the cognitive deficits and negative symptoms that are often evident prior to the onset of schizophrenia (and which are assumed to reflect underlying genetic and neurodevelopmental risk) will in fact reduce the likelihood of successful migration" (Morgan et al 2010 p656).

b) Genetic - No evidence of a greater genetic risk for psychosis in migration or ethnic minority populations.

c) Neurodevelopment - eg: viral infection during pregnancy more common in the home country of migrants. No direct evidence.

d) Substance use - Substance use is greater among ethnic minority populations and this could cause psychosis. But, for instance, the "evidence to date is weak, with no studies having taken into account age of first use or duration, amount, and type of cannabis used" (Morgan et al 2010 p658).

e) Other - eg: the impact of migration; stressors like unemployment; discrimination.

Morgan et al (2010) proposed a socio-developmental pathway which combined a number of the above explanations, including developmental factors (eg: early neurological insults; childhood adversity), genetic susceptibility, and social factors in adulthood (eg: urban living; migration experiences).

6.5. AIR POLLUTION

The ultra-fine ambient particulate matter of air pollution is a threat to human health, both physical and mental. The physical health risk is better known, but air pollution could effect the central nervous system (ie: cross the brain-blood barrier) and so mental health. For example, adult anxiety and depressive symptoms have been linked to ambient photochemical oxidants ²⁹ in California (eg: Jacobs et al 1984).

Oudin et al (2016) concentrated on children and adolescents in a Swedish study. Data for 2007 to 2010 for four different counties were amassed. Mental health was measured by the number of prescriptions for medicine related to psychiatric diagnoses for under eighteens. Three measures of air pollution from official sources

²⁹ "Secondary pollution" create when sunlight interacts with pollutants in the atmosphere.

were used.

Neighbourhood air pollution concentration was positively associated with the prescription data (after controlling for variables like socio-economic status) in three of the four counties. The exception was an area in the north of the country where air pollution is lower.

The measure of mental health was "very crude", the researchers accepted, as the data were divided into prescription or not. More detailed information would be desirable, including the number of dispensed medications per year. Annual mean pollution concentrations were used, and this assumed that the concentration was similar throughout the study period.

On the plus side, the study had a large sample (n = 552 221), and a longitudinal design.

Newbury et al (2019) were even more focused in their study - adolescents and psychotic experiences - using data from the Environmental Risk (E-Risk) Longitudinal Twin Study. This is a study involving 2232 twin children born in England and Wales in 1994-1995.

The participants have been assessed regularly, and at 18 years old, they were asked about thirteen psychotic experiences (eg: "Have you ever thought you were being watched, followed, or spied on?"; "My thinking is unusual or frightening") since 12 years old. Air pollution estimates were based on home address at seventeen years old from official data.

Overall, "adolescents exposed to the highest (top quartile) annual levels of air pollution reported higher rates of psychotic experiences than adolescents exposed to lower levels of pollution" (Newbury et al 2019 p617)

³⁰.

The researchers accepted certain limitations with their study, including:

- Psychotic experiences self-reported and not clinically verified.
- Air pollution data was available for one point in time, and not earlier, so the researchers "were not able to examine the associations of early-life or cumulative exposure to air pollution with psychotic experiences" (Newbury et al 2019 p620).

Two possible explanations have been proposed for such findings (Vaughan 2019):

³⁰ The researchers controlled for potential confounders, like family and neighbourhood factors, in their analysis.

a) Air pollution is linked to brain inflammation and degeneration, which is the basis to psychosis.

b) Air pollution is caused by road traffic in the main, and this produces noise pollution. Noise pollution disrupts sleep and increases stress, which lead onto psychosis.

6.5.1. Pollution Inequity

Fine particulate matter (PM2.5) air pollution exposure is estimated to be responsible for 3% of all deaths in the USA, and for nearly two-thirds of deaths from environmental causes (Tessum et al 2019). But this risk is inequitably distributed among racial-ethnic groups - a "pollution inequity" - based on pollution concentrations in different areas, and consumption of goods and services that cause such pollution (Tessum et al 2019) ³¹.

Tessum et al (2019) calculated that "in the United States, PM2.5 exposure is disproportionately caused by consumption of goods and services mainly by the non-Hispanic White majority, but disproportionately inhaled by Black and Hispanic minorities" (p6001). Non-Hispanic Whites experienced a "pollution advantage" (ie: around 17% less air pollution exposure than caused by their consumption), while Blacks and Hispanics have a "pollution excess" (of 56% and 63% respectively).

These calculations were based on two key elements - the rate of pollution based on consumption, and the geographical distribution of pollution. Also the assumptions were made that at a population-level, Non-Hispanic Whites are richer (ie: consume more) than the other groups, and Blacks and Hispanics are more likely to live in higher pollution areas.

6.6. APPENDIX 6A - DEBT

Montgomery and Tepe-Belfrage (2019) explored the "different manifestations of the emerging politics of debt in the wake of the 2007-08 financial crisis" (p310) with interviews with campaigners and policy advocates, and analysis of self-help debt literature

³¹ Boyce et al (2018) observed: "When people who could benefit from using or abusing the environment are economically and politically more powerful than those who could be harmed, the imbalance facilitates environmental degradation. And the wider the inequality, the more the damage. Furthermore, those with less power end bearing a disproportionate share of the environmental injury" (p67). In an analysis of all US States, Boyce et al (1999) found that wider economic inequality was associated with weaker State environmental policies.

³². In relation to household debt ³³, themes included:

- "Call to care about debt" - What debt is doing to the debtor, "not just counting money but also the emotional and unpaid labour dedicated to managing indebtedness in everyday life" (Montgomery and Tepe-Belfrage 2019 p313).
- "Call to act against debt" - eg: self-help materials encourage "sticking to a budget".
- The desire to achieve freedom from the harm of indebtedness - eg: 12-step programme designed by "Debtors Anonymous" along the lines of those for alcoholism.

The themes showed how debt was experienced (ie: "the debt space"; Harker 2017). Montgomery and Tepe-Belfrage (2019) observed: "A desire for freedom breeds action against the claims that debt makes. These actions include paying it down, diverting expenditures, defaulting, repudiating, cancelling, or paying it off altogether. Each of these are strategies of resistance to the moral authority of debt simultaneously delegitimising public and private logics of austerity" (p309).

Focusing on the social reproduction of debt on households, Montgomerie and Tepe-Belfrage (2017) showed the everyday experience of "caring for debts" with this comment from an Internet debt discussion forum: "My wife knows that we have a lot of debt as a chunk of it is in her name. She also knows that I have a lot in my name. She is a stresser and I haven't told her the awful grand total although she could work it out if she really wanted to know. I would like to be more open but it would cause her great stress (she is a terrible worrier) and quite frankly I am not sure that our relationship is strong

³² Fraser (2014) described the "triple crisis" of the West since the financial crisis: "There is, first, the ecological strand of crisis, reflected in the depletion of the earth's non-renewable resources and in the progressive destruction of the biosphere, as witnessed first and foremost in global warming. There is, second, the financialisation strand of crisis, reflected in the creation, seemingly out of thin air, of an entire shadow economy of paper values, insubstantial, yet able to devastate the 'real' economy and to endanger the livelihoods of billions of people. Finally, there is the strand pertaining to social reproduction, reflected in the growing strain, under neoliberalism, on what some call 'care' or 'affective labour', but what I understand more broadly as the human capacities available to create and maintain social bonds, which includes the work of socializing the young, building communities, of reproducing the shared meanings, affective dispositions and horizons of value that underpin social co-operation" (quoted in Montgomerie and Tepe-Belfrage 2017).

³³ The UK response to the financial crisis was "austerity", which involved a sharp reduction in state funding of the "household sector" (eg: benefits), but increasing funding of financial markets (eg: Quantitative Easing programme) (Montgomerie and Tepe-Belfrage 2017). This latter aspect is financialisation, which "relied on cheap credit to fuel an asset bubble and accompanying debt" (Montgomerie and Tepe-Belfrage 2017 p654).

enough to deal with the inevitable stress fuelled arguments. I love her and want to get us out of this. She contributes but prefers me to deal with the payments etc and this suits me" ("Money Saving Expert" April 2015; p660).

This is an example of the emotional experience of debt, and it showed "how debt interferes with and disrupts the intimacies of life, and in doing so erodes its own moral economic claim as a priority obligation within the household economy. These are the limits of financialisation because if debts are not 'cared for' they are non-performing. And, non-performing loans - as it turns out - cause catastrophic failures in financialised global markets. This alone makes understanding the household economy relevant to why neoliberalism is failing" (Montgomerie and Tepe-Belfrage 2017 p653).

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7. SOCIO-ECONOMIC STATUS AND OBESITY

- 7.1. Theory
- 7.2. Research
- 7.3. Subjective social status
- 7.4. References

7.1. THEORY

There is an inverse relationship between socio-economic status (SES) and obesity (ie: individuals with higher SES are less likely to be obese and vice versa). Kaiser et al (2012) tried to explain this "curious conjecture" from an evolutionary perspective. Animals (including humans) raised in an environment of uncertainty about future food use "life strategies to build and preserve energy stores to the extent that they... buffer against true food scarcity that may occur later" (quoted in Pavea et al 2019) ³⁴.

Claassen et al (2019) reviewed twenty-two studies, and found limited support for perceived future uncertainty as mediating the relationship between SES and body weight. But many of the studies had methodological weaknesses (Pavea et al 2019).

Other explanations of the relationship between SES and obesity include limited access to healthy foods for poorer individuals. "However, a nutritious diet does not need to cost more than a less nutritious diet, notably in European countries..., and programmes reducing the financial cost of healthy foods through food vouchers or tax reductions show unsubstantial effects on nutrition and weight outcomes... Likewise, supermarket density is high in Europe making a variety of food outlets easily accessible... And two recent publications showed that in the US, neither actual nor perceived availability of (fast) food outlets was related to fast food consumption... or BMI [body mass index]" (Claassen et al 2019 p208).

There are also gender differences in the relationship between SES and obesity. "The pressure to be thin is highest for women on the top end of the SES spectrum: While larger female body shapes are subject to stigmatisation, larger sizes among men are associated with power and dominance... This is, for instance, apparent in work settings where men with higher incomes work more hours and exercise less, whereas women with higher incomes exercise more often" (Claassen et al

³⁴ The "insurance hypothesis" (Nettle et al 2017). The idea that this applies only to lower SES individuals has been called the "resource scarcity" hypothesis (Dhurandhar 2016).

2019 p209).

While lower SES is stigmatised, and this can lead to more negative emotions, and the intake of high-calorie "comfort" foods (ie: stress-induced weight gain).

Altogether, Claassen et al (2019) considered three possible pathways between SES and BMI;

- Via environmental factors - environment and social disadvantage (eg: less money to buy good-quality food (economic hypothesis); lack of availability of healthy foods (availability hypothesis)).
- Via psychological factors (eg: stress-induced weight gain).
- Via environmental and psychological factors combined (psychosocial).

In twenty-two studies that covered these pathways, Claassen et al (2019) found "distinct associations between SES, psychosocial factors, and BMI across genders... [ie:] the relationship between SES and BMI is negative and consistent among women, but inconsistent or non-significant among men, depending on the SES indicator used" (pp210, 211).

Claassen et al's (2019) overall conclusion was "the findings provide inconclusive evidence due to significant limitations in research designs and mediation testing, the limited amount of studies per psychosocial factor, and the mixed results as a consequence of inconsistent use of types of samples, SES indicators, and measures across studies" (p215). However, the combination of environmental and psychological factors was the strongest mediator of SES and BMI (of the three pathways outlined above).

Caldwell and Sayer (2019) argued that evolutionary explanations need to be more complex, and they distinguished between proximate, ultimate, phylogenetic, and developmental levels of analysis ³⁵.

i) Proximate factors or level of analysis - These are "observable, measurable factors that are closely or immediately linked to the behaviour or outcome of interest" (Caldwell and Sayer 2019 p239) (eg: availability and economic hypotheses).

Caldwell and Sayer (2019) noted that "studies have yielded important findings regarding how neighbourhood-level food availability and the price of healthy foods

³⁵ These are based on Tinbergen (1963).

potentially influence eating behaviours among lower SES/social status individuals. However, public health interventions to improve availability or provide financial resources for healthy foods have yielded inconsistent results" (p241).

ii) Ultimate factors or level of analysis - The evolutionary adaptive function of behaviours.

"In general, humans and other non-human primates are expected to have evolved behavioural and physiological mechanisms that favour fat storage in order to fuel our large, metabolically expensive brains, even during times of food scarcity... Hedonic and homeostatic mechanisms that regulate intake and energy balance, hunger, satiation, overeating, frequent eating, and eating in the absence of need are all potential mechanisms that have evolved in humans to favour fat accumulation and storage because they would be adaptive in environments that lacked the food abundance that characterise modern environments... In modern environments, those mechanisms instead increase the risk of obesity and chronic disease" (Caldwell and Sayer 2019 p241).

This explains obesity in all humans, but what about the SES differences? Caldwell and Sayer (2019) suggested that humans are also sensitive to cues of social status. These authors quoted evidence from the Moving to Opportunities (MTO) project in the USA (Ludwig et al 2011). Individuals in high-poverty neighbourhoods were given the opportunity to move to low-poverty ones, and compared to controls, they showed reduced rates of obesity.

iii) Phylogenetic (or comparative) factors or level of analysis - The examination of traits or behaviours between species to show how they are preserved over evolutionary time.

Animal studies show that lower status individuals are more stressed and eat more (eg: macaques). In social hierarchies dominant individuals eat first, and have less risk of starvation. In other words, however little food is available, they will always eat. But food scarcity is a greater risk for subordinate individuals as they may not eat. Consequently, subordinates eat as much as possible when available.

iv) Developmental factors or level of analysis - This is "the ways developmental environments (including in utero) interact with genetic predispositions to shape a range of possible phenotypes that maximise the likelihood of reproductive success and survival in environments similar to developmental ones" (Caldwell and Sayer 2019 p239).

For example, "the thrifty gene hypothesis": "It is hypothesised that maternal cues of constrained resource

availability were likely to signify future environments with unstable resource availability, and therefore it was adaptive to shift reaction norms to develop a suite of metabolic characteristics that help buffer against hard times with: increases in fat accumulation, lower muscle mass, insulin and leptin resistance, lower vascular density, compact body shape, and earlier reproductive age" (Caldwell and Sayer 2019 p244).

In the end, Caldwell and Sayer (2019) argued for "more integrative and thorough interpretations of existing empirical studies that integrate across the four levels of analysis" (p246).

7.2. RESEARCH

Nettle et al (2019) considered the evolutionary argument discussed above in relation to food insecurity. They stated: "Food insecurity (FI), defined as the limited or uncertain ability to acquire nutritionally adequate and safe food in socially acceptable ways..., is associated with high body weight for women but not men in affluent Western societies" (Nettle et al 2019 p222).

But is this because food insecure individuals eat more when food is available, or have lower energy expenditure (ie: less active), or both?

Nettle et al (2019) investigated the first possibility in a study with 126 participants (mostly students) at an English university. The participants were offered as much of three energy-dense snack foods (salted popcorn, ready salted crisps, milk chocolate) as they wanted under the pretext of a "taste" test. Afterwards, the participants completed a questionnaire about their experiences of childhood and current FI (table 7.1).

- Did you worry about food supplies running out?
- Did you ever not eat for a whole day?
- Were you ever unsure where your next meal would come from?
- Did you ever find that good quality food was not available?
- Were your cupboards always full?

(Source: Nettle et al 2019 appendix A)

Table 7.1 - Example of questions about FI.

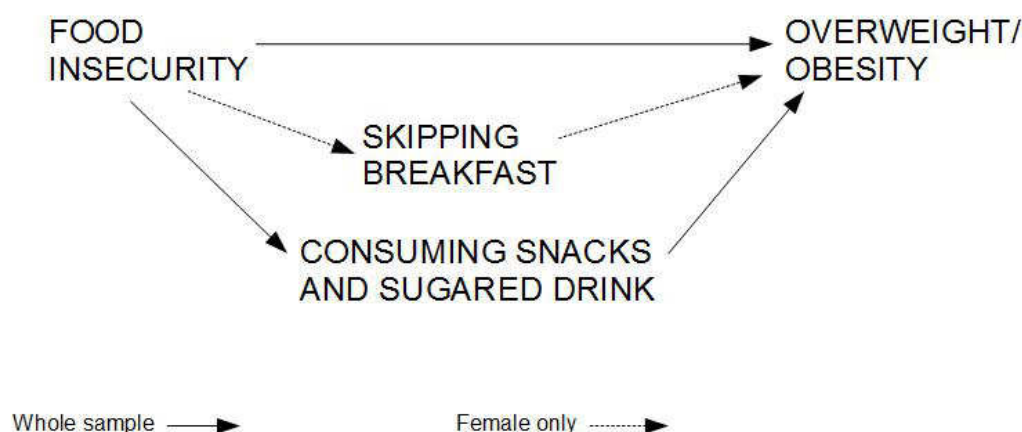
The mean calories consumed was 155, but there was a range of 5 to 563. There was a positive correlation between current FI and calories consumed and BMI for female participants only, and this relationship was stronger when childhood FI was added. Also higher FI

participants of both sexes rated liking chocolate more.

Nettle et al (2019) pointed out a key limitation: "Ours is a correlational study, and from correlational data alone, it is not possible to make strong inferences about causality. Adult and childhood FI might causally impact eating and weight, but there are other possible pathways by which the associations we observe could come about. For example, a liking of or habitual consumption of energy-dense snack foods may cause differences in regularity of food intake, manifest as a higher FI score. Alternatively, both FI and liking or consumption may be influenced by some unmeasured third variable. The only way to advance causal understanding in this area will be to find ways of experimentally manipulating FI" (p228).

Wu et al (2019) reported data on FI and weight from the Taiwan Database of Children and Youth in Poverty study. Specifically, data on 1326 adolescents were analysed (BMI, FI, dietary habits).

FI was associated with the likelihood of overweight/obesity (but there was no relationship between FI and being underweight). For example, those with the highest FI score were nearly four times more likely to be overweight or obese than non-FI individuals. "Those who reported more food insecurity, on average, consumed more snacks and sugared drinks which, in turn was associated with increased obesity. This mediating effect remained evident in the male sub-population. Among females, skipping breakfast mediated the association between food insecurity and overweight/obesity" (Wu et al 2019 p277) (figure 7.1).



(Based on Wu et al 2019 figure 1 p278)

Figure 7.1 - Significant associations found by Wu et al (2019).

Wu et al (2019) commented: "From a social justice perspective, economically disadvantaged populations are disproportionately at risk for food insecurity and struggle the most with access to resources. However, the concept of food insecurity should not solely be perceived as the availability of sufficient food that satiates the sense of hunger, but also must be emphasised on access to nutritious food and healthy dietary behaviours. Seipel et al indicated four main areas for further action against food insecurity: building awareness and interest, promoting principles of human rights, opposing harmful cultural practices against women, and increasing community participation... We may argue that public health sectors should instead promote self-awareness and self-efficacy among vulnerable populations regarding the importance of adopting healthy dietary behaviours, like having breakfast regularly and avoiding calorie-dense foods. On the other hand, poverty or socio-economic status per se, which underlies the cause of food insecurity, may critically drive these behaviours and/or directly associate with obesity... In this sense, interventions that focus on education and adoption of dietary habits alone may not be sufficient to address the underlying problem, and thus less successful" (p280).

In other real-life research, Cote-Lussier et al (2019) investigated the dietary habits of adolescents in the Quebec Longitudinal Study of Child Development in Canada, based on relative and absolute deprivation.

Relative deprivation was calculated for individuals as "their household family income relative to the household income levels of individuals living within a 1-km radius from their home" (Cote-Lussier et al 2019 p268) (known as the Yitzhaki index). Absolute deprivation was also measured using total household family income. The participants were 1290 12-14 year-olds, who reported frequency of consumption of "healthful foods" (eg: fruits, vegetables) and "unhealthful foods" (eg: soft drinks, sweets).

Absolute deprivation was negatively associated with healthful food consumption, except for individuals who reported symptoms of depression had less healthy consumption altogether. Surprisingly, relative deprivation was positively associated with healthful food consumption. Cote-Lussier et al (2019) explained that the findings may be "in part due to the measure of relative deprivation, which considered youths' deprivation in relation to those in their immediate neighbourhood. It is likely that this measure also partly captured social and physical aspects of the neighbourhood. In particular, it appears as though youth residing in neighbourhoods with 'better off' peers (ie: youth experiencing higher relative deprivation) had greater reported healthful food consumption. This finding may suggest that these youth

benefited from greater access to healthful food options (eg: more supermarkets)... and may adhere to more favourable cultural norms promoting healthful food consumption. Yet, there was some indication that living among 'better off' peers was also associated with reporting consuming more unhealthful foods (eg: soft-drinks, snacks, sweets), although this association was not significant when also taking into account absolute deprivation" (p271).

Cote-Lussier et al (2019) summed up: "The results suggest that those with the highest levels of reported healthful food consumption are those who experience low absolute deprivation and low depression, but high relative deprivation... Those who experience the lowest levels of reported healthful food consumption are those who experience high absolute deprivation, but low levels of depression and relative deprivation" (p270).

In terms of consumption of unhealthful foods, Cote-Lussier et al (2019) warned caution as the results were not clear.

The study did not take account of food vendors in the neighbourhoods, and it depended on self-reports of dietary habits (Cote-Lussier et al 2019).

7.3. SUBJECTIVE SOCIAL STATUS

Experiments have tried to manipulate "subjective social status" (SSS), defined as "a person's belief about his/her location in a social order" (Davis 1956 quoted in Wijayatunga et al 2019). For example, Cardel et al (2016) manipulated the status of participants in a "Monopoly" game (ie: "high status" players received more resources). Afterwards, individuals were allowed to eat as much lunch as they wanted. "Low status" individuals consumed an average of 130 calories more than "high status" players. This was only a short-term effect.

Wijayatunga et al (2019) investigated a longer-term effect of SSS. Seventeen female US students kept a food diary for 14 days. SSS was measured by participants placing themselves on an image of a ten-rung ladder in relation to other people in the USA ³⁶. The instructions were as follows: "At the top of the ladder are the people who are the best off - those who have the most money, the most education and the most respected jobs. At the bottom are the people who are the worst off - who have the least money, least education, and the least respected jobs or no job. The higher up are on this ladder, the closer you are to the people at the very top; the lower you are, the closer you are to the people at the very

³⁶ This is the MacArthur scale of Subjective Social Status (Adler and Stewart 2007).

bottom" (Wijayatunga et al 2019 p252).

Six participants rated themselves as 3-5 (lower SSS), and six participants as 7-8 (higher SSS) (with the remainder self-rated as 6).

Lower SSS participants consumed more calories (relative to their energy needs) (ie: positive energy balance) than higher SSS individuals. Note that physical activity was not measured, but the energy needs were estimated for sedentary individuals (Wijayatunga et al 2019).

Manipulating variables in experiments is not easy, nor ethical in some cases, with human participants, but is done with non-human animals. Roman et al (2019), for example, used sixteen unrelated female rhesus monkeys kept in small groups, and of which six were classed by observers as dominant (high social status) and ten as subordinate (low social status) individuals. The availability of food was manipulated.

For fourteen months the monkeys had access to a choice of chow diet (low-fat and low-sugar) or a calorically dense diet (CDD) (high-fat and high-sugar) (choice condition). The CDD was subsequently removed for fifteen weeks (chow-only condition), and returned for the next 15 weeks (back-to-choice condition).

Dominant females did not vary their calorie intake significantly across the three conditions, whereas subordinate females consumed significantly more in the back-to-choice condition (compared to their consumption in the choice and chow-only conditions). Overall, "subordinate females were responsive to the changing dietary conditions, consuming more calories during the two dietary choice phases compared to the chow-only condition" (Roman et al 2019 p234).

Roman et al (2019) concluded that their "present results are consistent with previous data showing female monkeys with a history of psychosocial stressor exposure preferentially consume CDD over chow, become mildly inappetent³⁷ upon removal of the CDD, and subsequently consume even greater amounts of the CDD upon reinstatement of availability. In contrast, dominant females showed no dietary preference and consumed a similar quantity of calories across the changing dietary environments. Within the subordinate females, preference for and increased consumption of CDD was associated with greater weight gain" (p236).

Chan and Zlatevska (2019) investigated SSS and meat preference in three experiments. They stated: "In mankind's evolutionary past, those who consumed meat were strong and powerful and thus man saw meat as indicative

³⁷ Lack of appetite.

of social status. This symbolic connection between meat and status persists today. Thus, based upon psychological theories of compensation, individuals low on subjective socioeconomic status (SES) should have a greater preference for meat, as meat may be substitutable for the status that they lack" (Chan and Zlatevska 2019 p257). This was the hypothesis.

In Experiment 1, 166 meat-eating business students imagined a scenario about their first job after graduation (either well-paid or not), which was the manipulation of SSS (independent variable). Afterwards, the participants were offered "leftover" beef jerky from a previous study to take home (ie: unused packets). The amount taken was measured as the strength of meat preference (dependent variable). The participants in the low-SSS condition took home over twice as much jerky as those in the high-SSS condition.

Experiment 2 involved 179 US meat-eaters recruited from Amazon Mechanical Turk. Participants were told to think of a situation in their lives where they had felt high or low social status, before rating their liking for pork tacos in a "market research" task. Participants were also asked to rate the level of social inequality in their home state.

For individuals who perceived high social inequality, low-SSS participants liked tacos more than high-SSS participants (mean 5.85 vs 4.06 out of 9), but there was no difference between conditions for individuals who perceived low social inequality (mean 4.56 vs 4.79). "This suggests that these individuals' preference for meat is likely driven by their desire for status. Per the 'social rank hypothesis' ³⁸, living in states with high inequality should motivate one to pursue status. If meat is linked to status, then individuals who feel low on subjective SES would like meat more when they see a higher degree of social inequality in their home state" (Chan and Zlatevska 2019 p261).

Experiment 3 replicated the previous experiment with beef burgers (and veggie burgers) instead of tacos, and added a control group who did not imagine a situation. The participants were 296 individuals recruited via Amazon Mechanical Turk. Participants in the low-SSS condition rated significantly higher the preference for beef burgers than the other two conditions, but there was no difference for veggie burgers (table 7.2).

³⁸ This is the idea "that individuals in societies that are unequal in terms of the distribution of income are more concerned with status than those in equal societies... In such a society, low-SES individuals especially want to improve their ranking much more than those in a society that is more equal and status is less concerning or motivating" (Chan and Zlatevska 2019 p260) (eg: Roberts 2011).

| CONDITION | BEEF BURGERS | VEGGIE BURGERS |
|-----------|--------------|----------------|
| Low SSS | 6.77 | 5.20 |
| High SSS | 5.42 | 5.47 |
| Control | 5.50 | 5.55 |

(Data from Chan and Zlatevska 2019 figure 2 p261)

Table 7.2 - Mean preference for burgers (out of 9) in Experiment 3.

The findings of the three experiments confirmed the hypothesis, and the idea of "psychological compensation". Individuals who feel low on SSS (actual SES) compensate by eating meat (perceived as high status).

Similarly, Rucker et al (2012) found that individuals who feel powerless buy soft drinks in larger sizes to compensate.

The key methodological issues with the experiments by Chan and Zlatevska (2019) included:

i) The use of hypothetical scenarios - eg: stated preference for meat in two experiments rather than actual choice. Other ways to measure meat preference include "people's willingness to pay for meat or even the amount of effort (eg: in terms of time or physical effort) that they would 'spend' in order to obtain meat" (Chan and Zlatevska 2019 p263).

ii) SSS was manipulated by participants thinking about their status rather than actually changing the status.

iii) Other variables were not tested - eg: labelling some meat as "gourmet", "as gourmet products will likely signal status more strongly than 'regular' meat" (Chan and Zlatevska 2019 p263), or the preference for meat with other foods. "For example, potatoes are seen as 'cheap' and 'inexpensive' foods and so the presence of meat along with potatoes may affect the perceptions of the meat's status. This is particularly important as meat is not presented and preferred, chosen, or eaten singly but jointly with other foods" (Chan and Zlatevska 2019 p263).

Chan and Zlatevska (2019) continued: "It would also be interesting to determine if our effect would further generalise beyond beef, pork, and chicken onto other meats such as duck or game. It is likely that some types of meats might strengthen or weaken the effect (eg: comparing red meat to non-red meat, given the likely-stronger link between red meat and status). Furthermore, testing our effect with other high-status foods such as seafood would be interesting" (p263).

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8. SOME RECENT RESEARCH ON GREENNESS

- 8.1. Pro-environmental behaviours
- 8.2. Future thinking
- 8.3. Moral persuasion
- 8.4. "Climate compensation"
- 8.5. A good life for all
- 8.6. Forcing change
- 8.7. Energy use and age
- 8.8. References

8.1. PRO-ENVIRONMENTAL BEHAVIOURS

Anderson (2019) interviewed eight individuals, recruited from environmental social media sites, who had been practising at least thirty pro-environmental behaviours for twelve months or more. The key themes from the interviews included:

- Interconnectivity - awareness that all behaviour has an environmental impact.
- Interdependence with the natural environment for survival.
- Strong positive nature connection.
- Adopting and sustaining pro-environmental behaviours.
- Overcoming barriers.

Anderson (2019) noted three mindfulness traits evident in the pro-environmental behaviours of the interviewees:

a) Present-centred awareness - an awareness of inner thought processes and decisions, which helped in changing habitual, automatic, and conditioned negative behaviours.

b) Mindful intention - the use of present-centred awareness to initiate positive behaviour change.

c) Non-judgment - dealing with perceived failures, negative thoughts, and barriers without judging the self and others.

8.2. FUTURE THINKING

Climate change can be viewed as a psychologically distant ³⁹, future threat, and so individuals do not alter their behaviour now. But episodic future thinking (EFT)

³⁹ Liberman and Trope (2008) distinguished four types of psychological distant - spatial or geographical, temporal, social, and certainty.

(ie: "projecting the self into the future to pre-experience future events"; Lee et al 2018 p1) may help.

EFT is distinct from semantic future thinking (SFT), which "involves only semantic knowledge about future events, uses abstract mental representations" (Lee et al 2018 p2).

Lee et al (2018) tested the prediction that "engagement in EFT pertaining to risk events associated with climate change would enhance climate change risk perception and thereby promote the tendency to act pro-environmentally" (p4) in two laboratory experiments.

In the first experiment, 93 students in Taiwan were randomly assigned to an EFT, SFT or control condition. All participants read about negative impacts of global warming on Taiwan (eg: floods; water shortages; seawater intrusion).

Then, in the EFT condition, participants closed their eyes and imagined what they thought were the three most important risks for two minutes. In the SFT condition, participants just wrote down the three risks, and the control group only read the material. Subsequently, a questionnaire about energy-saving pro-environmental behaviours was completed (eg: willingness to turn on air conditioning only at a higher room temperature).

Participants in the EFT condition scored significantly higher on the pro-environmental behaviours than the other two conditions. So, engaging in EFT encouraging energy-saving intentions. However, this was a statement of what individuals said they would do, not actually do.

Experiment 2 attempted to rectify this problem. This involved 102 more students in Taiwan, who performed in the EFT and SFT conditions as above. Then they were asked to help in a litter collection on a local beach, while being offered a reward food box for participation in the experiment. The choice of box was the behavioural measure of pro-environmental behaviours, while the beach-clearing was the intention. The food box was either vegetarian or non-vegetarian, and the carbon footprint of each was given (which was lower for the vegetarian option).

Participants in the EFT condition were significantly more likely to choose the vegetarian option (47% vs 28% in the SFT condition), and to volunteer for beach cleaning (67% vs 43%). Engaging in EFT encouraged pro-environmental intentions and behaviours, but the vividness of the imagery in the EFT was important.

The key limitations to these experiments were:

- Laboratory setting - "thus, caution should be exercised when generalising the results to real-world settings"

(Lee et al 2018 p15).

- Short-term effects of EFT only.
- Use of undergraduates.
- No measure of pre-test environmental attitudes and behaviours.
- Lack of control over individual's EFT.

8.3. MORAL PERSUASION

A moral message can be more persuasive in changing attitudes than a non-moral one. Luttrell et al (2019) showed this in relation to attitudes towards recycling in research testing three theories:

i) Moral-matching hypothesis - Moral appeals are more effective for morally-based attitudes (or "moralised attitudes"; Skitka 2010).

ii) Moral-strength hypothesis - Attitudes based in morality will be resistant to persuasion. "When people perceive that an attitude reflects their core moral principles, they tend to experience it as an absolute truth and thus maintain their position when challenged, resisting change in the face of social influence and non-moral persuasive arguments... The same may be true even with a message that appeals to morality (Luttrell et al 2019 p1137).

iii) Moral-rejection hypothesis - This is "whereby moral (vs non-moral) arguments that oppose an existing attitude may be even more objectionable when that attitude has a highly moral basis. That is, people may be especially offended when moral attitudes are challenged with moral appeals, so moral conviction may be associated with even more resistance in the face of such arguments" (Luttrell et al 2019 p1137).

In Luttrell et al's (2019) first experiment (Study 1a), 227 individuals were recruited online who completed questionnaires about their attitudes towards recycling. Then the participants read a short essay against recycling, either framed in moral terms (eg: "supporting recycling programmes would be a grave moral transgression") or in practical terms (eg: recycling is "an inefficient unfeasible endeavour for most municipalities to adopt"). Afterwards, attitude measures on recycling were completed again.

The results supported the moral-matching hypothesis.

Individuals with a high moral basis to their attitudes on recycling were more persuaded by the moral message than the practical one, and the opposite for attitudes with a low moral basis. The moral basis to an attitude was self-reported on a five-point scale.

These findings were replicated with 217 more online participants (Study 1b).

Study 2 used the topic of marijuana legalisation with 152 more online participants. The same procedure as Study 1 was used, and the findings were similar to that experiment.

It was also found that the moral-matching hypothesis was "stronger for more politically conservative participants" (Luttrell et al 2019).

The participants were recruited via Amazon's Mechanical Turk, and attitudes measures were self-reported.

8.4. "CLIMATE COMPENSATION"

"Climate compensation" in the form of offsets is growing in popularity, particularly in claims by businesses. But a psychological tendency to think that a good environmental deed can compensate for a bad environmental deed (eg: recycling waste, but driving a fossil-fuel car) ⁴⁰ "can fall down when applied to environmental impact and global climate change" (Sorqvist and Langeborg 2019a p24).

Sorqvist and Langeborg (2019a) reported that individuals believe that "green" buildings in a neighbourhood "not only keeps the neighbourhood from causing more environmental harm as a whole, but even reduces the neighbourhood's overall environmental burden" (Sorqvist and Langeborg 2019a p24).

Sorqvist and Langeborg (2019b) argued that exchange and balance have evolved as part of human interactions, and these are applied to wider issues like the environment.

"In social exchange, allowing give-and-take transactions to balance each other out works well to maintain well-functioning co-operation. However, the same balancing rule is not appropriate to apply to 'environmentally friendly' and 'harmful' behaviour. When people experience a negative imbalance from having done something harmful to the environment, they may actively seek an opportunity to do something good for the environment to restore the balance. However, the

⁴⁰ "Compensatory green beliefs" (Kaklamanou et al 2015).

environment is a complex system of processes that does not respond like a person in a reciprocal relationship. Also, and foremost, environmentally harmful behaviour can neither be compensated for, restored nor undone. While the tension in a relationship, caused by a harmful action to another person, can be restored by compensation without leaving permanent changes in either person, harmful actions on the environment have permanent consequences. Flying adds to an individual's total environmental burden, no matter how many meat free Mondays that individual has" (Sorqvist and Langeborg 2019b p3).

Sorqvist and Langeborg (2019b) made some recommendations to overcome this "balancing heuristic", including:

- Give customers information about the carbon footprint of each product, and so they have "immediate feedback saying that 'eco-labelled' products do not reduce but add to the accumulated carbon footprint of what they are buying" (Sorqvist and Langeborg 2019b p4).
- Information campaigns to show that terms like "climate compensation" and "environmentally friendly" are misleading.
- Encourage sustainability (eg: prevent population growth).

8.5. A GOOD LIFE FOR ALL

"Sustainability science" addresses a key question: "what level of biophysical resource use is associated with meeting people's basic needs, and can this level of resource use be extended to all people without exceeding critical planetary boundaries?" (O'Neill et al 2018 p88).

One approach to sustainability is "a safe operating space" (Rockstrom et al 2009), which involves nine boundaries not to be crossed if humanity wants to continue in relatively stable conditions (Steffen et al 2015). However, a number of these have already been transgressed (eg: climate change) (O'Neill et al 2018).

An alternative approach is the "environmental footprint", linked to consumption of goods and services (Hockstra and Wiedmann 2014). Consumers, thus, become responsible for resource use.

O'Neill et al (2018) combined both approaches in order to answer the question above with "a good life for all within planetary boundaries". Raworth (2017) proposed "a safe and just space" (SJS) framework, which "visualises sustainability in terms of a doughnut-shaped

space where resource use is high enough to meet people's basic needs (the inner boundary), but not so high as to transgress planetary boundaries (the outer boundary)" (O'Neill et al 2018 p88). Along with others, the aim is to quantify and measure empirically human needs (eg: nutrition; life satisfaction). Raworth (2012) specified eleven such needs or social indicators.

O'Neill et al (2018) analysis of World Bank data, for example, found that basic physical needs (eg: nutrition; sanitation; access to electricity; elimination of extreme poverty) must be prioritised with lower resource use. These needs "could likely be met for 7 billion people at a level of resource use that does not significantly transgress planetary boundaries. However, if thresholds for the more qualitative goals (that is, life satisfaction, healthy life expectancy, secondary education, democratic quality, social support and equality) are to be universally met then provisioning systems – which mediate the relationship between resource use and social outcomes – must become two to six times more efficient" (O'Neill et al 2018 p92).

The authors recommended reducing resource use in wealthy countries (eg: "degrowth"; D'Alisa et al 2014), alternative economic models, more equitable distribution of wealth across the world, and improvements in resource efficiency (eg: switch from fossil fuels to renewable energy) (O'Neill et al 2018).

8.6. FORCING CHANGE

Based on a four-year project called HOPE, Dubois et al (2019) produced five insights into households' carbon footprint.

HOPE was a study with over 300 households in four major cities in France, Germany, Norway and Sweden. The goal was to find ways to halve household greenhouse gas emissions by 2030. The project included a detailed survey of household carbon footprints, an interactive mitigation simulation game, and qualitative interviews.

The five "empirical insights" were:

i) The majority of the household's carbon footprint came from mobility (car and plane), food consumption (particularly meat and dairy products), and heating.

ii) Demographic factors influenced intentions to reduce carbon footprint – eg: income level (eg: richer individuals were more likely to fly); household size; home ownership (eg: tenants less able to renovate home).

iii) Household carbon footprint and decisions linked to major life events – eg: parents with children may travel more.

iv) Voluntary actions will not be enough to change certain behaviours - For example, in the simulation game, "households chose actions characterised by fairly incremental efficiency improvements such as eco-driving or substituting local public transport with walking and biking instead of more substantial changes such as reducing intercontinental flights or giving up their cars" (Dubois et al 2019 p149).

A quote from a German woman summed up the problem as participants viewed it: "It is important to have a semester abroad in your CV. The companies think: Hey, this guy is motivated, he wants to learn, he is flexible, he has been to the US for a year. It sounds better, than saying: Oh well, yes, this guy is organic, he is climate-friendly, he decided to stay at home and not pollute the air" (p150).

v) Household perceptions of their responsibility was limited - Participants were "ready to act if everyone - including individuals and other societal players, like businesses and governments - acted in concert collectively" (Dubois et al 2019 p152).

Dubois et al (2019) ended: "Importantly, households will only reduce about half of what they should to reach the reduction targets commensurate with reaching the 1.5 °C goal. Further substantial emissions reductions need strong and effective public policies incentivising and supporting changes, the proverbial mix of carrots and sticks. Even then, mobility seems to be 'stickier' [Hansen 2018] and more difficult to decarbonise. We need to rely on stronger policy interventions more than, or at least in addition to, altruism" (p152). Put simply, "people need forcing to become greener" (Vaughan 2019a).

8.7. ENERGY USE AND AGE

Reducing household energy consumption as a response to climate change needs to take into account energy demand variations across the lifespan.

Estiri and Zagheni (2019) analysed data from the US Residential Energy Consumption Survey (RECS) in 1987, 1990, 2005 and 2009. In each case, over 6000 households were sampled at random using a "complex multi-stage area-probability design". Energy consumption was calculated based on variables like size of household, type of housing, and ambient temperature.

Energy consumption was lower for young adults (in their 20s), probably due to "people tending to live in smaller households and having more modest housing needs during this period" (Estiri and Zagheni 2019 p66). Then consumption climbed until the 50s, decreased between the ages 60 to 80 years old, and rose for the oldest old.

Generally, energy consumption increased with higher incomes, mostly due to larger housing, and it was also higher in colder climates.

Estiri and Zagheni (2019) summed up: "Our findings suggest that by itself, ageing could lead to an increase in the proportion of the population with high energy consumption levels" (p69).

Catherine Mitchell noted the implications of these findings for policymakers: "What the paper says is that there is a lot of work about how buildings use energy, but probably not enough about how the people in them use energy" (quoted in Vaughan 2019b).

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