

PSYCHOLOGY MISCELLANY

No.152 - 15th August 2021

Politics and Economics

Kevin Brewer

ISSN: 1754-2200

orsettpsychologicalservices@phonecoop.coop

This document is produced under two principles:

1. All work is sourced to the original authors. The images are all available in the public domain (most from http://commons.wikimedia.org/wiki/Main_Page). You are free to use this document, but, please, quote the source (Kevin Brewer 2021) and do not claim it as you own work.

This work is licensed under the Creative Commons Attribution (by) 3.0 License. To view a copy of this license, visit <http://creativecommons.org/licenses/by-nc-nd/3.0/> or send a letter to Creative Commons, 171 2nd Street, Suite 300, San Francisco, California, 94105, USA.

2. Details of the author are included so that the level of expertise of the writer can be assessed. This compares to documents which are not named and it is not possible to tell if the writer has any knowledge about their subject.

Kevin Brewer BSocSc, MSc

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/>.

CONTENTS

Page Number

1. POLITICAL NEUROSCIENCE

4

- 1.1. Three strands of research
 - 1.2. Overconfidence
 - 1.2.1. Increasing awareness
 - 1.3. Moral grandstanding
 - 1.4. Visceral politics
 - 1.4.1. Novelty seeking
 - 1.5. Ideological obsession
 - 1.5.1. Alt-right
 - 1.5.2. Need for chaos
 - 1.6. Basal cognition
 - 1.7. Appendix 1A - Confirmation bias
 - 1.8. Appendix 1B - Zmigrod et al (2021)
 - 1.9. Appendix 1C - Populism
 - 1.9.1. Debate: Is the world changing faster than ever?
 - 1.10. Appendix 1D - Statistical significance
 - 1.11. References
- Addendum - Reminders of inequality

2. NON-HUMAN PRIMATE ECONOMIC BEHAVIOUR

32

1. POLITICAL NEUROSCIENCE

- 1.1. Three strands of research
- 1.2. Overconfidence
 - 1.2.1. Increasing awareness
- 1.3. Moral grandstanding
- 1.4. Visceral politics
 - 1.4.1. Novelty seeking
- 1.5. Ideological obsession
 - 1.5.1. Alt-right
 - 1.5.2. Need for chaos
- 1.6. Basal cognition
- 1.7. Appendix 1A - Confirmation bias
- 1.8. Appendix 1B - Zmigrod et al (2021)
- 1.9. Appendix 1C - Populism
 - 1.9.1. Debate: Is the world changing faster than ever?
- 1.10. Appendix 1D - Statistical significance
- 1.11. References
- Addendum - Reminders of inequality

1.1. THREE STRANDS OF RESEARCH

"Political neuroscience" is a growing field that uses insights from cognitive science to understand "the origins of voting behaviour and ideological worldviews" (Zmigrod and Tsakiris 2021 p1).

Ideological behaviour can be defined as "behaviour that is epistemically dogmatic and interpersonally intolerant towards non-adherents or non-members. In other words, a person thinking or behaving 'ideologically' is rigidly adhering to a doctrine, resisting credible evidence when forming opinions, and selectively antagonistic to individuals who do not follow their ideological group or cause" (Zmigrod and Tsakiris 2021 pp1-2). Such behaviour is not just related to politics, but also religion and other aspects of society (eg: gender; social class).

Zmigrod and Tsakiris (2021) outlined three strands of research on the "political brain":

1. Computational approaches - eg: computational modelling of human behaviour.

For example, dogmatism and poor decision-making go together (Zmigrod et al 2021) - ie: "dogmatism may emerge owing to general tendencies to make impulsive decisions

based on imperfectly processed evidence" (Zmigrod and Tsakiris 2021 p3) (appendix 1A).

De Dreu et al (2021) modelled a political conflict where parties attack or defend the status quo (like the UK leaving or remaining as a member of the EU) as a two-player game. At the most basic, each player assesses the pay-off from fighting or yielding. A number of predictions can be made from the model, like "both attacker and defender should try to predict their rival's future play and, at the same time, hide their own true intentions from their rival" (De Dreu et al 2021 p3).

But theoretical models are different to actual humans for various reasons, including (De Dreu et al 2021):

a) Individual differences - "People with pro-social preferences attach a positive weight to others' welfare, value equality or want to avoid harming others, whereas people with anti-social preferences attach a negative weight to others' welfare, value winning and lack empathy for harming others" (De Dreu et al 2021 p4).

b) Cognitive biases in decision-making - eg: overconfidence; sub-optimal assessment of costs and benefits; wrong beliefs about rivals (appendix 1B).

c) Features of the political context - eg: power differences between players; the ability to make or break alliances; cohesiveness of a group).

Social categorisation is the process by which people are divided into in-group or out-group members. "Dyadic similarity" is seen as a key factor in this process - ie: "we could compare our own social identities against those of the target person to infer similarity to the target, whether through direct or implied means" (Lau 2021 p2).

Lau (2021) questioned this as visual cues to group membership may not be available, and individuals are members of different groups at the same time and so similarity may change in different contexts.

Lau (2021) developed a generalisable computational model to predict "the degree of similarity between targets and perceivers that is required for perceivers to view targets as in-group members" (pp2-3). Data are collected by presenting three individuals with different views on the same issue, and the task is to pair two of them. Over many trials, the similarity space can be created based on probability levels of agreement. This is

described as latent structure learning or the latent groups account.

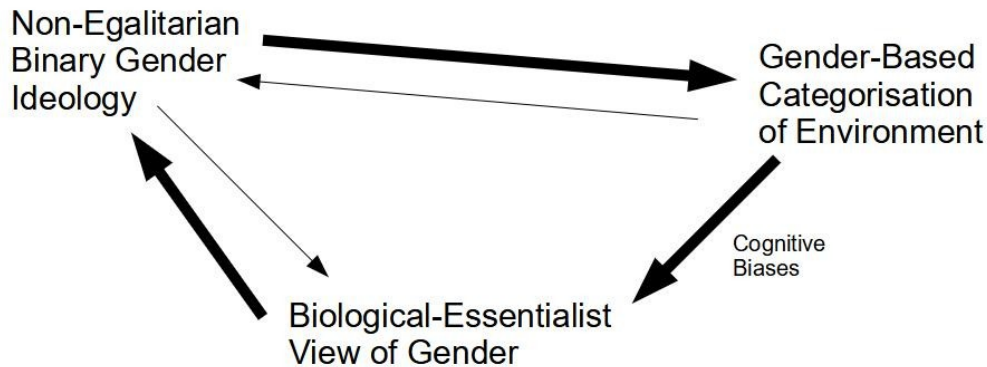
Lau (2021) found from this approach that social categorisation depends on contextual factors more than just dyadic similarity, and "we can move beyond thinking about political allegiance as a static, immutable affiliation and rather as a changeable, evolving function of all possible current political party allegiances" (p5).

The process of categorising the world underlies ideology, as in the case of gender as "the way individuals think about, and make sense of, gender differences plays a central role in shaping their gender ideology" (Saguy et al 2021). Gender ideology here refers to "a set of beliefs about the proper order of society in terms of the roles women and men should fill" (Saguy et al 2021 p1). This includes support for the division of paid work and family responsibilities along gender lines.

Research using statements like, "A man's job is to earn money, a woman's job is to look after the home and family", and "It is more important for a wife to help her husband's career than to have one herself", can assess the non-egalitarian basis of gender ideology (Saguy et al 2021).

Holding non-egalitarian gender ideology can be linked to the categorising of differences between men and women stemming from biological differences between them (a biological-essentialist view). For example, Brescoll and LaFrance (2004) found that participants who read about biologically determined differences between the sexes were more likely to endorse traditional gender stereotypes than participants reading about gender differences originating in socialisation. "A biological-essentialist view of gender was further found to shape support for broader patterns of gender hierarchy. Because according to this view differences between men and women are seen as natural, differences in power and status between these groups can be attributed to inevitable and justified reasons" (Saguy et al 2021).

Putting all of this together, Saguy et al (2021) described "the gender-binary cycle", self-perpetuated by "a biological-essentialist view of gender differences, a non-egalitarian gender ideology, and a binary organisation of the environment along gender lines" (p1) (figure 1.1).



(Based on figure 1 Saguy et al 2021)

Figure 1.1 - Gender-binary cycle.

2. Neurocognitive perspectives - eg: neuroimaging.

For example, functional magnetic resonance imaging (fMRI) during a task to categorise "racially ambiguous faces" showed activity in the anterior insula area of the brain (Krosch et al 2021) (table 1.1). The categorisation process can involve "hypo-descent" - "a type of social discrimination whereby multi-racial individuals are categorised in terms of their 'socially subordinate' racial group" (Zmigrod and Tsakiris 2021 p3). Political conservatives were more likely to use hypo-descent and to show greater activity in the anterior insula. "A neural sensitivity to racial ambiguity - and not necessarily racial animus against black individuals - may therefore be an important process underlying toxic and discriminatory behaviour" (Zmigrod and Tsakiris 2021 p3).

- Forty-six White undergraduate psychology students in New York self-reported their political ideology on an eleven-point scale, from "extremely liberal" to "extremely conservative" before undergoing fMRI scanning.
- During the scan, participants rated faces of individuals as "Black" or "White". A range of faces were adapted from photographs by a computer programme to range from 100% Black to 100% White (at 10% increments). The middle range of faces (ie: mixed heritage) were most interesting to the researchers in terms of categorisation.

- There was a non-significant relationship found, in that increased political conservatism was associated with a lower threshold for categorising mixed-race faces as Black (known as the point of subjective equality). In terms of the neuroimaging results, activity in the bilateral anterior insula was important. This was associated with the racial ambiguity of a face, such that "White political conservatives showed stronger insula sensitivity to racial ambiguity than liberals, and this helped to explain their lower threshold for categorising an ambiguous face as Black (ie: hypo-descent). These results suggest that ideological differences in race categorisation may not necessarily be driven by racial animus against Black targets, but rather reactions to deviations from either the White or Black prototype. In other words, hypo-descent may stem from ideological differences in the intolerance of racial ambiguity" (Krosch et al 2021 p6).

Table 1.1 - Details of Krosch et al (2021).

Haas et al (2021) investigated brain activity in response to political candidates with fMRI scanning of 48 US adults. Participants read about hypothetical Democrat or Republican candidates and their policy position on a certain issue. The position was either as expected (congruent) or opposite (incongruent) for their party, and the degree of certainty was varied ("may support" or "definitely supports"). There were eight independent experimental conditions based on three independent variables - certainty of position, congruence with party, and participant's own political preference.

The insula cortex and the anterior cingulate cortex were active areas of the brain of interest. Both these areas were more active in response to an incongruent/certain candidate (ie: a definite policy position that was opposite to expected) than incongruent/uncertain. But with the congruent candidates, greater activation of these areas was observed in uncertain than certain conditions.

These areas of the brain are involved in evaluation of information, and the findings here suggested sensitivity to information that is incongruent (ie: unexpected).

Neuropsychology and neuroscience generally compare brain injured and healthy individuals to understand the workings of the brain. Nam et al (2021) did this for political orientations (ie: liberal or conservative).

Eighteen individuals with frontal lobe damage (lesions) and 26 with damage to areas including the amygdala, who were patients at a New York hospital, were compared to eighteen healthy controls. Participants rated

themselves on an eleven-point scale from 1 (extremely liberal) to 6 (neither) to 11 (extremely conservative), as well as completing other political attitude measures.

The frontal lobe damaged participants were significantly more politically conservative than the other two groups, but amygdala damage was unrelated to political orientation.

Nam et al (2021) made this point: "we are not in any way suggesting that holding liberal or "conservative attitudes is reflective of neural deficits or damage. Rather, the lesion method illuminates which neuroanatomical regions – and the cognitive functions related to them – may be necessary for understanding the development of political ideology. It is also important to keep in mind that studies of brain structure, including lesion studies, do not rule out effects of neural reorganisation and malleability. Accordingly, we strongly caution against deterministic or essentialised interpretations of our research" (p7).

This research fits with the assumption of political neuroscience of links between brain functions and structures, and political ideology. Nam et al (2021) explained that there is "a rich literature that conceptualises political ideology as a belief system that is motivated by basic social, cognitive and motivational needs. Theory and evidence indicate that liberals (or leftists) and conservatives (or rightists) are motivated by fairly different psychological preferences and tendencies. Whereas conservatism is associated with heightened preferences for cognitive consistency, closure and structure, as well as greater attention to threat and needs for security, liberalism is associated with increased tolerance for uncertainty, ambiguity and cognitive conflict" (p2).

It is assumed that the political orientations of conservative and liberal are universals. There is great variety in political views around the world, and a label in one place may differ from another (eg: populism; appendix 1C).

Misinformation seems to be magnified by modern social media. But the acceptance of such information does depend on its alignment with an individual's worldview ("self-reinforcing (SR) accounts"), according to one view, or the failure to process the information deeply ("effortful rejection"; ER), by another. The identity-based hybrid (I-bH) approach combines both views – individuals are motivated to process information differently depending on whether it aligns with their

worldview (self identity) (Moore et al 2021).

Neuroimaging has been used to study brain activity when processing misinformation. Moore et al (2021) did this with Brexit in the UK. Thirty-eight adults who self-identified as "Remain" supporters underwent fMRI scanning, while reading 120 Brexit-related tweets (half positive and half negative about Brexit). Participants rated each tweet as "true" on a seven-point scale.

The rating of true was associated with alignment with beliefs, as expected. For example, a tweet like, "UK will be £135 bn richer with a no-deal Brexit" (positive about Brexit) was rated as less true than, "Brits face longer passport queues after Brexit" (negative about Brexit). Brain areas related to judgments of the self and others were active, as well as the automatic or shallow processing of information. Moore et al (2021) saw the findings as "ultimately supporting motivated cognition accounts of misinformation endorsement" (p1) (ie: the I-bH approach, and SR accounts).

3. Behavioural studies - eg: polarisation.

Zmigrod and Tsakiris (2021) noted the key themes like uncertainty and decision-making and cognitive processes, and the role of social influence in the union of political psychology and neuroscience in political neuroscience.

Much of the research in political neuroscience is looking for universal patterns of behaviour. But Romano et al (2021) showed that cultural context was important in differences in national parochialism (ie: greater co-operation with members of one's nation compared to other nations). Liberals are viewed as lower on this characteristic than conservatives.

Romano et al (2021) analysed data from over 18 000 online participants in forty-two nations. The study involved a co-operation game (eg: sharing of a small amount of money) where the partner was presented as from the same or another nation.

As a rule, self-identified conservatives co-operated more with partners from the same nation than another one, while self-identified liberals showed no difference. But this pattern varied between countries depending on the characteristics of the nation like wealth, rule of law, and government effectiveness. The difference was stronger in nations with greater wealth, a stronger rule of law and government effectiveness.

1.2. OVERCONFIDENCE

There is concern about susceptibility to false/fake news. For example, "though Americans believe confusion caused by false news is extensive, relatively few indicate having seen or shared it – a discrepancy that suggests that members of the public may not only have a hard time identifying false news, but also fail to recognise their own deficiencies at doing so" (Lyons et al 2021 p1).

Lyons et al (2021) were interested in this over confidence: "If people incorrectly see themselves as highly skilled at identifying false news, they may unwittingly be more likely to consume, believe, and share it, especially if it conforms to their worldview" (p1).

These researchers reported two large-scale studies in the USA. Over 8000 individuals were surveyed by "YouGov" between October 2018 and January 2019 (covering a period of mid-term elections). Firstly, participants rated the accuracy of real and false political headlines formatted to appear like a Facebook news feed. Individuals were given an accuracy score (out of 100), and this was the measure of actual accuracy.

Perceived or self-rated accuracy was measured by individuals scoring themselves on a scale between 1 and 100 in response to the question: "How do you think you compare to other Americans in your general ability to recognise news that is made up?".

Next, the news websites visited was collected by a computer programme that participants consented to download. The websites were subsequently divided into mainstream or false news.

Overconfidence generally is a cognitive bias in decision-making, and it is linked to accurate self-assessment of abilities. The Dunning-Kruger effect (DKE) (Kruger and Dunning 1999) describes "a general tendency of poor performers in social and intellectual domains to be unaware of their own deficiency. By contrast, the most competent performers slightly underestimate their own ability relative to others due to a form of false consensus effect in which they assume others are performing more similarly to themselves than they really are" (Lyons et al 2021 p2). For poor performers, there is a "double bind": "Not only does a lack of expertise produce errors in the first place, it also prevents recognition of these errors and awareness of others' capabilities" (Lyons et al 2021 p2).

Applying this to spotting false news, these individuals are poor in actual accuracy and poor in self-

perception of abilities (ie: rate themselves as accurate - overconfidence).

Lyons et al (2021) divided the participants into four groups for analysis based on actual accuracy. The least accurate group had an average around 10 out of 100, but the mean perceived ability was around 60, while the most accurate group had a performance average around 80 and a self-perception score in the 60s. This was evidence of the DFE.

The researchers found that overconfident individuals visited more false news websites, and were more likely to share false headlines. In sum: "The individuals who are least equipped to identify false news content are also the least aware of their own limitations and, therefore, more susceptible to believing it and spreading it further" (Lyons et al 2021 p1).

The findings suggested that "overconfidence may be a crucial factor for explaining how false and low-quality information spreads via social media. Many people are simply unaware of their own vulnerability to misinformation" (Lyons et al 2021 p7).

1.2.1. Increasing Awareness

Salovich and Rapp (2021) observed that "fiction, including movies, TV shows, and popular novels, often includes assertions and claims that could serve as fodder for informing everyday judgments and decisions, as offered through character discussions, narration, and unfolding events... These contents frequently include inaccurate statements and ideas, especially when creators prioritise entertainment over accuracy. People do not seem to consistently evaluate these inaccuracies, nor reflect deeply on the fact that they could be influenced by such information... As a consequence, fiction-embedded inaccuracies may influence judgments about reality" (p608).

In terms of research, Marsh et al (2003) presented stories in which characters sometimes gave inaccurate factual information, like Oslo as the capital of Finland (when it is Norway). In a subsequent general knowledge quiz, participants who had heard the wrong information were more likely to give that answer. "This occurs not only for participants who may not have known the correct answer prior to reading the text, and thus learned new, albeit incorrect information, but also for participants who possess relevant prior knowledge they could have used to discount the inaccuracies" (Salovich and Rapp 2021

p608).

Validation should help deal with false information. This describes "the evaluative processes necessary for detecting and encoding the consistency, congruence, and coherence of information" (Salovich and Rapp 2021 p609), and it may be based on prior knowledge (knowledge-based validation) or the logic of the narrative (consistency checking). But validation is "less likely if the false information is difficult to detect, such as when it is a subordinate rather than central idea of a sentence" (Salovich and Rapp 2021 p609). Furthermore, individuals may not be motivated to engage in evaluation, and this can be linked to the perceived susceptibility to false information.

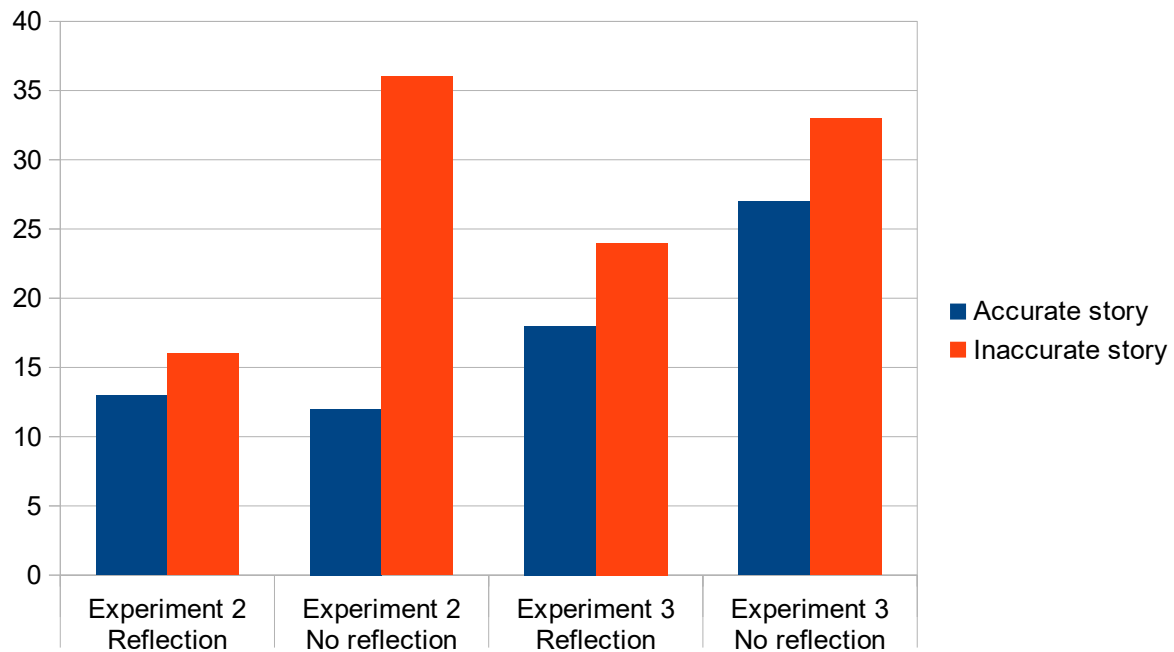
Salovich and Rapp (2021) explored the latter and how to increase accuracy in three experiments. In Experiment 1, online participants assessed their ability to detect false information after reading a story including accurate or inaccurate facts. The story was called "The Kidnapping" (about college students and pranks), which included statements like "Wearing a seatbelt can increase your chances of living through an accident" (accurate) or "Wearing a seatbelt can reduce your chances of living through an accident" (inaccurate version).

Participants who read the story with inaccurate information agreed with the information in a later test significantly more than participants with the "accurate story" (36% vs 12% on average) (appendix 1D). In terms of self-assessment of ability to spot false information, "people who estimated they would be better at detecting and discounting inaccurate information actually made more judgment errors after reading false content than those who reported lower self-estimates" (Salovich and Rapp 2021 p612). Put simply, participants were influenced by false information they had read, especially if they believed they could not be fooled (ie: low metacognition).

Experiment 2 was a replication of Experiment 1, but added a condition where participants were prompted to reflect on the information they were reading (eg: "Remember to consult what you already know while reading"). Participants believed less false information as true in the reflection conditions. Reflection did also have some influence on self-assessment of ability to spot false information. Experiment 3 was a direct replication of Experiment 2 with more online participants (figure 1.2).

Salovich and Rapp (2021) concluded: "Appealing to people's metacognitive considerations appears to motivate

more careful consideration of the accuracy of information, and also potentially increase awareness of potential effects of inaccurate exposures" (p617).



(Data from table 1 p612 Salovich and Rapp 2021)

Figure 1.2 - Mean error rates (%) (ie: believing that false information is true) in Experiments 2 and 3.

1.3. MORAL GRANDSTANDING

“Moral grandstanding” (MG) has been coined to describe “a use of moral talk that attempts to get others to make certain desired judgments about oneself, namely, that one is worthy of respect or admiration because one has some particular moral quality – for example, an impressive commitment to justice, a highly tuned moral sensibility, or unparalleled powers of empathy. To grandstand is to turn one’s contribution to public discourse into a vanity project” (Tosi and Warmke 2016 p199).

MG includes a “recognition desire” - “the grandstander simply wants a general form of admiration or respect for being ‘on the side of the angels’” (Tosi and Warmke 2016 p201). This can be in relation to one’s own group (the in-group) or the outgroup. The recognition desire is achieved through the “grandstanding

expression", where the individual aims to say or write something of importance (Tosi and Warmke 2016).

Tosi and Warmke (2016) outlined five manifestations of MG:

i) "Piling on" - ie: "the reiteration of something that has already been said in order to get in on the action, and to register one's inclusion on what one believes to be the right side" (Tosi and Warmke 2016 pp203-204).

ii) "Ramping up" - Making increasingly stronger or more extreme claims about the issue under discussion ("a sort of moral arms race"; Tosi and Warmke 2016 p205).

iii) "Trumping up" - This is "the insistence on the existence of a moral problem where there is none. If grandstanders are eager to show that they are morally respectable, they may be too eager to identify as moral problems things that others have (correctly) taken to be morally unproblematic. Trumping up functions to show that one is morally respectable insofar as one has, for example, a keener moral sense than others. Whereas some alleged injustices fall below the moral radar of many, they are not missed by the vigilant eye of the morally respectable" (Tosi and Warmke 2016 p206).

iv) Excessive emotional displays - Individuals use moral outrage "to signal that they are more affected by moral disorder in the world, or empathise more fully with victims of wrongdoing" (Tosi and Warmke 2016 p207).

v) Claims of self-evidence - The claim that the view of the grandstander is so obviously right. "Claims of self-evidence can be used to signal that one's moral sensibilities are more finely tuned than those of others, and thus that one is morally respectable. What is not obvious to others is painfully obvious to the grandstander. Moreover, any suggestion of moral complexity or expression of doubt, uncertainty, or disagreement is often declaimed by the grandstander as revealing a deficiency in either sensitivity to moral concerns or commitment to morality itself" (Tosi and Warmke 2016 pp207-208).

Tosi and Warmke (2016) saw MG as problematic because of "three bad effects":

a) Increased cynicism - Distrust of the sincerity of

individuals advocating a moral position, and the important points about the issue are lost to the cynics. In other words, a genuine moral point is dismissed as MG.

b) Outrage exhaustion - Genuine moral outrage is dismissed as part of MG.

c) Group polarisation - ie: the move to extreme positions.

MG is not about the moral issue, but about the grandstander. "Individual acts of grandstanding are typically self-promoting, and so grandstanding can reveal a narcissistic or egoistic self-absorption. Public moral discourse involves talking about serious and important issues: the evaluation of conditions that greatly affect the well-being of millions of people, the levelling of accusations that could ruin lives, the consideration of a policy that could save or ruin a state and its subjects, and so on. These are matters that generally call for other-directed concern, and yet grandstanders find a way to make discussion at least partly about themselves" (Tosi and Warmke 2016 p215).

Along with this, grandstanders "sometimes implicitly claim an exalted status for themselves as superior judges of the content of morality and its proper application. Grandstanding can thus be a kind of 'power grab'. For instance, one might employ grandstanding in order to seek greater status within an in-group as a kind of moral sage" (Tosi and Warmke 2016 p214).

1.4. VISCERAL POLITICS

Tsakiris et al (2021) introduced the concept of "visceral politics". This is "the intersection of the body's physiology, experienced emotion, and political behaviour, and highlights the ways in which the physiological, emotive nature of our engagement with the social world shapes our political decisions and behaviour, and in turn how socio-political forces recruit physiology and emotions to influence our politics" (Tsakiris et al 2021 p1).

Tsakiris et al (2021) explained: "The brain has recently come to be viewed as a predictive organ that strives to predict future states of the world. Recent approaches have further refined such predictive models by viewing the body as a hyper-prior suggesting that the brain must first and foremost predict future states of

the body with the aim of achieving a dynamic regulation of bodily states through change. In other words, the brain strives to predictively adjust bodily states in response to actual and/or anticipated demands, a process which is called allostasis" (p2). Uncertainty about the environment or the social world upsets the balance, and produces "allostatic load" (ie: high physiological arousal or stress). "The brain serves the body by maintaining pro-actively a healthy 'body-budget' [Barrett 2017] in anticipation of future situations that may put the organism at risk" (Tsakiris et al 2021 p2). Allostatic load challenges this body-budget.

Depletions of the body-budget affects political behaviour. For example, stressed individuals, who consequently suffer sleep deprivation, are less likely to vote (Tsakiris et al 2021). Another consequence of uncertainty is the dominance of emotions (visceral states) (over cognition) in political decision-making. For example, anxiety, fear, and perceptions of threat influence which politicians to support (eg: authoritarian ones) (Tsakiris et al 2021).

Tsakiris et al (2021) performed a study with thirty-nine volunteers in London as evidence of visceral politics. The participants completed questionnaires about political beliefs, and characteristics like anxiety. Then they completed a "leader choice task" while their heart rate was measured. This task involved two computer generated faces (candidates) and the decision of which one to vote for in a hypothetical national election. There were ninety trials, and the faces were presented very quickly. The faces were varied on trustworthiness and dominance.

In terms of political beliefs, the sample was predominantly liberal (as opposed to conservative), and overall, candidates with higher perceived trustworthiness and lower perceived dominance were preferred. However, leader choice was modulated by the phase of the heartbeat.

Tsakiris et al (2021) described the findings as "proof-of-concept" for visceral politics (ie: it "provides preliminary evidence for the role that interoceptive signals may play in biasing political leader choices"). The point was that the decision of the candidate was so fast that it had to be automatic, and the unconscious bodily signals (in this case heartbeat cycle) influenced the decision.

Tsakiris et al (2021) ended: "Politics have always been visceral. We have always faced existential threats

and looked to our political systems to attempt to address them. Equally, our bodily states and their regulation, our emotions and their expression have always been integral to our political life and societal organisation. Understanding the specific ways in which this viscerality interacts with our current political practices will help to explain why the uncertain world we live in *now* feels the way it does".

1.4.1. Novelty Seeking

"Innate attraction to novelty is thought to be an evolutionary pre-requisite for complex learning and guides organisms toward acquisition of adaptive behavioural repertoires" (Faranbakhsh and Siciliano 2021 p684). But, on the down side, high novelty-seeking is linked to problem behaviours like addiction (Faranbakhsh and Siciliano 2021).

Novelty-seeking in mice, say, is studied with the free-access double-choice task. An individual animal is placed in an arena with a familiar object at one end and a novel object at the other. The time spent interacting with each object can be recorded. Ahmadlou et al (2021) is an example of such studies. "Video analysis and statistical modelling revealed that animals interacted more with novel stimuli, and with stereotypic action sequences (such as bite, grab, and carry), which diverged on the basis of familiarity. When mice approached and sniffed objects, the probability of subsequently biting was greater when the object was novel, and the sniff-to-bite transition marked the onset of long bouts of continuous investigation. This allowed for interaction bouts to be separated into 'deep' investigations, when sniff-bite was the first transition, or 'shallow' when it was not" (Faranbakhsh and Siciliano 2021 p685).

Studying the neurobiology of such behaviour, Ahmadlou et al (2021) focused on neurons in the medial zona incerta (a cortico-sub-thalamic-hindbrain circuit of neurons widely connected to other areas of the brain, and the spinal cord). Neuronal activity was different during deep and shallow investigation of novel objects. Simply, the activation of this area during deep investigation was positive reinforcement and so drove the behaviour of novelty exploration (Faranbakhsh and Siciliano 2021).

1.5. IDEOLOGICAL OBSESSION

Belanger (2021) considered the motivation to join violent ideological groups as "ideological obsession" (or "obsessive ideological passion"), using an addiction framework. "Much like other addictions, the manifestations of ideological obsession consist of strong irresistible impulses, recurrent conflicts with other life domains, giving up other activities and the pursuit of one's ideology despite it being both psychologically and physically hazardous" (Belanger 2021 p1).

Key to addiction is "a common genesis: the desire to fill a void. In fact, whether people indulge excessively in drug use or become firebrands of an ideology, addictions often originate from people experiencing a feeling that their own lives are worthless, spoiled and meaningless" (Belanger 2021 p2). This is a "loss of personal significance" (Belanger 2021). Belanger (2021) explained that "irrespective of the 'ism' for which people are willing to risk life and limb (be it jihadism, ethnonationalism or environmentalism), our findings indicate that people harbouring radical ideas are generally afflicted by this aversive psychological state. They believe that their sacrifice or act of 'martyrdom' will serve their group survival, provide them with a hero status and enshrine them forever in the collective memory of their group. This represents the pinnacle of personal significance and is perhaps one of the oldest narratives used by propagandists to produce ideologues marching in lockstep to the drumbeat of extremism" (p2).

Ideological obsession includes "the chronic frustration of basic psychological needs" (eg: personal failures), which motivates the individual to overcome this (ie: regain significance or status). But if options are "perceived as unavailable, unattainable or unlikely to redress one's significance, then people are either crushed by hopelessness or tempted to use ideological violence as a strategy of last resort to provoke radical societal changes. If nothing else, commitment to an ideology is a means for individuals to attain – at least in their minds, if not also among their peers – a desired social status that might otherwise be unavailable to them" (Belanger 2021 p3).

Once convinced that violent ideology is the only way, two psychological processes are involved (Belanger 2021):

- i) Goal-shielding - When the ideological obsession

conflicts with other aspects of life (eg: family), goal-shielding is used, which is a mechanism that "automatically regulates one's attentional focus by inhibiting potentially distracting alternative goals" (Shah et al 2002 quoted in Belanger 2021).

Ignoring all other goals except the ideological obsession can produce an "end justified the means" mentality, and a dehumanising of opponents (Belanger 2021). In the latter case, Belanger et al (2019a) presented ideologically obsessed "environmentalists" with pictures of faces of oil industry supporters on a computer screen. These faces morphed into inanimate objects, and participants were asked to press the space bar when the faces no longer looked human. The environmentalists did this earlier than non-ideologically obsessed participants, "indicating that they swiftly dehumanised outgroup members. Importantly, the speed at which they made such decisions predicted their support for ideological violence, such that faster judgements were related to greater support for violence against outgroup members" (Belanger 2021 p3).

ii) Ego-defensiveness - The individual's self-worth becomes exclusively based around their ideological obsession (ie: unidimensional), but, at the same time, it is fragile. So, the individual must defend their sense of identity, including by mixing only with like-minded individuals, and avoiding alternative views.

Belanger (2021) advocated a counter-strategy to violent ideology of helping individuals find personal significance elsewhere. For example, Belanger et al (2019b) helped individuals obsessed with one thing (eg: exercising) to diversify their goals, and subsequently the strength of the obsession was reduced. Belanger (2021) admitted: "Although these findings were not in the context of ideological obsession per se, they are a proof of concept, paving the way for future prevention strategies designed to steer individuals away from violent extremism" (p4).

1.5.1. Alt-Right

Concentrating on the USA in recent years, Argentino et al (2021) listed "alt-right" groups (or ideologically motivated violent extremist; IMVE) associated with the "Make America Great Again (MAGA) movement, including "Oath Keepers", "Boogaloo Bois", "Three Percenters",

"Proud Boys", and "QAnon". Common themes in their narratives included anti-government ideologies, covid-19 conspiracy theories, 2020 US election misinformation, racism, anti-semitism, misogyny, and transphobia.

Mamie et al (2021) investigated anti-feminist content on Reddit and YouTube. Four groups were distinguished - anti-feminist male-separatist group "Men Going Their Own Way" (MGTOW) members, men's right activists, "incels" ("involuntary celibates"), and "pick-up artists".

MGTOW members were most likely to post anti-feminist comments and later appear in "alt-right" forums, while "incels" were least likely to migrate to such forums.

But Jacob Johanssen noted that these groups are "very heterogeneous", and that "there isn't one incel community" (quoted in Stokel-Walker 2021).

1.5.2. Need for Chaos

Related to ideological obsession is the "need for chaos", which "emerges from an obsession with status and disruption" (Zmigrod and Tsakiris 2021 p4).

Arceneaux et al (2021) explained that "some individuals have a strong desire to incite chaos when they perceive themselves to be marginalised by society. These individuals tend to see chaos as a way to invert the power structure and gain social status in the process" (p1). However, at the same time, "not everyone who feels marginalised has a desire to 'watch the world burn'" (Arceneaux et al 2021 p1).

The need for chaos can be defined as "a desire for a new beginning through the destruction of order and established structures" (Petersen et al 2020 quoted in Arceneaux et al 2021). Petersen et al (2020 quoted in Arceneaux et al 2021) developed the eight-item Need for Chaos scale (NFC_{chaos} scale) with statements like "I think society should be burned to the ground", "Sometimes I just feel like destroying beautiful things", "I need chaos around me - it is too boring if nothing is going on", and "I get a kick when natural disasters strike in foreign countries".

Arceneaux et al (2021) used this scale with over 12 000 participants in the UK, USA, Canada, and Australia. Analysis of the patterns of responses found that the need for chaos had different motivations, varying between the desire to rebuild society ("Rebuilders"; 8-13% of respondents depending on country) and those enjoying

destruction for its own sake ("High Chaos"; 3-10%). Though these two types were similar in many responses, Rebuilders were more idealistic and High Chaos more nihilistic.

1.6. BASAL COGNITION

What are the features of the brain that produce cognition? Attempting to answer this question is taken up by "the emerging field of basal cognition" (Levin et al 2021).

It is assumed that cognition requires a brain, but Levin et al (2021) pointed out that this is challenged by "aneural systems" (ie: organisms without a brain). For example, "cognitive operations we usually ascribe to brains - sensing, information processing, memory, valence, decision making, learning, anticipation, problem solving, generalisation and goal directedness - are all observed in living forms that don't have brains or even neurons. Indeed, the great variety of such systems suggests not a binary dichotomy of cognitive versus mechanical but, rather, a continuum of cognition from modest to complex" (p1).

Levin et al (2021) continued on that "the molecular machinery we associate with traditional brain-based cognition - ion channels, neurotransmitters, synaptic proteins, networks and circuits, oscillatory activity - are present not only in aneural animals but also in our closest unicellular relatives, and many are also found in a wide variety of extant unicellular organisms and in plants" (p1).

Understanding aneural systems should help in explaining the evolution of cognition. Nervous systems, for instance, may not be "exceptional forms of organisation", but rather "a variation of more basic biological signalling systems" (Levin et al 2021 p4). This is the aneural which later became the neural.

The current consensus is that the early nervous system was an "elementary nerve net" (ie: a loose connection of cells) which became a centralised nervous system (Levin et al 2021).

"Each step entails a key transition in learning and memory: first, the acquisition of the nerve net enabled habituation and sensitisation on an unprecedented level; second, the evolution of a central nervous system and brain brought about within-lifespan associative learning" (Levin et al 2021 p5).

1.7. APPENDIX 1A – CONFIRMATION BIAS

Polarisation between opposing views is a problem on many political and social issues. "An important cognitive driver of this polarisation is the human tendency to discount evidence against one's current position, a phenomenon known as confirmation bias" (Rollwage and Fleming 2021 p1).

Strong confirmation bias goes with dogmatism as does overconfidence and low metacognitive ability (ie: an inaccurate assessment of ability) (Rollwage and Fleming 2021).

Rollwage and Fleming (2021) modelled these processes with a computer simulation of decision-making in 200 000 trials. There was initial information presented, and the algorithm made one or two decisions about it before receiving more information that either confirmed or disputed the decision made. It was found that "selective information processing can even improve decision-making when compared with unbiased evidence accumulation, as long as it is accompanied by good metacognition" (Rollwage and Fleming 2021 p1).

When presented with large amounts of information, it is useful to have a shortcut or heuristic to speed up decision-making. Confirmation bias is one such heuristic, and it is helpful, but only for individuals with good metacognition. Such individuals can "downweight contradictory information when correct but still able to seek new information when they realise they are wrong" (Rollwage and Fleming 2021 p1).

Rollwage and Fleming (2021) ended: "Selective information processing has been assumed to lead to skewed, entrenched and potentially inaccurate beliefs about a range of societal and political issues. However, the current results suggest that the detrimental effects of selective information processing depend on people's broader self-awareness. In turn, metacognitive deficits might represent core drivers of polarized or radical beliefs, owing to their consequence for maladaptive confirmation bias" (p7).

1.8. APPENDIX 1B – ZMIGROD ET AL (2021)

The analysis of large amounts of data is possible with computational approaches. For example, Eisenberg et al (2018) asked 522 US participants to complete 37 cognitive tasks and 22 questionnaires about personality characteristics, while Zimrod et al (2021) re-recruited

334 of these individuals for surveys about political and ideological beliefs. Techniques like factor analysis allowed the data to be reduced to five cognitive factors, twelve personality factors, and sixteen ideological orientations.

Zimrod et al (2021) concentrated on the dimensions of political conservatism¹, and dogmatism. Political conservatism was "significantly associated with greater caution and temporal discounting and reduced strategic information processing in the cognitive domain, and by greater goal-directedness, impulsivity, and reward sensitivity, and reduced social risk-taking in the personality domain" (Zimrod et al 2021 p6). Dogmatism was "significantly associated with reduced speed of evidence accumulation in the cognitive domain and by reduced social risk-taking and agreeableness as well as heightened impulsivity and ethical risk-taking in the personality domain" (Zimrod et al 2021 p6).

Of particular interest was the combination of caution in cognitive tasks that involved speed in decision-making, and impulsivity among high dogmatic individuals. Zimrod et al (2021) explained that this combination "may result in the dogmatic tendency to discard evidence prematurely and to resist belief updating in light of new information" (p8).

Zimrod et al (2021) emphasised the relationship between perceptual decision-making strategies and ideological beliefs, and their findings showed "both the cognitive vulnerabilities to toxic ideologies as well as the traits that make individuals more intellectually humble, receptive to evidence and ultimately resilient to extremist rhetoric" (p11).

1.9. APPENDIX 1C – POPULISM

Populism is a contested term, but it includes "anti-elitist" and "people-centred" worldviews², as well as

¹ Stenner (2009) began: "When people use the terms conservative or right-wing they typically mean one (or problematically, more) of the following: an enduring inclination to favour stability and preservation of the status quo over social change (what I call 'status quo conservatism'); a persistent preference for a free market and limited government intervention in the economy ('laissez-faire conservatism'); or an enduring predisposition, in all matters political and social, to favour obedience and conformity (oneness and sameness) over freedom and difference" (p142). The latter has been called "social conservatism", or "authoritarianism", which Stenner (2009) preferred. It is this that is the basis of intolerance, not conservatism, she argued.

The preference for uniformity ("difference-ism"), and obedience to authority of authoritarianism that distinguish it from "libertarianism" with the emphasis on individual diversity and autonomy (Stenner 2009).

² "Anti-elitism" refers to populists' negative perception of elites as evil and corrupt, and includes the Psychology Miscellany No. 152; 15th August 2021; ISSN: 1754-2200; Kevin Brewer

“post-factual” political attitudes (Huber et al 2021).

Populists span the political spectrum from far-left to far-right in Europe, for example, where there is concern about their attitudes towards climate change mitigation policies. Huber et al (2021) studied six European Union (EU) countries with prominent populist parties.

There was “substantial heterogeneity” found in their discourses, positions and actions towards climate change. The right-wing populist parties (eg: FPO in Austria) talked of national sovereignty as a way to challenge international and EU policies on decarbonisation, say. In contrast, left-wing populist parties (eg: Syriza in Greece) emphasised “the urgency of climate mitigation, blame the elites for failing to deal with climate change and call for more international co-operation, economic redistribution and citizen participation...” (Huber et al 2021 p1011). “Centrist” or “valence” (Zulianello 2020) populist parties (like MSS in Italy) made “more ambiguous statements along the left-right ideological cleavage” (Huber et al 2021 p1011).

Populist discourse was not always present in relation to climate change policies, and Huber et al (2021) found evidence that “the frequency and intensity of populist messages decline as parties move from opposition to government” (p1012). In fact, the “populist parties do not behave significantly different from what is known about mainstream parties in that they do not exhibit anti-system behaviour and that they often moderate actions once in power” (Huber et al 2021 p1012).

To sum up, it is not easy to predict how populist parties who come to power, at least in Europe, will respond to international climate change policies.

1.9.1. Debate: Is the world changing faster than ever? ³

Depends:

- Depends when and where you focus. There are times and places when change was very rapid (eg: France 1789-94) (Ian Mortimer).

critique of the ‘establishment’; established parties, bureaucrats at different levels, the mainstream media or big capital. The elite serves as the antagonist to the people and thus ‘people-centrism’ constitutes the second central dimension of populism. Populists claim to be the true champion of ‘the upright and good people’, a glorified and homogeneous group with a general will” (Huber et al 2021 p1000).

³ Source: BBC World History, July/August 2020 pp94-99.

- Technology is developing rapidly, but many other aspects of life remain unchanged (eg: language - still able to understand Shakespeare from 400 years ago), and many individuals today are not dependent on nature as in harvests and the consequent short-term fluctuations in fortunes (Ian Mortimer).

No:

- "Throughout history, societies have experienced seismic change" (Jane Winters p96).
- "Nostalgia for a lost 'golden age' is threaded through human history" (Jane Winters p96).
- "Every generation likes to believe it is unique" (Keith Lowe p98). The current changes are not necessarily any greater than decades of the 20th century, say (Keith Lowe).
- "Momentous changes are indeed taking place today, but they build on equally momentous events that were brought about by previous generations - and they in turn provide a platform for changes yet to come" (Keith Lowe p98).

Yes:

- "The world has changed more in the past 100 years than in the previous 100 000" (Ian Morris p97).
- Speed of change fastest in China in the past half-century (Rana Mitter).
- Consumption has been the biggest change, and increased twentyfold per capita worldwide over the 20th century (Felipe Fernandez-Armesto).
- "The acceleration of change jar security, well-being and confidence in the future, and induce spectral fears" (Felipe Fernandez-Armesto p99).

1.10. APPENDIX 1D - STATISTICAL SIGNIFICANCE

The idea of a p (probability) value of 0.05 (5%) as Psychology Miscellany No. 152; 15th August 2021; ISSN: 1754-2200; Kevin Brewer

the cut-off point for statistical significance came as a suggestion from Ronald Fisher (1925). This figure has become fixed in stone. In later years, Fisher admitted that his greatest regret was "ever mentioning 0.05" (Denworth 2019).

The problem is: "People say, 'I've got 0.05, I'm good'. The science stops" (Ronald Wasserstein quoted in Denworth 2019). This has led to the search for alternative ways to show "real" differences in the data. Wasserstein admitted: "The fear is that taking away this long-established practice of being able to declare things as statistically significant or not would introduce some kind of anarchy to the process" (quoted in Denworth 2019).

The "American Statistician" journal has had a special issue on alternatives to $p < 0.05$ (Wasserstein et al 2019), as has "Nature Human Behaviour" (eg: Benjamin et al 2017), for instance.

Alternatives include (Denworth 2019):

a) Effect size (or relative effect size) - The average outcome of a treatment group, say, compared to the average outcome of a no-treatment group.

b) "Surprisal" (or "Shannon transform" (s value)) - The surprisingness of the findings (which can be converted into a p-value if required).

EG: Tossing a coin:

- Two heads in a row = 2 bits of surprisal
= $1/2^2$ ($p = 0.25$)
- Five heads in a row = 5 bits of surprisal
= $1/2^5$ ($p = 0.03215$) (Denworth 2019).

1.11. REFERENCES

Ahmadlou, M et al (2021) A cell type-specific cortico-sub-cortical brain circuit for investigatory and novelty-seeking behaviour Science 372, p704 & eabe9681

Arceneaux, K et al (2021) Some people just want to watch the world burn: The prevalence, psychology and politics of the "need for chaos" Philosophical Transactions of the Royal Society B 376, 20200147

Argentino, M-A et al (2021) Far From Gone: The Evolution of Extremism in the First 100 Days of the Biden Administration London: International Centre for the Study of Radicalisation, Kings College Psychology Miscellany No. 152; 15th August 2021; ISSN: 1754-2200; Kevin Brewer

London

Barrett, L.F (2017) How Emotions are Made: The Secret Life of the Brain London: Macmillan

Belanger, J.J (2021) The socio-cognitive processes of ideological obsession: Review and policy implications Philosophical Transactions of the Royal Society B 376, 20200144

Belanger, J.J et al (2019a) Passion and moral disengagement: Different pathways to political activism Journal of Personality 87, 1234-1249

Belanger, J.J et al (2019b) Using implementation intentions to change passion: The role of environmental mastery and basic psychological needs Motivation Science 5, 4, 343-356

Benjamin, D.J et al (2017) Redefine statistical significance Nature Human Behaviour 2, 6-10

Brescoll, V & LaFrance, M (2004) The correlates and consequences of newspaper reports of research on sex differences Psychological Science 15, 8, 515-520

De Dreu, C.K.W et al (2021) Political games of attack and defence Philosophical Transactions of the Royal Society B 376, 20200135

Denworth, L (2019) A significance problem Scientific American October, 55-59

Eisenberg, I.W et al (2018) Applying novel technologies and methods to inform the ontology of self-regulation Behaviour Research and Therapy 101, 46-57

Faranbakhsh, Z.Z & Siciliano, C.A (2021) Neurobiology of novelty seeking Science 372, 684-685

Fisher, R (1925) Statistical Methods for Research Workers Edinburgh: Oliver & Boyd

Haas, I.J et al (2021) Political uncertainty moderates neural evaluation of incongruent policy positions Philosophical Transactions of the Royal Society B 376, 20200138

Huber, R.A et al (2021) Is populism a challenge to European energy and climate policy? Empirical evidence across varieties of populism Journal of European Public Policy 28, 7, 998-1017

Krosch, A.R et al (2021) The neural basis of ideological differences in race categorisation Philosophical Transactions of the Royal Society B 376, 20200139

Kruger, J & Dunning, D (1999) Unskilled and unaware of it: How difficulties in recognising one's own incompetence lead to inflated self-assessments Journal of Personality and Social Psychology 77, 1121-1134

Lau, T (2021) Reframing social categorisation as latent
Psychology Miscellany No. 152; 15th August 2021; ISSN: 1754-2200; Kevin Brewer

structure learning for understanding political behaviour
Philosophical Transactions of the Royal Society B 376, 20200136

Levin, M et al (2021) Uncovering cognitive similarities and differences, conservation and innovation Philosophical Transactions of the Royal Society B 376, 20200458

Lyons, B.A et al (2021) Overconfidence in news judgments is associated with false news susceptibility Proceedings of the National Academy of Sciences, USA 118, 23, e2019527118

Mamie, R et al (2021) Are anti-feminist communities gateways to the far right? Evidence from Reddit and YouTube arXiv (<https://arxiv.org/abs/2102.12837>)

Marsh, E.J et al (2003) Learning facts from fiction Journal of Memory and Learning 49, 519-536

Moore, A et al (2021) Trust in information, political identity and the brain: An interdisciplinary fMRI study Philosophical Transactions of the Royal Society B 376, 20200140

Nam, H.H et al (2021) Towards a neuropsychology of political orientation: Exploring ideology in patients with frontal and mid-brain lesions Philosophical Transactions of the Royal Society B 376, 20200137

Rollwage, M & Fleming, S.M (2021) Confirmation bias is adaptive when coupled with efficient metacognition Philosophical Transactions of the Royal Society B 376, 20200131

Romano, A et al (2021) Political ideology, co-operation, and national parochialism across 42 nations Philosophical Transactions of the Royal Society B 376, 20200146

Saguy, T et al (2021) The gender-binary cycle: The perpetual relations between a biological-essentialist view of gender, gender ideology, and gender-labelling and sorting Philosophical Transactions of the Royal Society B 376, 20200141

Salovich, N.A & Rapp, D.N (2021) Misinformed and unaware? Metacognition and the influence of inaccurate information Journal of Experimental Psychology: Learning, Memory and Cognition 47, 4, 608-624

Shah, J.Y et al (2002) Forgetting all else: On the antecedents and consequences of goal shielding Journal of Personality and Social Psychology 83, 1261-1280

Stenner, K (2009) Three kinds of "conservatism" Psychological Inquiry 20, 142-159

Stokel-Walker, C (2021) Anti-feminism is route to alt-right New Scientist 13th March, p11

Tosi, J & Warmke, B (2016) Moral grandstanding Philosophy and Public Affairs 44, 3, 197-217

Tsakiris, M et al (2021) Visceral politics: A theoretical and Psychology Miscellany No. 152; 15th August 2021; ISSN: 1754-2200; Kevin Brewer

empirical proof of concept Philosophical Transactions of the Royal Society B 376, 20200142

Wasserstein, R.L et al (2019) Moving to a world beyond " $p < 0.05$ " American Statistician 73, supp 1, 1-19

Zmigrod, L & Tsakiris, L (2021) Computational and neurocognitive approaches to the political brain: Key insights and future avenues for political neuroscience Philosophical Transactions of the Royal Society B 376, 20200130

Zmigrod, L et al (2021) The cognitive and perceptual correlates of ideological attitudes: A data-driven approach Philosophical Transactions of the Royal Society B 376, 20200424

Zulianello, M (2020) Varieties of populist parties and party systems in Europe: From state-of-the-art to the application of a novel classification scheme to 66 parties in 33 countries Government and Opposition 55, 2, 327-347

ADDENDUM - REMINDERS OF INEQUALITY

Reminders of inequality in an unequal society encourage poorer individuals to seek redress. Sands and de Kadt (2020) performed a field experiment in a poor area of South Africa (Soweto) that supported this statement. The participants ($n = 1489$), who were predominantly Black, were approached in the street to sign a petition. The petition was either to increase taxes on the rich, or to abandon nuclear power (control condition). Participants were asked in the presence of an expensive car or not. Participants were significantly more likely to sign the tax petition in the presence of the car than when it was absent. There was no difference for the control petition. So, "local exposure to inequality in everyday environments increases support for the taxation of wealthy individuals who live among people living under the poverty line..." (Sands and de Kadt 2020 p258).

But the participants were not asked if they noticed the car when it was present. "This type of question might have been avoided for fear of biasing results, but a side effect is that we cannot know for sure that the car reminded people of inequality" (Tredoux and Dixon 2020 p201).

Furthermore, what did the luxury car mean to the participants? "Does a luxury car prompt inter-individual comparisons (it is unfair that X gets to drive that car), intra-community comparisons (that car is probably owned by a wealthy Sowetan), 'generic' rich versus poor comparisons (the gulf between the haves and have-nots in

South Africa is unfair), or even broader inter-racial comparisons (for instance, comparisons that remind Black people of economic disparities between Black and White communities)?" (Tredoux and Dixon 2020 p202).

Another criticism of the study was that it was not clear if the reminder of wealth prompted a change in attitude or behaviour (Tredoux and Dixon 2020).

Sands and de Kadt (2020) argued that individuals need reminders of inequality to demand redistribution of wealth, because of economic segregation, "people who are less wealthy live separately from wealthier individuals and that this segregation is more pronounced in places that are more unequal" (Sands and de Kadt 2020 p260). The "Robin Hood paradox" (eg: Meltzer and Richard 1981) has been observed, where support for taxes on the rich and redistribution of wealth is stronger in more egalitarian/wealth-equal societies than unequal ones.

Meltzer, A.H & Richard, S.F (1981) A rational theory of the size of government Journal of Political Economy 89, 914-927

Sands, M.L & de Kadt, D (2020) Local exposure to inequality raises support of people of low wealth for taxing the wealthy Nature 586, 257-261

Tredoux, C & Dixon, J (2020) Propelling the poor to demand taxes on the rich Nature 586, 201-202

2. NON-HUMAN PRIMATE ECONOMIC BEHAVIOUR

de Waal (2021) pointed out that it is "wrong to think that animals never trade or that fairness is alien to them" (p1). Drawing a parallel with humans and real estate trading, for example, abandoned burrows and nests are "valued goods" that animals make use of. While hermit crabs show a behaviour called the "vacancy chain" (Chase 1988). "Each crab carries its house around – usually an empty gastropod shell – so as to cover its soft abdomen. The problem is that the crab grows. Hermit crabs are always on the look-out for larger accommodations. The moment they upgrade to a roomier shell, other crabs line up for the vacated one" (de Waal 2021 p1).

Those who study economic behaviour of non-human primates make the assumption that "some decision-making abilities and observed exchanges among non-human primates are the evolutionary precursors of more elaborate economic abilities we find in humans" (Bourgeois-Gironde et al 2021 p1). Though human economies today are complex, there are underlying patterns that can be observed in different species of primates.

This view assumes that "individuals are endowed with cognitive abilities that are sufficient for them to maximise their individual welfare through their decisions in their typical environments" (Bourgeois-Gironde et al 2021 p2). Researchers here are interested in the cognitive abilities that have become the basis of human economics.

An alternative view is that the basis of economic behaviour is more ingrained in organisms, and does not involve specific cognitive abilities. For example, prospect theory (Tversky and Kahneman 1992) and the pattern of risk-aversion in relation to gains while risk-seekingness in relation to losses throughout the animal kingdom (Bourgeois-Gironde et al 2021) (appendix 2A).

Studying economic behaviour in non-human primates is not easy, particularly when defining economic behaviour in this context is a difficult issue (de Waal 2021) ⁴. A real-life study is of the macaques at the Uluwatu temple in Bali, Indonesia (Leca et al 2021) (appendix 2B). The macaques steal objects from visitors which are only returned in exchange for food. The researchers pointed to the "cultural transmission of apt behaviour (when to

⁴ "It is hard to define economics, especially in relation to animals. Most definitions of human economics stress the production and distribution of goods and services, and the allocation of resources" (de Waal 2021 p1).

steal, how to initiate the exchange) and cognitive adequacy (recognition of the good media of exchange, possible anticipation of the acceptable amount and type of food to be accepted during the exchange) between trained adults and youngsters" (Bourgeois-Gironde et al 2021 p3).

Laboratory studies are common ⁵. The aim is to teach the participant-animal to use tokens to exchange for food (eg: Wolfe (1936) with chimpanzees who "worked" for poker chips to put into a "chimpomat" to "buy" foods or other desirable activities like play with the experimenter). "Several non-human primate species are remarkably gifted in exchanging tokens against primary rewards (food). The ability to associate a token with no intrinsic value to a primary reward is the basic requirement on the path towards monetary abstraction, or what Beran and Parrish (2021) call the emergence of a currency. They report that some monkey species, for instance capuchins, are able to implement timely choices in order both to obtain valuable tokens and to exchange them to gain optimal reward. They thereby display a clear understanding of the exchange environment and its inherent contingencies and opportunities, and engage in sophisticated probabilistic inferences... They are also capable of delaying gratification by accumulating tokens..." (Bourgeois-Gironde et al 2021 p3).

There are a number of aspects of human economic behaviour which have been studied in non-human primates, including (Bourgeois-Gironde et al 2021):

a) Decision-making is not rational, but influenced by cognitive biases.

b) "Conditional valuation" - The value of certain goods are based on their pairing with another thing rather than an individual value. "Complementary goods mutually enhance their respective values: an ice cream is better with a sun-bath and a sun-bath is better with an ice cream. By contrast, goods with a similar or quasi-similar purpose do not pool their value" (Bourgeois-

⁵ Leca et al (2021) criticised this method - "most of these experimental procedures involve human-induced exchanges with relatively small samples of individually trained, laboratory-bred subjects. During the experiments, these subjects (i) are typically placed in isolation from their conspecifics and their other daily activities, (ii) exchanged in constrained environments characterised by a lack of alternative response options, and (iii) received small rewards for the correct actions. These conditions markedly contrast with real-world human economic behaviours that offer many different formats and variants, often occur over extended periods of time, are spontaneously engaged in by a very heterogeneous population, use a range of symbolic currencies and are influenced by a rich social context" (p2).

Gironde et al 2021 p4).

Evidence of this behaviour can be seen in the preference for a token that is associated with two complementary goods rather than a token for two for irrelevant goods of the same objective value (Chung et al 2021).

c) The management of costs versus benefits not only in the immediate situation, but also in the longer term.

d) Opportunity costs - Choices are made under scarcity, thus picking A means not having B.

e) Decisions are made in the context of uncertainty (ie: the probability of outcomes), and ambiguity (ie: knowledge of outcomes).

APPENDIX 2A - PROSPECT THEORY

Nioche et al (2021) found support for prospect theory in a study involving nine Tonkean macaques from a captive community in France. Each monkey started a trial with three tokens, and there was the possibility to lose them or gain three more in a choice situation. The tokens were exchanged for liquid reward at the end. The monkeys had been trained to press a touchscreen when a choice was offered. In this experiment, the choice was between a sure win of one token, say, or a gamble (eg: 30% chance of two tokens, but 70% chance of zero), and between a sure loss (eg: one token) or gamble (eg: 30% chance of no loss, but 70% chance of losing two tokens). Over 250 000 trials were performed.

The prospect theory was supported as a sure win was preferred to a gamble for more, while a sure loss was preferred less than a gamble over loss.

Nioche et al (2021) applied these findings to real-life. In a life-threatening situation with a predator, say, (ie: a loss), a gamble is better for survival, but in the case of finding food (ie: a gain), it is better to take what you have than gamble that there will be better or more food later.

Methodological Issues

The "description-based paradigm" involves outlining the options before the decision, while "experience-based decisions" are where the individual learns by trial and

error the consequences of decisions. "However, relatively few situations in real life match the characteristics of the pure description-based paradigms, namely complete and explicit information about outcome values and probabilities" (Garcia et al 2021 p4).

Furthermore, "pure description-based paradigms cannot exist in monkey studies because of the lack of language. In fact, in monkey studies, whenever outcomes and probabilities are conveyed via a symbolic system, the system is nonetheless learned and maintained by trial-by-trial outcomes (ie: a situation similar to the 'description plus experience' paradigm'...). In such 'pseudo' description-based paradigm, monkeys are trained to associate continuous variations in one visual feature (eg: colour or size) to continuous variations of a decision variable (eg: outcomes or probabilities)" (Garcia et al 2021 pp5,7).

"Pseudo description-based studies" with rhesus monkeys, for instance, have mixed results, but experience-based studies do support prospect theory (Garcia et al 2021).

Other methodological differences between monkey and human studies include (Garcia et al 2021):

i) Monkey studies use primary rewards (eg: fruit juice) while with humans, secondary rewards (eg: money) are common. It is difficult to apply losses with primary rewards - "it is impossible to take some fruit juice away from the stomach of a monkey" (Garcia et al 2021 p9).

Hayden and Platt (2009), for example, used primary and secondary rewards in different conditions of an experiment with humans (ie: sports beverage and money), and found similar results to those studies with monkeys and primary rewards.

While studies using tokens with monkeys usually have the situation where the tokens are "almost immediately changed against primary reward, making them not really comparable to money, whose value is much more permanent" (Garcia et al 2021 p9).

ii) The size of the reward. Human studies with hypothetical gambles use large amounts (eg: one month's salary), while monkey studies involve drops of liquid. But humans have been studied with small rewards and the predictions of prospect theory are observed (Garcia et al 2021).

iii) The amount of training before the experiment. "In human experiments, task training rarely takes more than a few minutes (in some extreme cases of description-based paradigms, there is virtually no training: subjects are just asked to reveal their preferences). On the other side, monkey experiments require extensive training, in general spanning several months (usually training takes longer than the experiment itself). It can be, therefore, argued that their behaviour becomes to some extent habitual or automatised: a cognitive state that contrasts dramatically with the declarative and deliberative stance of description-based choices taken by humans" (Garcia et al 2021 p9).

Overall, Garcia et al (2021) felt that rhesus monkeys were a "partial model" of human decision-making under certainty. "Risk preferences in monkeys are generally better explained as experience-based processes. Accordingly, monkeys proved to be a very good model of human reinforcement learning processes..." (Garcia et al 2021 p9).

APPENDIX 2B - LECA ET AL (2021)

Leca et al (2021) tested three hypotheses:

1: "Experiential learning" hypothesis - Older animals will be more successful at robbing and bartering with tourists than younger ones. This would show the learning of values of things that are not directly food.

Success was defined as four steps of robbing - stare at target (tourist), approach inconspicuously, snatch object, and escape - and three steps of bartering - held object before tourist for barter without being caught, gain food reward from them, and return object undamaged. Age was based on observation as adult, sub-adult, and juvenile.

2: "Value-based token selection" hypothesis - Older animals will choose items of "higher value" to steal and barter. This would show an understanding of value attached to the objects.

Six types of objects were categorised - empty containers (eg: plastic bottles), accessories (eg: hairpins), hats, shoes, glasses, and electronic devices/wallets. The last two categories were rated as "high value".

3: "Robbing/bartering pay-off maximisation" hypothesis - Older animals will barter for better rewards. This behaviour would be evidence of being able to distinguish variations in "reward quality".

For each monkey, a food likeability score was calculated based on the rejection of food offered during bartering.

Each robbing/bartering event was video-recorded during 273 observation days between September 2015 and August 2016.

Hypothesis 1 was supported. Adults were significantly more successful at robbing and bartering than sub-adults and juveniles. In relation to Hypothesis 2, adults and sub-adults chose higher value targets significantly more often than low value ones (eg: empty containers).

With Hypothesis 3, adults showed evidence of "reward quality", particularly when holding a high value object to barter. When holding objects of a medium value (eg: hats) or low value, the monkeys accepted any food reward.

The three hypotheses were supported in the main. Leca et al (2021) felt that their findings also supported the laboratory-based token exchange experiments. They stated that "our field observational data are in line with laboratory-based studies showing that several non-human primate species can (i) understand the effectiveness of tokens as secondary reinforcements to make simple calculations about quantities of reward, (ii) determine an item's value on the basis of its perceived utility (eg: exchanging only a low-preferred reward for a tool necessary to reach a more preferred reward) and (iii) recognise the appropriate conditions in which a successful exchange could occur (eg: presence/absence of the experimenter, safe/risky experimenter)" (Leca et al 2021 p8).

This observational study has three key strengths:

a) Video-recording of events to allow detailed analysis later. However, only the information within the camera's view is available.

b) The use of "behaviour-dependent sampling", where a "conspicuous" or "attention-attracting" behaviour is recorded every time it appears during the sampling time period (Martin and Bateson 1993). However, it depends on the observers noticing the behaviour.

c) Clear definitions of the categories and scoring of behaviours, which were checked for intra-observer and inter-observer reliability. The former is the same individual scoring the same behaviour at two different times, and the latter is agreement between two different observers of the same behaviour. Only some of the observations were checked in this way (3% of the total robbing/bartering attempts). There was around and above 90% agreement.

REFERENCES

- Beran, M.J & Parrish, A.E (2021) Non-human primate token use shows possibilities but also limitations for establishing a form of currency Philosophical Transactions of the Royal Society B 376, 20190675
- Bourgeois-Gironde, S et al (2021) Economic behaviours among non-human primates Philosophical Transactions of the Royal Society B 376, 20190676
- Chase, I (1988) The vacancy chain process: A new mechanism of resource distribution in animals with application to hermit crabs Animal Behaviour 36, 1265-1274
- Chung, H-K et al (2021) Conditional valuation for combinations of goods in primates Philosophical Transactions of the Royal Society B 376, 20190669
- de Waal, F.B.M (2021) How animals do business Philosophical Transactions of the Royal Society B 376, 20190663
- Garcia, B et al (2021) The description-experience gap: A challenge for the neuroeconomics of decision-making under uncertainty Philosophical Transactions of the Royal Society B 376, 20190665
- Hayden, B.Y & Platt, M.L (2009) Gambling for Gaterade: Risk-sensitive decision making for fluid rewards in humans Animal Cognition 12, 201-207
- Leca, J-B et al (2021) Acquisition of object-robbing and object/food-bartering behaviours: A culturally maintained token economy in free-ranging long-tailed macaques Philosophical Transactions of the Royal Society B 376, 20190677
- Martin, P & Bateson, P (1993) Measuring Behaviour: An Introductory Guide Cambridge: Cambridge University Press
- Nioche, A et al (2021) The adaptive value of probability distortion and risk-seeking in macaques' decision-making Philosophical Transactions of the Royal Society B 376, 20190668
- Tversky, A & Kahneman, D (1992) Advances in prospect theory: Cumulative representation of uncertainty Journal of Risk and Uncertainty 5, 297-323
- Wolfe, J.B (1936) Effectiveness of token-rewards for chimpanzees Comparative Psychology Monographs 12, 1-72