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The enemy between us: The psychological and social costs of inequality

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Abstract

There is now substantial evidence that larger income differences in a society increase the prevalence of most of the health and social problems that tend to occur more frequently lower down the social ladder. The pathways through which human beings are sensitive to inequality are however less clear. This paper outlines the explanatory theory that we think best fits the growing but incomplete body of evidence available. Inequality appears to have its most fundamental effects on the quality of social relations—with implications affecting the prevalence of a number of psychopathologies. We suggest that human beings have two contrasting evolved social strategies: one that is adaptive to living in a dominance hierarchy and the other appropriate to more egalitarian societies based on reciprocity and cooperation. Although both strategies are used in all societies, we hypothesise that the balance between them changes with the extent of material inequality.

There are dangers in writing from one academic discipline to another. Things that may seem true from one perspective often seem dubious from another. As social epidemiologists with only a partial familiarity with neighbouring areas of psychology, we hope that readers will forgive us if from time to time we seem to ride roughshod over some psychological toes.

Income inequality has been described by world leaders as the 'defining challenge of our time' (Obama, 2014) and the 'root of social ills' (Francis, 2013). Despite growing agreement that it is harmful, there is little understanding of the processes that make it so. In this paper, we outline a theoretical framework that we think explains why more unequal societies perform worse on a wide range of outcomes. We describe what we see as the core causal processes while recognising that some parts of the evidence are stronger than others.

In our book, *The Spirit Level*, (Wilkinson & Pickett, 2009a) and a series of research papers (Pickett & Wilkinson, 2007, 2010, 2015a, 2015b; Wilkinson & Pickett, 2006, 2007; Wilkinson & Pickett, 2009b), we have discussed the work of many scholars showing that a long list of health and social problems with social gradients, that is, problems that are more common further down the social ladder are much more prevalent in societies with larger income differences between rich and poor (Figure 1).

Many different measures of income inequality have been used in research on the social determinants of health. They include the Gini coefficient, the ratio of

the top to bottom 10% or 20% of incomes and the share of income received by the bottom half of the population. Different measures tend to produce similar results mainly because the ordering of societies by inequality varies only slightly with the measure used. Depending partly on what data are available, incomes are usually household income after taxes and benefits, adjusted for household size. Although it might be desirable to put together measures of overall material inequality combining both income and wealth inequality, internationally comparable measure of wealth inequality are only just becoming available (Luxembourg Income Study, 2016).

Health outcomes related to greater income inequality include shorter life expectancy and higher mortality rates, including infant mortality (Babones, 2008; De Vogli, Mistry, Gnesotto, & Cornia, 2005; Hales, Howden-Chapman, Salmond, Woodward, & Mackenbach, 1999; Kondo et al., 2009; Ram, 2006; Subramanian & Kawachi, 2004; Wilkinson & Pickett, 2006, 2007). Rates of mental illness and obesity are two to four times higher in more unequal societies (Offer, Pechey, & Ulijaszek, 2012; Pickett, Kelly, Brunner, Lobstein, & Wilkinson, 2005; Pickett & Wilkinson, 2010). In both developing and developed countries, human immunodeficiency virus infection prevalence rises with inequality (Drain, Smith, Hughes, Halperin, & Holmes, 2004; Over, 1998). The research literature on income inequality and health is extensive; in 2015, we reviewed this literature within

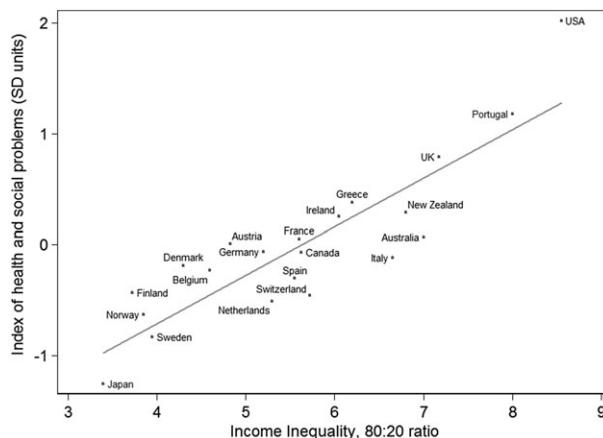


Fig. 1: Health and social problems are closely related to inequality among rich countries (Wilkinson & Pickett, 2009a)

a causal framework of Popperian theory testing (Popper, 2014) and epidemiological causal criteria and found it strongly supportive of a causal explanation (Costa & Kahn, 2001).

Indicators of social cohesion, including generalised trust and social capital, are also better in more equal countries (Elgar, 2010; Elgar & Aitken, 2011; Kawachi, Kennedy, Lochner, & Prothrow-Stith, 1997; Rothstein & Uslaner, 2005; Uslaner, 2002). Indicators of women's status and equality are generally better (Kawachi, Kennedy, Gupta, & Prothrow-Stith, 1999; Wilkinson & Pickett, 2009a), and a large literature shows that rates of both property crime and homicides are lower in more equal societies (Daly, Wilson, & Vasdev, 2001; Elgar & Aitken, 2011; Elgar et al., 2013a; Fajnzylber, Lederman, & Loayza, 2002; Hsieh & Pugh, 1993; Krahn, Hartnagel, & Gartrell, 1986; Rufrancos, Power, Pickett, & Wilkinson, 2013).

Children's life chances and trajectories are also affected by income inequality. The UNICEF Index of Child Well-being in rich countries has been shown repeatedly to be significantly higher in more equal societies (Pickett & Wilkinson, 2007, 2015a; Unicef, 2016). Educational attainment is higher, fewer young people drop out of education and fewer teenage girls become mothers in more equal societies (Pickett & Vanderbloemen, 2015; Siddiqi, Kawachi, Berkman, Subramanian, & Hertzman, 2007; Wilkinson & Pickett, 2007). Equality of opportunity is damaged by inequality of outcomes—social mobility is more restricted in very unequal societies (Blanden, 2009; Wilkinson & Pickett, 2007).

Although the effects of inequality tend to be greatest among the poorest in each society, outcomes tend to be less good even among the better off. Indeed, it is because a large majority of the population—not just the poor—are affected by inequality that the differences in the performance of more and less equal societies are so large. The scale of the differences varies from one health or social problem to another, but they are all between 2 and 10 times as common in more unequal societies compared with more equal ones.

The Evolved Psychology of Social Relations

Our own work on the social effects of income inequality came out of research on health inequalities. From that initial biological background, it came to focus particularly on causal processes centred on the sources and effects of chronic stress. The explanatory picture we shall outline is made up like a jigsaw puzzle from pieces contributed by research workers in a variety of different fields. At its centre is an evolved psychology of social relations that leads people to use different social strategies in more and less hierarchical contexts.

Dunbar's (1998, 2014) work on the close correlation between the proportion of the brain made up of the neocortex and the typical group size in primate species is a powerful indication that the complexities of social relations have been crucial to human brain development. Since Dunbar first formulated this 'social brain hypothesis', further research has confirmed that non-human primate species with larger group sizes do indeed perform better on tests of social intelligence (Dunbar & Shultz, 2007).

Given that other people can be anything from our most feared rivals to our best source of cooperation and assistance, the quality of social relations and the handling of hierarchical relationships will always have been crucial to survival, well-being and reproductive success.

The nature of social relationships varies not simply at the individual level but also according to social structure. There seems to be some agreement that there have been three main periods of social organisation in human development: pre-human dominance hierarchies such as those seen in chimpanzees and other apes, the egalitarian hunting and gathering societies of human prehistory and the social hierarchies of more recent agricultural and industrial societies. Dominance hierarchies are widely assumed to have been the typical form of social organisation among prehuman hominids, and several different theories have been proposed to explain the transition to the egalitarianism typical of pre-historic human hunter-gatherers (Boehm, 2012; Gavrilets, 2012; Megarry, 1995; Runciman, 2005). Similarly, there is an agreement that the rise of inequality is associated with the development of agriculture over the last 10–12 000 years, but less agreement on the causes of the transition (Boehm, 1999; Cohen, 1998; Woodburn, 1982). Fully stratified class systems are still more recent. They began to appear around 5500 years ago, associated with settled agriculture and higher population densities (Diamond, 2012). Nevertheless, for around 90% or 95% of the time that our species has been 'anatomically modern' with brains the present size, humans lived predominantly as highly egalitarian hunter-gatherers.

We need not go into the different explanations for the transitions to and from egalitarianism except to say that none suggest that they were precipitated by genetic changes in a desire for dominance. Instead, the evidence points to cultural drivers such as the effects of big game hunting, the development of so-called counter

dominance strategies, or changes in pair bonding. Our point here is only that whatever their causes, these different social structures provided different selective environments for human social characteristics. They changed the characteristics that led to success and began to provide the psychological foundations for new social strategies—some appropriate to life in dominance hierarchies, others based on friendship, reciprocity, cooperation and sharing, which suited life in more egalitarian societies such as the pre-historic hunter-gatherers.

Members of species that have strong ranking systems need social strategies for maximising and maintaining rank while avoiding the risk of attacks by dominants. Although there are many variations in the way ranking systems work in different species, what we might call the ‘pure’ logic of ranking systems is that position in the dominance hierarchy determines who has precedence over whom in access to scarce resources; orderings are based on strength and power, and disputes are resolved by trials of strength; you show respect and deference to superiors and treat inferiors with impunity and disdain.

This contrasts sharply with the social strategies that in more egalitarian societies replace rank as the main determinant of access to resources. These include social accounting systems based on reciprocity, sharing and cooperation, in which trust and trustworthiness are essential. People who seem to be more trustworthy, generous and kind will be preferred as mates and as partners in cooperative activities. But as well as selection for pro-social characteristics, Boehm shows that there was also deselection for anti-social characteristics: Selfishness and anti-social behaviour in hunting and gathering societies would result in people being ridiculed, ostracised or even killed (Boehm, 2012).

Because the contrast between the behaviour appropriate in each of these two systems is so great, it is important to match one’s behaviour to one’s setting. Generosity and selflessness are valued and rewarded among friends and in egalitarian settings but would simply be taken advantage of and exploited in a dominance hierarchy. Similarly, the naked pursuit of self-interest and self-aggrandisement appropriate to a rank ordered society would have led to ostracism in a typical hunting and gathering society. It is therefore crucial for behaviour to be sensitive to how hierarchical or egalitarian a society is.

This leads us to expect the pattern of differences in behaviour that we see between more and less egalitarian societies (egalitarianism as judged from the distribution of material resources or income). As we shall see, in more unequal societies, status becomes more important, status anxiety increases and self-serving individualism and self-aggrandisement increase. Community life, rooted in trust, reciprocity and public spiritedness, declines; bullying and violence increase. Of course, rather than using one social strategy or another, everyone uses a mix of dominance and affiliative strategies in different areas of life. Our hypothesis is simply that the

balance between these strategies shifts depending on the level of inequality.

In the rest of this paper, we shall show how this picture has been confirmed—particularly during the last few years—by research across a range of scientific and social science disciplines, including psychology, epidemiology, sociology, neurobiology and behavioural economics. In reviewing the empirical research findings, we hope to provide a coherent picture of how social and economic inequality affects people at a personal and psychological level.

Status Becomes More Important

From violence and ill health to poorer educational performance, it looks as if the problems that tend to become more common in more unequal societies are almost entirely those with negative social gradients (i.e., those that are more common lower down the social ladder). To test this hypothesis, we looked at death rates from causes of death with and without social gradients. We found that the steeper a death rate’s social gradient, the stronger the tendency for rates to be higher in more unequal societies (Wilkinson & Pickett, 2008). Death rates like breast and prostate cancer with little or no social gradient showed no correlation with income inequality, whereas ones like heart disease with strong social gradients showed a strong tendency to be higher in more unequal societies.

We noted in a review of 168 analyses of the relation between income inequality and health that relationships were strongest when the areas of analysis were large enough to measure the scale of inequality across the social pyramid in whole countries or states, rather than in small areas (Wilkinson & Pickett, 2006). We suggest that instead of involving separate processes from the gradients with class and status, greater income inequality increases the power of status differentiation.

Several other findings suggest that **bigger income differences increase the importance of status—bigger objective differences lead, unsurprisingly, to increases in their subjective importance**. First, social mobility (as measured by intergenerational income mobility) is lower in more unequal societies. Social mobility becomes more strongly restricted by social origins, suggesting that status differentiation becomes more powerful (Corak, 2013).

Second, increased inequality is associated with higher levels of status anxiety. In 2014, Layte and Whelan analysed data for 35 634 adults in 31 countries that participated in the 2007 European Quality of Life Survey (Layte & Whelan, 2014). Respondents were asked to what extent they agreed or disagreed with the statement: ‘Some people look down on me because of my job situation or income’. There was quite wide variation across countries, but in all countries, status anxiety increased as people’s income rank decreased—those at the top of the income hierarchy were, not unexpectedly, consistently less worried about their status than those at the bottom. But most importantly, status

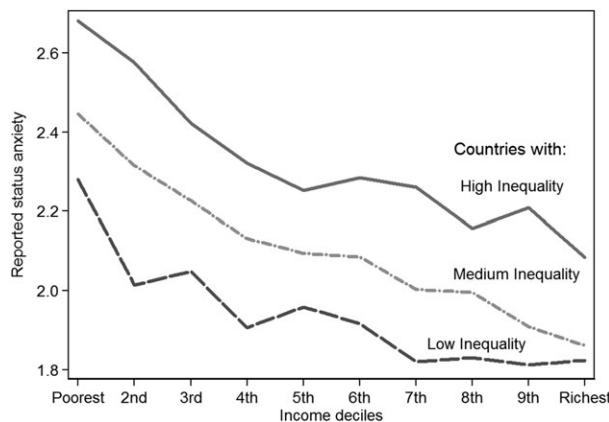


Fig. 2: Status anxiety is higher at all levels of income in more unequal countries. Redrawn from Layte and Whelan (Layte & Whelan, 2014) data kindly provided by Richard Layte

anxiety was higher at all income levels in more unequal countries (Figure 2).

Third, and making the same point—that larger income differences make status more important—is the evidence that there is a stronger tendency towards conspicuous consumption in more unequal societies. As Veblen recognised, conspicuous consumption is a form of self-advertisement that speaks of status competition (Veblen, 2007). Research using Google Correlate and Google Trends has shown, both internationally and among the 50 states of the USA, that where there is more inequality, people are more likely to search for high-status goods and less likely to search for things unrelated to status (Walasek & Brown, 2015, 2016). Income for income, people are more likely to buy high-status cars in more unequal U.S. counties (Bricker, Ramcharan, & Krimmel, 2014). Nor is the effect of inequality on status consumption confined to the richer countries (Jaikumar & Sarin, 2015). As well as increases in conspicuous consumption, there is also evidence that inequality increases debt and bankruptcies (Iacoviello, 2008; Levine, Frank, & Dijk, 2010).

Taken together, the evidence outlined in this section suggests that bigger income differences increase the salience of status differentiation in societies.

Sensitivity to Social Status

If greater inequality does make status differentials more salient, then people in a more unequal society may face an increased social evaluative threat. Indeed, this is very much what the higher levels of status anxiety and conspicuous consumption seem to be telling us. A paper by Dickerson and Kemeny (2004) showed that social evaluative threats are particularly powerful sources of stress. This was the finding of a meta-analysis of some 208 reports of laboratory studies in which volunteers had been given stressful tasks to perform while having their cortisol levels monitored. Different studies employed a wide variety of tasks as stressors and the purpose of the meta-analysis was to see what kinds of tasks produced the biggest cortisol

response. Dickerson and Kemeny concluded that tasks that included uncontrollable social evaluative threat, ‘threats to self-esteem or social status’, in which task performance could be negatively judged by others, produced both the largest cortisol and adrenocorticotropin hormone increases and had the longest times to recovery.

If we are particularly sensitive to social evaluative threat, what is the effect of living in a society in which levels of threat are raised? We hypothesise that there are two contrasting responses. One is to be overcome with feelings of inadequacy, self-doubt, low self-esteem and depression. The other is almost the opposite and involves forms of narcissism and self-enhancement that may or may not serve as covers for self-doubt. When discussing the psychological effects of increasing inequality, we have been influenced particularly by Sheri Johnson’s work on the dominance behavioural system (DBS) and Paul Gilbert’s on the evolutionary origins of depression as a response to involuntary defeat. Johnson described the DBS as ‘a biologically-based system which guides dominance motivation, dominant and subordinate behavior, and responsivity to perceptions of power and subordination’ (Johnson, Leedom, & Muhtadie, 2012). She and her colleagues have drawn attention to a growing body of research suggesting that problems involving issues of dominance and subordination processed by the DBS contribute to a broad range of psychopathologies (Johnson et al., 2012; Tang-Smith, Johnson, & Chen, 2015). In summary,

‘Extensive research suggests that externalizing disorders, mania proneness, and narcissistic traits are related to heightened dominance motivation and behaviors. Mania and narcissistic traits also appear related to inflated self-perceptions of power. Anxiety and depression are related to subordination and submissiveness, as well as a desire to avoid subordination’— (Johnson et al., 2012).

‘Animal, biological and behavioural research provide support for the idea that problems with this system are robustly associated with psychopathy, antisocial personality disorder, alcohol-related problems, depression, anxiety disorders, and bipolar disorder’— (Tang-Smith et al., 2015).

When Johnson and colleagues were first writing about problems associated with the DBS, they assumed that social hierarchies were broadly similar in most societies with similar effects of social differentiation among populations. It is therefore particularly interesting that some of the psychopathies that they suggested were related to the DBS are, as we shall see below, now shown to be more common in more unequal societies. This provides some confirmation of the Johnson thesis of the involvement of the DBS in various psychopathologies and also of the view that increased income inequality increases status anxiety and the social evaluative threat. The evidence also corroborates our earlier findings of a higher burden of mental illnesses in more unequal rich societies (Pickett & Wilkinson,

2010). We shall summarise some of this evidence before moving on to discuss how these specific psychopathologies might be related to inequality.

Researchers from the Inter-American Development Bank have shown that depression is more common in more unequal societies. They used data from more than 80 000 people from 93 countries who responded to a 2007 Gallup Opinion Poll (Melgar & Rossi, 2010). Almost 15% of people reported feeling depressed the previous day, and there was very wide variation from one country to another. While average incomes were not related to feeling depressed, income inequality was, and this effect was particularly strong for people living in cities, rather than in rural areas. In addition, Messias and colleagues using data for 45 U.S. states have also shown that income inequality is significantly related to higher rates of depression (Figure 3) (Messias, Eaton, & Grooms, 2011).

In contrast to succumbing to depression, there is also evidence that some people respond to a heightened social evaluative threat consequent on greater inequality with forms of self-enhancement and narcissism. In a study of 15 different countries, Loughnan and colleagues showed that self-enhancement is strongly related to income inequality and that measures of individualism/collectivism did not explain the relationship (Loughnan et al., 2011). Self-enhancement was measured using a standard questionnaire in which participants were asked to rate themselves on 20 desirable personality traits compared to what they thought was the average in their country. Figure 4 shows a strong association between increased income inequality and self-enhancement.

Other studies have found an increased incidence of schizophrenia and a higher prevalence of psychotic symptoms in countries with high levels of income inequality. Burns and colleagues collected 107 schizophrenia incidence rates from 26 countries and found the positive relationship with inequality shown in Figure 5 (Burns Tomita, & Kapadia, 2013). More recently, Johnson et al. analysed data from 249 217 people in 50 countries and found a significantly higher

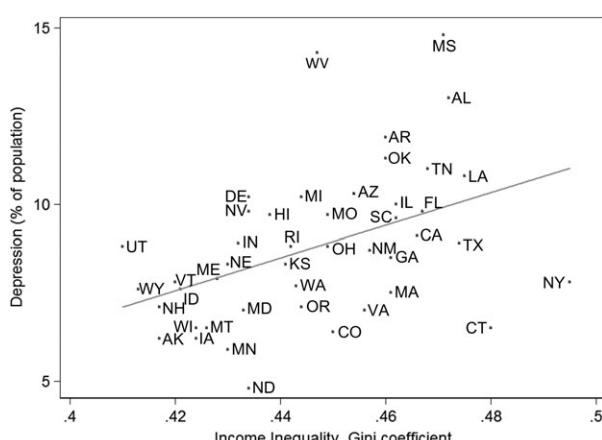


Fig. 3: Income inequality and prevalence of depression across 45 U.S. states. Redrawn from data used in the study of Messias et al. (2011)

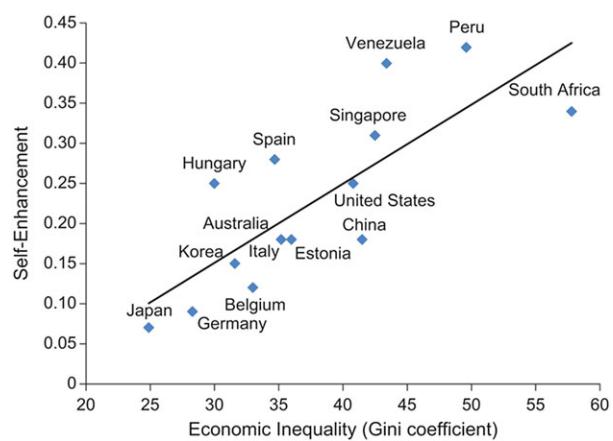


Fig. 4: Income inequality is related to higher levels of self-enhancement bias (Loughnan et al., 2011). [Colour figure can be viewed at wileyonlinelibrary.com]

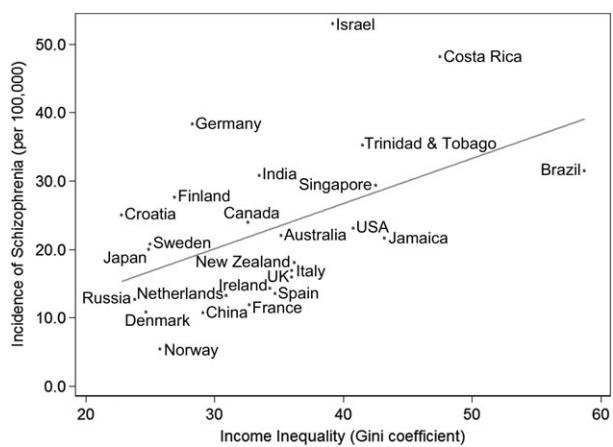


Fig. 5: Income inequality and incidence of schizophrenia, 1975–2001. Redrawn from data in the study of Burns et al. (2013).

prevalence of psychotic symptoms in more unequal societies (Johnson, Wibbels, & Wilkinson, 2015).

A review of 85 studies that measured scores on the Narcissistic Personality Inventory in samples of the American population between 1982 and 2006 found a steep rise in narcissism—30% more people showed narcissistic tendencies in 2006 than in 1982 (Twenge, Konrath, Foster, Campbell, & Bushman, 2008). In Figure 6, we plot rising Narcissistic Personality Inventory scores together with U.S. income inequality data from the World Top Incomes Database (Piketty & Saez, 2007). The rise in narcissism is at least consistent with a possible effect of rising inequality over the same time period.

Are the Links with Inequality Plausible?

Depression

Research on depression suggests why it might be more common in more unequal societies: The links are likely to involve the pathway through involuntary defeat and subordination that have been set out by a number of research workers (Gilbert & Allan, 1998; Sloman & Gilbert, 2000). The review by Johnson et al. (2012)

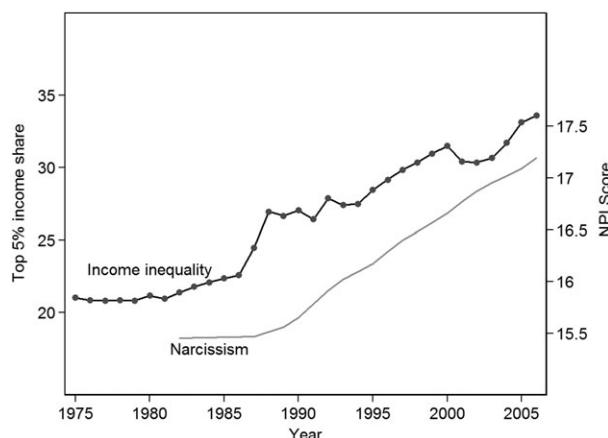


Fig. 6: Narcissistic Personality Inventory scores among U.S. college students in relation to income inequality

referred to above shows that in more than 20 studies people with depression were more likely to report feeling inferior, or experiencing shame. In 23 studies, low testosterone was related to depression and depressive symptoms, and in an experiment in which men were given testosterone lowering drugs, 10% developed depressive symptoms, compared to none in the group receiving a placebo. In another study, people without depression who were given antidepressant medication became less submissive with their family members and more dominant with strangers.

A study designed to look at explanations for the link between greater income inequality and worse mental health in 30 European countries found that it appeared to be mediated by lower social capital and more status anxiety. It found no support for the idea that the association reflected lower levels of investment in public services (Layte, 2012). Mental health seems to be affected by the impact of inequality on the quality of our social relationships, rather than by whether countries spend more or less on health systems.

Wood and colleagues posited that if social rank is important for mental well-being, then income should be related to mental health primarily by acting as a proxy or marker for rank within a comparison group. The absolute level of income you have should not matter, but where it places you in the social hierarchy should (Wood, Boyce, Moore, & Brown, 2012). In a sample of over 30 000 people in Britain, people's absolute levels of income were compared with income rank within three comparison groups (within a region of Britain, within an age group and among people with a similar level of education) as predictors of psychological distress measured by the General Health Questionnaire. Income rank in relation to each of the three comparison groups trumped absolute income in predicting mental distress in both cross-sectional and longitudinal models, even after controlling for age, gender, education, marital status, housing ownership and other factors. A similar study of psychosomatic symptoms in more than 48 000 adolescents in eight countries showed that relative deprivation (deprivation in relation to others within the region where the adolescent lived and in their

school) and rank affluence in region were related more closely to symptoms than absolute affluence—even after differences in absolute affluence were held constant (Elgar et al., 2013b).

Narcissism, Self-Enhancement and Psychopathy

As greater inequality makes social position more important, narcissism and self-enhancement are likely to rise for much the same reasons as we saw earlier that inequality pushed up consumption of conspicuous and status goods. Where some people appear to be worth so much more than others, we judge each other more by status. Narcissism is part of the struggle for social survival against self-doubt and the sense of inferiority. Another sign of the connection between rising inequality and people's desire for status comes from survey data showing the increase in the income levels to which people aspire. In the decade from the mid-1980s to the mid-1990s, the incomes Americans thought they would need to fulfil their dreams doubled from \$50 000 to \$102 000, as income inequality rose (Schor, 1999). Using U.S. samples, Twenge and colleagues have compared different generations at the same age, including Baby Boomers (born 1946–1961), Generation X'ers (born 1962–1981) and Millennials (born after 1982). Those born later thought that money, image and fame were more important, and self-acceptance, affiliation and community were less important. Over time, and in periods with higher income inequality, wanting to make money was a more important motivation for going to college than wanting to gain an appreciation of ideas (Twenge, Campbell, & Freeman, 2012; Twenge & Donnelly, 2016).

Inequality and the accompanying increase in status competition, seem to have created a culture where 'greed is good', risk-taking admired and domination mistaken for leadership. In such a climate, it is perhaps no wonder that individuals with a personality disorder characterised by lying, manipulation, deceit, egocentricity and callousness can often be found working their way up to the top of modern corporate structures instead of being shunned. Board and Fritzon compared the personality traits of 39 senior business managers (all men) to a sample of 768 patients from Broadmoor High Security Hospital. All patients in this hospital have received a legal classification of either mental illness or psychopathic disorder and have either been convicted of serious crime or found unfit to plead when tried for such crimes (Board & Fritzon, 2005). The business men scored higher than the diagnosed patients on several negative traits, including histrionic (superficial charm, insincerity, egocentricity and manipulativeness), narcissistic (grandiosity, lack of empathy, exploitativeness and independence) and compulsive (perfectionism, excessive devotion to work, rigidity, stubbornness and dictatorial tendencies). Philosopher Simon Blackburn, in an extended essay on self-love, *Mirror, Mirror*, discussing rising inequality and the vast salaries and bonuses of the top 1% asks, 'How can they

look themselves in the mirror, walk down the street? Have they no sense of decency, let alone fellow feeling with the rest, whom they have robbed and continue to rob?' (Blackburn, 2014). He suggests that they have come to believe that they are 'worth it because of their exceptional abilities, judgement and intelligence. Anything less than, say, 300 times the average income of workers in their companies would be unjust, a simple failure to reward their astonishing gifts adequately'. Never mind, points out Blackburn, that it requires no extraordinary genius to pay bank customers 1% interest and lend to borrowers at 16.5% interest.

Beyond narcissism and psychopathy, there may be other costs to society of people feeling that their superior position makes them more deserving than others. In a series of observational and experimental studies, Piff and colleagues found people with lower social class to be significantly more likely to behave in prosocial and ethical ways than those with higher social class, who are significantly more likely to exhibit a sense of entitlement and narcissistic characteristics (Piff, 2014; Piff, Kraus, Cote, Cheng, & Keltner, 2010; Piff, Stancato, Côté, Mendoza-Denton, & Keltner, 2012). Piff also showed that when subjects were primed to consider the value of greed or egalitarianism then differences between lower and upper class subjects were attenuated, leading the researchers to conclude that they did not differ in their capacities but only in their general, default tendencies. This fits well with a more recent study that used data from across the 50 states of the USA rather than using subjects just in California as Piff's work did. This study found that how the rich behave towards others is also affected by the extent of inequality: It was only in the more unequal states that richer people were less generous (Côté, House, & Willer, 2015).

A key link between narcissism, psychopathy and a sense of entitlement is lack of empathy. Fiske describes how psychological experiments that induce people to feel powerful also cause deficits in their ability to understand others' emotions and thoughts, because powerful or dominant people can ignore others with impunity (Fiske, 2011). As Fiske says, '... we are divided by envy and scorn, brought on by the status concerns that pervade our society. Income inequality, now at historically high levels, aggravates these status divides', page 9.

Social Cohesion

Another important consequence of greater inequality is that it weakens social cohesion—confirming the intuition that inequality is divisive. Figure 7, from Lancee and Van de Werfhorst (2012), uses data from 24 European countries and shows that civic participation (belonging to groups, clubs or organisations, including recreational political, charitable, religious or professional groups) is significantly lower in more unequal countries. Individual income (probably serving as an indicator of status) also matters, but it matters more in more unequal countries. The researchers suggest that their findings support the idea that inequality increases

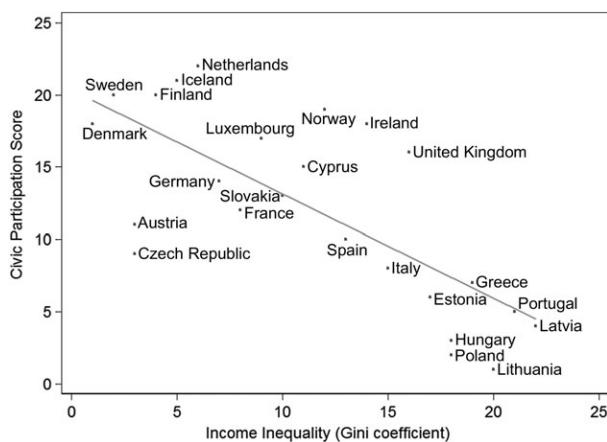


Fig. 7: Civic participation decreases in more unequal European countries (income inequality measured by the Gini coefficient). Re-drawn from data in Lancee and Van de Werfhorst's work (Lancee & Van de Werfhorst, 2012)

the social distances between people. Putnam's measures of social capital among the regions of Italy as well as among the states of the USA are also closely related to inequality (Putnam, 1993, 2000).

There are also a number of studies showing that people are much more likely to feel they can trust others in more equal societies (Kawachi et al., 1997; Uslaner & Brown, 2005). If we are right to think that the scale of inequality shifts us between social strategies characterised, at one end, by sharing and reciprocity, and at the other, by the individualistic self-interest associated with dominance hierarchies, then the association between **inequality and lower levels of trust is to be expected**. Indeed, the link is obvious in relation to some of the survey questions used to measure trust: one used in the U.S. Federal Government's General Social Survey and elsewhere asks whether you agree that 'most people would take advantage of you if they got the chance'. Research suggests that trust mediates the relationship between inequality and other variables including violence and health (Elgar, 2010; Elgar & Aitken, 2011).

If inequality does increase the social evaluative threat, participation in community life may atrophy partly because social contact becomes more stressful. If people are worried about how others might judge them, social contact will become more of an ordeal as they become more anxious about self-presentation. However, it is also possible that the shift in social strategies includes a reduction in people's desire for social affiliation.

de Vries, Gosling, and Potter (2011) tested the hypothesis that inequality creates a more competitive, less cohesive social milieu, using a large sample of volunteers taking part in an Internet survey of personality. They measured how people scored on a scale of Agreeableness—a measure of people's attitudes and behaviours towards others, including empathy, trust, altruism, friendliness and cooperation. In more unequal U.S. states, average scores of Agreeableness were lower even after controlling for age, sex, education, urbanisation, average income and the percentage of people belonging to an ethnic minority.

In another study that used data covering 26 European countries, **both richer and poorer people showed less solidarity in more unequal societies**—less ‘willingness to contribute to the welfare of other people’ (Paskov & Dewilde, 2012). Specifically, people were less willing to help neighbours, older people, immigrants and the sick and disabled.

Violence is close to the opposite of agreeableness, solidarity and trust, and the evidence that it rises with inequality is very well established (Daly, 2016). Often triggered by disrespect, humiliation or loss of face, explanations of this link centre on increased competition for status.

False Remedies: Drugs, Alcohol, Comfort Eating, Gambling, Compulsive Shopping and Consumerism

Whether people feel defeated by a heightened social evaluative threat and their confidence collapses or whether they brazen it out in an attempt to convince the world that they are managing successfully and doing okay, the threat to self-esteem and the effort of trying to maintain face is highly stressful. We think this is likely to lead to an increased desire for anything that alleviates social anxieties and makes people feel better—whether alcohol, drugs, eating for comfort, ‘retail therapy’, and so forth.

We have known for some time that **use of illicit drugs is higher in more unequal countries** (Wilkinson & Pickett, 2009b). Among U.S. states, the most unequal have higher rates of drug addiction and deaths from drug overdoses (Wilkinson & Pickett, 2009b). Studies of New York City neighbourhoods found that those with the most income inequality had higher rates of smoking marijuana (Galea, Ahern, Tracy, & Vlahov, 2007) and deaths from drug overdose (Galea et al., 2003). In the UK and the USA, drinking any alcohol at all is more common higher up the social ladder, but problematic drinking is more common further down. Income inequality has been linked to more frequent drinking in New York City neighbourhoods, (Galea et al., 2007) to heavier drinking and drunkenness among adolescents in rich countries (Elgar, Roberts, Parry-Langdon, & Boyce, 2005), to per capita alcohol consumption in 13 European countries (Cutright & Fernquist, 2011) and (in a complex pattern) to deaths attributable to alcohol in local government areas of Australia (Dietze et al., 2009). However, perhaps because of differences in drinking patterns, not all studies have straightforward results—the study of 13 European countries shows no association between inequality and deaths from alcoholic liver disease despite the link to heavier alcohol consumption. The Australian study found that alcohol-related hospitalisations initially decline when areas become more unequal, but then this was followed by a rapid increase. Among U.S. states, one study found that the ratio of White to Black and Hispanic poverty was more closely related to higher levels of alcohol problems

than an overall measure of inequality (Karriker-Jaffe, Roberts, & Bond, 2013).

Obesity and calorie consumption are higher in more unequal societies and may be an indicator of ‘eating for comfort’ and compulsive over-eating (Pickett et al., 2005). We also found a strong and significant relationship between income inequality and the population prevalence of problem gambling (Figure 8) (Williams, Volberg, & Stevens, 2012)—an addictive behaviour related perhaps to financial strain, stress and anxiety.

Denmark is a relatively egalitarian country and in *Affluenza*, his book on overconsumption and ‘retail therapy’, psychologist Oliver James quotes a Danish newspaper editor who says, ‘Multinationals have learnt that there is no market for luxury goods here. When a new type of product comes out, for a few years it doesn’t penetrate at all because it’s too expensive and we don’t like to be ostentatious, so only freaky playboys have one. But when the price comes down, so that middle-class Danes can afford it, then within eighteen months it reaches 70 per cent of the population’ (James, 2007). James comments that consumption of luxury goods is not a source of status for Danes; their greater equality of income, as well as greater equality between men and women, means that they are less susceptible to advertising and to pining after flashy cars and other prestige goods. We have found spending on advertising as a proportion of gross domestic product increases significantly with greater inequality (Figure 9).

How Inequality Gets Under the Skin

It is usually assumed that inequality is experienced primarily in adult life. Most studies have looked at cross-sectional associations between inequality and contemporaneous outcomes. However, the best methodological study of lag times in relation to mortality suggests that the effects on death rates of a rise in inequality start to appear after about 3 years and continue to accumulate until some 12 years later (Zheng, 2012). Another study suggests that inequality in childhood can affect health in later life (Lillard, Burkhauser, Hahn, & Wilkins, 2015). This possibility is made more plausible

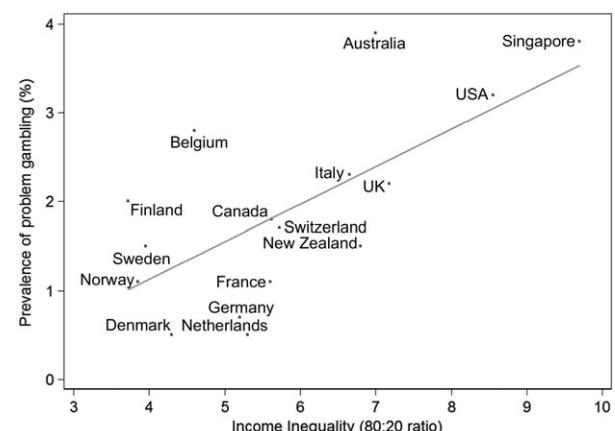


Fig. 8: Income inequality is related to higher levels of problem gambling in rich countries (Williams et al., 2012)

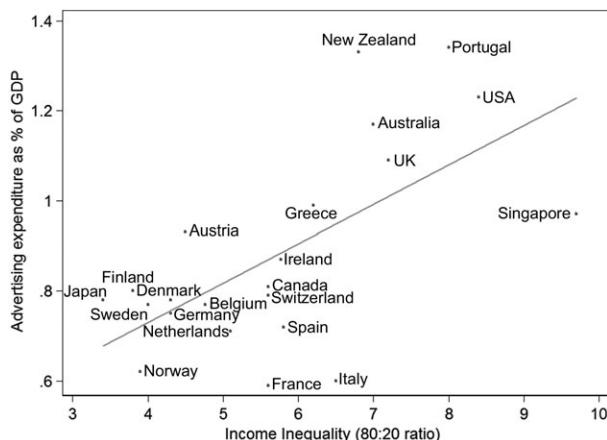


Fig. 9: Spending on advertising, as a percentage of gross domestic product (GDP), increases with greater income inequality (World Advertising Research Center Ltd. 2007)

by the large body of evidence showing that birthweight and childhood circumstances affect health in later life (Almond & Currie, 2011).

But there is also increasing evidence that materialism and status consumption affect the well-being of children in unequal societies. Using two sets of cross-sectional data and changes between them over time, we found that changes in the UNICEF Index of child well-being were closely related to changes in inequality in rich countries (Pickett & Wilkinson, 2015a). A UNICEF UK-commissioned study of family life in three countries (Sweden, low inequality and high child well-being; Spain, mid-range inequality and high well-being; and UK high inequality and low well-being) used focus groups of friendship groups in schools and in-depth observations of family life (Ipsos-Mori & Nairn, 2011). The struggles of British families contrasted starkly with the experience of Spanish and Swedish families. In Sweden, parents talked about children saving their money for special purchases and making and mending toys. In Spain, there were children cherishing books and educational toys and storing them in special boxes. In the UK, the parents appeared universally exhausted and their homes were filled with boxes and piles of discarded toys. As the report stated:

'Many UK children do not refer to material goods when talking about what makes them happy, and also understand the principles of moderation in consumption, but many have parents who feel compelled to purchase, often against their better judgement'.

'Children [have a] growing awareness of inequality as they approach secondary school and the role of consumer goods in identifying and creating status groups within peer groups Whilst many UK parents are complicit in purchasing status goods to hide social insecurities, this behaviour is almost totally absent in Spain and Sweden'.

We have found that many of the components of the UNICEF index of child well-being are related to inequality, including child conflict (Pickett & Wilkinson, 2007).

The relationship with bullying, replicated by Elgar on a larger data set, suggests that inequality affects not just children's circumstances or family life, but also how they behave (Elgar, Craig, Boyce, Morgan, & Vella-Zarb, 2009). Given that animal dominance hierarchies are essentially bullying hierarchies, ordered from the strongest at the top to the weakest at the bottom, the 10-fold differences found in the prevalence of bullying between more and less equal societies may be particularly indicative. It has been shown that children as young as five years are aware of social status differences and it would be surprising if they remained oblivious to them (Simmons & Rosenberg, 1971). There is however also the possibility that early experience may lead to biological (epigenetic) changes which prepare children for a more or less equal world.

Epigenetics

A review of epigenetic research concluded that the evidence is 'consistent with the idea that social adversity, particularly that involving parent–offspring interactions, alters the epigenetic state and expression of a wide range of genes, the products of which regulate hypothalamic-pituitary-adrenal function' (i.e., the system that regulates stress responses) (Anacker, O'Donnell, & Meaney, 2014). Slavich and Cole (2013) stated that 'external social conditions, especially our subjective perceptions ... can substantially alter the expression of literally hundreds of genes ...'. Although the important effects of early childhood experience on the course of a person's later psychological development have long been recognised, research has only recently shown that the processes involved are partly underpinned by epigenetic changes. Children who experience a lot of stress are likely to become more reactive to it, more anxious and more vulnerable to depression later on (Provençal & Binder, 2015).

Epigenetic change increases the ability of an organism to adapt flexibly to the demands of different circumstances. Because, in the course of evolution, humans have experienced societies based on everything from 'might is right' dominance hierarchies at one extreme, to caring, sharing and reciprocity on the other, a key issue is that development should be sensitive to indicators of the kind of society in which a child is growing up. There may have been important advantages in being prepared appropriately, either for a world in which individuals are rivals for scarce resources, have to avoid challenging dominants and learn not to trust others, or for a society in which people depend on cooperation and reciprocity, where empathy and trust are important. Each kind of society requires a different social orientation, a different emotional and cognitive development.

As well as the radical differences in the general quality of relationships from one society to another, there are also processes of adaptation to the challenges of living nearer the top or the bottom of the social ladder. In more unequal societies, the quality of social relations

and the experience of adversity will differ according to where you are on the social ladder. Life is tougher at the bottom, and there is evidence of epigenetic differences between people living in richer and poorer areas. Researchers found that there were a large number of epigenetic differences between people living in rich and poor areas of Glasgow (McGuinness et al., 2012).

Competition for status means being very aware of status rankings and is likely to be the source of the downward prejudice seen in human societies towards those lower on the social ladder. Human beings still show a remarkable ability to judge dominance characteristics in each other. One study observed interactions among small groups of students meeting each other in experimental conditions for the first time. It found that even 'at first glance'—actually within 1 minute of meeting and before they had spoken to each other—they had made subliminal assessments of each other's tendency to dominant behaviour as expressed in body language. These assessments were then borne out in observations of subsequent interaction (Kalma, 1991). It seems plausible that one of the epigenetic changes caused by exposure to greater inequality may be increased vigilance about social comparisons with those around us.

Another indication that some responses to more unequal societies may be partly biologically programmed comes from two papers that show that women in more unequal societies prefer more stereotypically masculinized men's face than women in more equal societies (Brooks et al., 2011; DeBruine, Jones, Crawford, Welling, & Little, 2010). The research paper points out that this is despite 'compelling evidence that women ascribe anti-social traits and behaviours to more masculine looking men. Women perceive more masculine men as dishonest, uncooperative and more interested in short-term than long-term relationships' (DeBruine et al., 2010). It looks as if women in more unequal societies may be biased towards men with the rugged masculine faces and characteristics that might get them nearer the top in a dominance hierarchy. Women in a tougher society may prefer tougher-looking men.

There is at the same time a substantial body of research, including from experiments using games designed to explore human motivations, showing that, alongside (and despite) our concern for status, human beings show 'inequality aversion' (Dawes, Fowler, Johnson, McElreath, & Smirnov, 2007; Fehr & Gachter, 2002). A human aversion to inequality is likely to have been a crucial strategy for maintaining harmonious relations between people. (Sahlins, 2003) The practice of prosocial values depends on our desire for the good will of others and to be regarded as cooperative and an asset to the well-being of the group.

Lastly, an indication that we have evolved biological responses to the quality of social relations come from research on fibrinogen. Higher levels of fibrinogen make blood from a wound clot faster. Among both male and female civil servants, there is a strong social gradient with higher levels lower down the office hierarchy (Brunner et al., 1996). Among hierarchical non-human

primates, it would clearly be a survival advantage if the blood of subordinates, at higher risk of injury from dominants, clotted faster. In contrast, another paper has shown that friendship lowers fibrinogen (Kim, Benjamin, Fowler, & Christakis, 2016).

Conclusions

This paper has offered an explanation of why larger income differences in a society increase the prevalence of many of the health and social problems that tend to occur more frequently lower down the social ladder. It has proposed that the scale of material inequality in a society has a fundamental effect on the quality of social relations. More egalitarian societies enjoy higher levels of interpersonal trust, stronger community life and lower levels of violence. We have suggested that the processes that underlie these differences include contrasting but partly biologically embedded social strategies. Strategies adaptive to dominance relations involve heightened attention to status and self-advancement. Those appropriate to more egalitarian settings put greater emphasis on cooperation, mutual support and reciprocity. Although both social strategies are used in different contexts in all societies, how much each is used is affected by the extent of income inequality in a society.

The evidence strongly suggests that greater inequality increases the importance of status differences and of the social evaluative threat. Responses to an increased social evaluative threat are likely to involve the DBS and include forms of psychopathology related, on the one hand, to self-enhancement and, on the other, to a sense of defeat and depression. There is some evidence to suggest that both kinds of psychopathology may be more common in more unequal societies.

Increases in levels of social evaluative threat and the greater preponderance of more antagonistic forms of social relations in more unequal societies would be expected to raise levels of anxiety. We suggest that this may be why more unequal societies show higher levels of dysfunction related to the use of alcohol, drugs and consumerism. Finally, the effects of inequality are not confined to adult behaviour. We suggest that inequality may affect children through pathways that include changes in gene expression consequent on early social experience.

Conflict of Interest

Both authors are Trustees of the Equality Trust.

References

- Almond, D., & Currie, J. (2011). Killing me softly: The fetal origins hypothesis. *The Journal of Economic Perspectives*, 25(3), 153–172.
- Anacker, C., O'Donnell, K. J., & Meaney, M. J. (2014). Early life adversity and the epigenetic programming of hypothalamic-pituitary-adrenal function. *Dialogues in Clinical Neuroscience*, 16(3), 321.

- Babones, S. J. (2008). Income inequality and population health: Correlation and causality. *Social Science & Medicine*, 66(7), 1614–1626.
- Blackburn, S. (2014). *Mirror, mirror: The uses and abuses of self-love*. Oxford: Princeton University Press.
- Blanden, J. (2009). *How much can we learn from international comparisons of intergenerational mobility?* London: Centre for the Economics of Education.
- Board, B. J., & Fritzson, K. (2005). Disordered personalities at work. *Psychology, Crime & Law*, 11(1), 17–32.
- Boehm, C. (1999). *Hierarchy in the forest: The evolution of egalitarian behavior*. Cambridge: Harvard University Press.
- Boehm, C. (2012). *Moral origins: The evolution of virtue, altruism, and shame*. New York: Basic Books.
- Bricker, J., Ramcharan, R., & Krimmel, J. (2014). Signaling status: The impact of relative income on household consumption and financial decisions. *Board of Governors of the Federal Reserve System Finance and Economics Discussion Series, FEDS Working Paper No. 2014-76*.
- Brooks, R., Scott, I. M., Maklakov, A. A., Kasumovic, M. M., Clark, A. P., & Penton-Voak, I. S. (2011). National income inequality predicts women's preferences for masculinized faces better than health does. *Proceedings of the Royal Society of London B: Biological Sciences*, 278(1707), 810–812.
- Brunner, E., Marmot, M., Canner, R., Bekinska, M., Davey Smith, G., & O'Brien, J. (1996). Childhood social circumstances and psychosocial and behavioural factors as determinants of plasma fibrinogen. *The Lancet*, 347(9007), 1008–1013. [http://dx.doi.org/10.1016/S0140-6736\(96\)90147-6](http://dx.doi.org/10.1016/S0140-6736(96)90147-6)
- Burns, J. K., Tomita, A., & Kapadia, A. S. (2013). Income inequality and schizophrenia: Increased schizophrenia incidence in countries with high levels of income inequality. *International Journal of Social Psychiatry*, 60(2), 185–196. <http://dx.doi.org/10.1177/0020764013481426>
- Cohen, M. N. (1998). The emergence of health and social inequalities in the archaeological record. *Human Biology and Social Inequality*, 39, 249.
- Corak, M. (2013). Income inequality, equality of opportunity, and intergenerational mobility. *Journal of Economic Perspectives*, 27(3), 79–102. <http://dx.doi.org/10.1257/jep.27.3.79>
- Costa, D. L., & Kahn, M. E. (2001). Understanding the decline in social capital, 1952–1998 (Working paper no. 8295). Cambridge, MA: National Bureau of Economic Research.
- Côté, S., House, J., & Willer, R. (2015). High economic inequality leads higher-income individuals to be less generous. *Proceedings of the National Academy of Sciences of the United States of America*, 112(52), 15838–15843. <http://dx.doi.org/10.1073/pnas.1511536112>
- Cutright, P., & Fernquist, R. M. (2011). Predictors of per capita alcohol consumption and gender-specific liver cirrhosis mortality rates: Thirteen European countries, circa 1970–1984 and 1995–2007. *OMEGA—Journal of Death and Dying*, 62(3), 269–283. <http://dx.doi.org/10.2190/OM.62.3.d>
- Daly, M. (2016). *Killing the competition: Economic inequality and homicide*. New Brunswick, NJ: Transaction.
- Daly, M., Wilson, M., & Vasdev, S. (2001). Income inequality and homicide rates in Canada and the United States. *Canadian Journal of Public Health-Revue canadienne de criminologie*, 43(2), 219–236.
- Dawes, C. T., Fowler, J. H., Johnson, T., McElreath, R., & Smirnov, O. (2007). Egalitarian motives in humans. [10.1038/nature05651]. *Nature*, 446(7137), 794–796.
- De Vogli, R., Mistry, R., Gnesotto, R., & Cornia, G. A. (2005). Has the relation between income inequality and life expectancy disappeared? Evidence from Italy and top industrialised countries. *Journal of Epidemiology & Community Health*, 59(2), 158–162.
- de Vries, R., Gosling, S., & Potter, J. (2011). Income inequality and personality: are less equal U.S. states less agreeable? *Social Science & Medicine*, 72(12), 1978–1985. <http://dx.doi.org/10.1016/j.socscimed.2011.03.046>
- DeBruine, L. M., Jones, B. C., Crawford, J. R., Welling, L. L., & Little, A. C. (2010). The health of a nation predicts their mate preferences: Cross-cultural variation in women's preferences for masculinized male faces. *Proceedings. Biological sciences/The Royal Society*, 277(1692), 2405–2410. <http://dx.doi.org/10.1098/rspb.2009.2184>
- Diamond, J. M. (2012). *The world until yesterday: What can we learn from traditional societies?* New York: Viking.
- Dickerson, S. S., & Kemeny, M. E. (2004). Acute stressors and cortisol responses: A theoretical integration and synthesis of laboratory research. *Psychological Bulletin*, 130(3), 355–391.
- Dietze, P. M., Jolley, D. J., Chikritzhs, T. N., Clemens, S., Catalano, P., & Stockwell, T. (2009). Income inequality and alcohol attributable harm in Australia. *BMC Public Health*, 9, 70.
- Drain, P. K., Smith, J. S., Hughes, J. P., Halperin, D. T., & Holmes, K. K. (2004). Correlates of national HIV seroprevalence: An ecologic analysis of 122 developing countries. *Journal of Acquired Immune Deficiency Syndromes*, 35(4), 407–420.
- Dunbar, R. I. M. (1998). The social brain hypothesis. *Brain*, 9 (10), 178–190.
- Dunbar, R. I. M. (2014). The social brain psychological underpinnings and implications for the structure of organizations. *Current Directions in Psychological Science*, 23(2), 109–114.
- Dunbar, R. I. M., & Shultz, S. (2007). Evolution in the social brain. *Science*, 317(5843), 1344–1347. <http://dx.doi.org/10.1126/science.1145463>
- Elgar, F. J. (2010). Income inequality, trust, and population health in 33 countries. *American Journal of Public Health*, 100(11), 2311–2315. <http://dx.doi.org/10.2105/AJPH.2009.189134>
- Elgar, F. J., & Aitken, N. (2011). Income inequality, trust and homicide in 33 countries. *European Journal of Public Health*, 21(2), 241–246. <http://dx.doi.org/10.1093/ejph/ckq068>
- Elgar, F. J., Craig, W., Boyce, W., Morgan, A., & Vella-Zarb, R. (2009). Income inequality and school bullying: Multilevel study of adolescents in 37 countries. *Journal of Adolescent Health*, 45(4), 351–359.
- Elgar, F. J., De Clercq, B., Schnohr, C. W., Bird, P., Pickett, K. E., Torsheim, T., ... Currie, C. (2013a). Absolute and relative family affluence and psychosomatic symptoms in adolescents. *Social Science & Medicine*, 91(0), 25–31. <http://dx.doi.org/10.1016/j.socscimed.2013.04.030>
- Elgar, F. J., Pickett, K. E., Pickett, W., Craig, W., Molcho, M., Hurrelmann, K., & Lenzi, M. (2013b). School bullying, homicide and income inequality: A cross-national pooled

- time series analysis. *International Journal of Public Health*, 58(2), 237–245. <http://dx.doi.org/10.1007/s00038-012-0380-y>
- Elgar, F. J., Roberts, C., Parry-Langdon, N., & Boyce, W. (2005). Income inequality and alcohol use: A multilevel analysis of drinking and drunkenness in adolescents in 34 countries. *European Journal of Public Health*, 15(3), 245–250.
- Fajnzylber, P., Lederman, D., & Loayza, N. (2002). Inequality and violent crime. *Journal of Law and Economics*, 45, 1–40.
- Fehr, E., & Gachter, S. (2002). Altruistic punishment in humans. *Nature*, 415(6868), 137–140.
- Fiske, S. T. (2011). *Envy up, scorn down: How status divides us*. New York, NY: Russell Sage Foundation.
- Francis, P. (2013). *Evangelii gaudium*. Vatican City: Vatican Press.
- Galea, S., Ahern, J., Tracy, M., & Vlahov, D. (2007). Neighborhood income and income distribution and the use of cigarettes, alcohol, and marijuana. *American Journal of Preventive Medicine*, 32(6 Suppl), S195–S202. <http://dx.doi.org/10.1016/j.amepre.2007.04.003>
- Galea, S., Ahern, J., Vlahov, D., Coffin, P. O., Fuller, C., Leon, A. C., & Tardiff, K. (2003). Income distribution and risk of fatal drug overdose in New York City neighborhoods. *Drug & Alcohol Dependency*, 70(2), 139–148.
- Gavrilets, S. (2012). Human origins and the transition from promiscuity to pair-bonding. *Proceedings of the National Academy of Sciences*, 109(25), 9923–9928.
- Gilbert, P., & Allan, S. (1998). The role of defeat and entrapment (arrested flight) in depression: An exploration of an evolutionary view. *Psychological Medicine*, 28(03), 585–598.
- Hales, S., Howden-Chapman, P., Salmond, C., Woodward, A., & Mackenbach, J. (1999). National infant mortality rates in relation to gross national product and distribution of income. *Lancet*, 354(9195), 2047.
- Hsieh, C.-C., & Pugh, M. D. (1993). Poverty, income inequality, and violent crime: A meta-analysis of recent aggregate data studies. *Criminal Justice Review*, 18, 182–202.
- Iacoviello, M. (2008). Household debt and income inequality, 1963–2003. *Journal of Money, Credit and Banking*, 40(5), 929–965.
- Ipsos-Mori, & Nairn, A. (2011). *Children's well-being in UK, Sweden and Spain: The role of inequality and materialism*. London: Unicef UK.
- Jaikumar, S., & Sarin, A. (2015). Conspicuous consumption and income inequality in an emerging economy: Evidence from India. *Marketing Letters*, 26(3), 279–292.
- James, O. (2007). *Affluenza*. London: Vermilion.
- Johnson, S. L., Leedom, L. J., & Muhtadie, L. (2012). The dominance behavioral system and psychopathology: Evidence from self-report, observational, and biological studies. *Psychological Bulletin*, 138(4), 692–743. <http://dx.doi.org/10.1037/a0027503>
- Johnson, S. L., Wibbels, E., & Wilkinson, R. (2015). Economic inequality is related to cross-national prevalence of psychotic symptoms. *Social Psychiatry and Psychiatric Epidemiology*, 50(12), 1799–1807. <http://dx.doi.org/10.1007/s00127-015-1112-4>
- Kalma, A. (1991). Hierarchisation and dominance assessment at first glance. *European Journal of Social Psychology*, 21(2), 165–181.
- Karriker-Jaffe, K. J., Roberts, S. C., & Bond, J. (2013). Income inequality, alcohol use, and alcohol-related problems. *American Journal of Public Health*, 103(4), 649–656.
- Kawachi, I., Kennedy, B. P., Gupta, V., & Prothrow-Stith, D. (1999). Women's status and the health of women and men: A view from the States. *Social Science & Medicine*, 48(1), 21–32.
- Kawachi, I., Kennedy, B. P., Lochner, K., & Prothrow-Stith, D. (1997). Social capital, income inequality, and mortality. *American Journal of Public Health*, 87(9), 1491–1498.
- Kim, D. A., Benjamin, E. J., Fowler, J. H., & Christakis, N. A. (2016). Social connectedness is associated with fibrinogen level in a human social network. *Proceedings of the Royal Society B*, 283,. <http://dx.doi.org/10.1098/rspb.2016.0958>
- Kondo, N., Sembajwe, G., Kawachi, I., van Dam, R. M., Subramanian, S. V., & Yamagata, Z. (2009). Income inequality, mortality, and self rated health: Meta-analysis of multilevel studies. *The BMJ*, 339, b4471.
- Krahn, H., Hartnagel, T. F., & Gartrell, J. W. (1986). Income inequality and homicide rates: Cross-national data and criminological theories. *The Sociological Quarterly*, 17, 303–313.
- Lancee, B., & Van de Werfhorst, H. G. (2012). Income inequality and participation: A comparison of 24 European countries. *Social Science Research*, 41(5), 1166–1178. <http://dx.doi.org/10.1016/j.ssresearch.2012.04.005>
- Layne, R. (2012). The association between income inequality and mental health: Testing status anxiety, social capital, and neo-materialist explanations. *European Sociological Review*, 28(4), 498–511.
- Layne, R., & Whelan, C. (2014). Who feels inferior? A test of the status anxiety hypothesis of social inequalities in health. *European Sociological Review*, 30, 525–535. <http://dx.doi.org/10.1093/esr/jcu057>
- Levine, A. S., Frank, R. H., & Dijk, O. (2010). Expenditure cascades. *SSRN Electronic Journal*, 1 (September 2010). <http://dx.doi.org/10.2139/ssrn.1690612>
- Lillard, D. R., Burkhauser, R. V., Hahn, M. H., & Wilkins, R. (2015). Does early-life income inequality predict self-reported health in later life? Evidence from the United States. *Social Science & Medicine*, 128, 347–355.
- Loughnan, S., Kuppens, P., Allik, J., Balazs, K., de Lemus, S., Dumont, K., ... Haslam, N. (2011). Economic inequality is linked to biased self-perception. *Psychological Science*, 22(10), 1254–1258. <http://dx.doi.org/10.1177/0956797611417003>
- Luxembourg Income Study. (2016). *New Luxembourg Wealth Study (LWS) Database*. Retrieved from <http://www.lisdatacenter.org/news-and-events/new-luxembourg-wealth-study-lws-is-launched/>
- McGuinness, D., McGlynn, L. M., Johnson, P. C., MacIntyre, A., Batty, G. D., Burns, H., ... Shiels, P. G. (2012). Socio-economic status is associated with epigenetic differences in the pSoBid cohort. *International Journal of Epidemiology*, 41(1), 151–160. <http://dx.doi.org/10.1093/ije/dyr215>
- Megarry, T. (1995). *Society in prehistory: The origins of human culture*. New York, NY: NYU Press.
- Melgar, N., & Rossi, M. (2010). A cross-country analysis of the risk factors for depression at the micro and macro level. *IDB Working Paper Series* (No. IDB-WP-195). Washington, DC: Inter-American Development Bank.

- Messias, E., Eaton, W. W., & Grooms, A. N. (2011). Economic grand rounds: Income inequality and depression prevalence across the United States: An ecological study. *Psychiatric Services*, 62(7), 710–712. <http://dx.doi.org/10.1176/appi.ps.62.7.710>
- Obama, B. (2014). State of the Union address. (Accessed 5 Dec 2014): <http://www.whitehouse.gov/the-press-office/2014/01/28/president-barack-obamas-state-union-address>
- Offer, A., Pechey, R., & Ulijaszek, S. (2012). *Insecurity, inequality, and obesity in affluent societies*. Oxford: Oxford University Press.
- Over, M. (1998). The effects of societal variables on urban rates of HIV infection in developing countries: An exploratory analysis. In *Confronting AIDS: Evidence from the developing world*. (pp. 39–51). Brussels and Washington, DC: European Commission and World Bank.
- Paskov, M., & Dewilde, C. (2012). Income inequality and solidarity in Europe. *Research in Social Stratification and Mobility*, 30(4), 415–432. <http://dx.doi.org/10.1016/j.rssm.2012.06.002>
- Pickett, K. E., Kelly, S., Brunner, E., Lobstein, T., & Wilkinson, R. G. (2005). Wider income gaps, wider waistbands? An ecological study of obesity and income inequality. *Journal of Epidemiology & Community Health*, 59(8), 670–674.
- Pickett, K., & Vanderbloemen, L. (2015). Mind the gap: Tackling social and educational inequality. *Cambridge Primary Review Trust Report*, 4.
- Pickett, K. E., & Wilkinson, R. G. (2007). Child wellbeing and income inequality in rich societies: Ecological cross sectional study. *The BMJ*, 335(7629), 1080.
- Pickett, K. E., & Wilkinson, R. G. (2010). Inequality: An underacknowledged source of mental illness and distress. *British Journal of Psychiatry*, 197, 426–428.
- Pickett, K. E., & Wilkinson, R. G. (2015a). The ethical and policy implications of research on income inequality and child well-being. *Pediatrics*, 135(Suppl 2), S39–S47. <http://dx.doi.org/10.1542/peds.2014-3549E>
- Pickett, K. E., & Wilkinson, R. G. (2015b). Income inequality and health: A causal review. *Social Science & Medicine*, 128, 316–326. <http://dx.doi.org/10.1016/j.socscimed.2014.12.031>
- Piff, P. K. (2014). Wealth and the inflated self: Class, entitlement, and narcissism. *Personality and Social Psychology Bulletin*, 40(1), 34–43. <http://dx.doi.org/10.1177/0146167213501699>
- Piff, P. K., Kraus, M. W., Cote, S., Cheng, B. H., & Keltner, D. (2010). Having less, giving more: The influence of social class on prosocial behavior. *Journal of Personality and Social Psychology*, 99(5), 771–784. <http://dx.doi.org/10.1037/a0020092>
- Piff, P. K., Stancato, D. M., Côté, S., Mendoza-Denton, R., & Keltner, D. (2012). Higher social class predicts increased unethical behavior. *Proceedings of the National Academy of Sciences*, 109(11), 4086–4091. <http://dx.doi.org/10.1073/pnas.1118373109>
- Piketty, T., & Saez, E. (2007). Income and wage inequality in the US 1913–2002. In A. Atkinson, & T. Piketty (Eds.), *Top incomes over the twentieth century*. Oxford: Oxford University Press.
- Popper, K. (2014). *Conjectures and refutations: The growth of scientific knowledge*. Abingdon: Routledge.
- Provençal, N., & Binder, E. B. (2015). The effects of early life stress on the epigenome: From the womb to adulthood and even before. *Experimental Neurology*, 268, 10–20. <http://dx.doi.org/10.1016/j.expneurol.2014.09.001>
- Putnam, R. D. (1993). *Making democracy work: Civic traditions in modern Italy*. Princeton: Princeton University Press.
- Putnam, R. D. (2000). *Bowling alone: The collapse and revival of American community*. New York: Simon and Schuster.
- Ram, R. (2006). Further examination of the cross-country association between income inequality and population health. *Social Science & Medicine*, 62(3), 779–791.
- Rothstein, B., & Uslaner, E. (2005). All for all: Equality, corruption and social trust. *World Politics*, 58, 41–72.
- Rufrancos, H., Power, M., Pickett, K. E., & Wilkinson, R. (2013). Income inequality and crime: A review and explanation of the time-series evidence. *Sociology and Criminology*, 1, 103.
- Runciman, W. G. (2005). Stone age sociology. *Journal of the Royal Anthropological Institute*, 11(1), 129–142.
- Sahlins, M. (2003). *Stone age economics*. London: Routledge.
- Schor, J. B. (1999). *The overspent American: Why we want what we don't need*. New York, NY: HarperCollins.
- Siddiqi, A., Kawachi, I., Berkman, L., Subramanian, S. V., & Hertzman, C. (2007). Variation of socioeconomic gradients in children's developmental health across advanced Capitalist societies: Analysis of 22 OECD nations. *International Journal of Health Services*, 37(1), 63–87.
- Simmons, R. G., & Rosenberg, M. (1971). Functions of children's perceptions of the stratification system. *American Sociological Review*, 36, 235–249.
- Slavich, G. M., & Cole, S. W. (2013). The emerging field of human social genomics. *Clinical Psychological Science*, 1(3), 331–348.
- Sloman, L., & Gilbert, P. (2000). *Subordination and defeat: An evolutionary approach to mood disorders and their therapy*. Abingdon: Routledge.
- Subramanian, S. V., & Kawachi, I. (2004). Income inequality and health: What have we learned so far? *Epidemiological Reviews*, 26, 78–91.
- Tang-Smith, E., Johnson, S. L., & Chen, S. (2015). The dominance behavioural system: A multidimensional transdiagnostic approach. *Psychology and Psychotherapy: Theory, Research and Practice*, 88(4), 394–411.
- Twenge, J. M., Campbell, W. K., & Freeman, E. C. (2012). Generational differences in young adults' life goals, concern for others, and civic orientation, 1966–2009. *Journal of Personality and Social Psychology*, 102(5), 1045–1062. <http://dx.doi.org/10.1037/a0027408>
- Twenge, J. M., & Donnelly, K. (2016). Generational differences in American students' reasons for going to college, 1971–2014: The rise of extrinsic motives. *Journal of Social Psychology*, 156(6), 620–629. <http://dx.doi.org/10.1080/00224545.2016.1152214>
- Twenge, J. M., Konrath, S., Foster, J. D., Campbell, W. K., & Bushman, B. J. (2008). Egos inflating over time: A cross-temporal meta-analysis of the Narcissistic Personality Inventory. *Journal of Personality*, 76(4), 875–902. <http://dx.doi.org/10.1111/j.1467-6494.2008.00507.x>
- Unicef. (2016). *Fairness for children. A league table of inequality in child well-being in rich countries*. Florence, Italy: Unicef Innocenti Centre.

- Uslaner, E. M. (2002). *The moral foundations of trust*. Cambridge: Cambridge University Press.
- Uslaner, E. M., & Brown, M. (2005). Inequality, trust, and civic engagement. *American Politics Research*, 33(6), 868–894. <http://dx.doi.org/10.1177/1532673x04271903>
- Veblen, T. (2007). *The theory of the leisure class*. Oxford: Oxford University Press.
- Walasek, L., & Brown, G. D. (2015). Income inequality and status seeking searching for positional goods in unequal US states. *Psychological Science*, 26(4), 527–533.
- Walasek, L., & Brown, G. D. (2016). Income inequality, income, and internet searches for status goods: A cross-national study of the association between inequality and well-being. *Social Indicators Research*, 129(3), 1001–1014. <http://dx.doi.org/10.1007/s11205-015-1158-4>
- Wilkinson, R. G., & Pickett, K. E. (2006). Income inequality and population health: A review and explanation of the evidence. *Social Science & Medicine*, 62(7), 1768–1784.
- Wilkinson, R. G., & Pickett, K. E. (2007). The problems of relative deprivation: Why some societies do better than others. *Social Science & Medicine*, 65(9), 1965–1978.
- Wilkinson, R. G., & Pickett, K. E. (2008). Income inequality and socioeconomic gradients in mortality. *American Journal of Public Health*, 98(4), 699–704.
- Wilkinson, R. G., & Pickett, K. E. (2009a). *The spirit level: Why more equal societies almost always do better*. London: Penguin.
- Wilkinson, R. G., & Pickett, K. E. (2009b). Income inequality and social dysfunction. *Annual Review of Sociology*, 35, 493–512.
- Williams, R. J., Volberg, R. A., & Stevens, R. M. G. (2012). *The population prevalence of problem gambling: Methodological influences, standardized rates, jurisdictional differences and worldwide trends*. Ontario, Canada: Ontario Problem Gambling Research Centre & the Ontario Ministry of Health and Long Term Care.
- Wood, A. M., Boyce, C. J., Moore, S. C., & Brown, G. D. (2012). An evolutionary based social rank explanation of why low income predicts mental distress: A 17 year cohort study of 30000 people. *Journal of Affective Disorders*, 136(3), 882–888. <http://dx.doi.org/10.1016/j.jad.2011.09.014>
- Woodburn, J. (1982). Egalitarian societies. *Man*, 17, 431–451.
- World Advertising Research Center Ltd (2007). *World advertising trends 2007*. World Advertising Research Center Ltd: Henley on Thames.
- Zheng, H. (2012). Do people die from income inequality of a decade ago? *Social Science & Medicine*, 75(1), 36–45. <http://dx.doi.org/10.1016/j.socscimed.2012.02.042>