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

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

CONTENTS

1. AUTONOMOUS SENSORY MERIDIAN RESPONSE

1.1. EARLY RESEARCH

Autonomous sensory meridian response (ASMR) has gained media attention in recent years with its own internet communities [1]. "Media designed specifically to produce ASMR has amassed a community of thousands of members. Capable individuals utilise a variety of visual and audio stimulation – most typically through video sharing – to achieve a tingling, static-like sensation widely reported to spread across the skull and down the back of the neck" (Barratt and Davis 2015 p1) (appendix 1A) [2] [3].

In the first formal study, Barratt and Davis (2015) surveyed 475 volunteers recruited from specialised ASMR interest groups on Facebook and Reddit. General information was collected about the individuals, and details of their ASMR experiences (eg: triggers; motivations for watching ASMR videos).

Almost all responses viewed ASMR videos as an opportunity for relaxation, and as a way of dealing with stress. The words of one respondent gave a flavour of the views: "I was totally amazed, I can only describe what I started feeling as an extremely relaxed trance like state, that I didn't want to end, a little like how I have read perfect meditation should be but I never ever achieved" (quoted in Barratt and Davis 2015).

Four prominent categories of triggers emerged (ie: experienced by more than half of respondents) - whispering (75%), personal attention (69%), "crisp" sounds (64%), and slow movements (53%).

Four-fifths of the respondents reported ASMR as producing a positive mood, and the remainder were not sure. ASMR was linked to an improvement in depression for

[1] The term ASMR was coined in 2010 by Jennifer Allen, but it has also been called "brain tingles" or "brain orgasm" in the popular press (Lochte et al 2018).

[2] "Hundreds and thousands of people are now ardent viewers of ASMR videos (creations by so-called 'ASMRtists') on websites such as YouTube. Popular videos include: simulations of medical examinations, haircuts and massages, towel folding tutorials, and customer service role plays" (Poerio et al 2018 p2).

[3] Janik McErlean and Banissy (2017) found that ASMR videos involving whispering, spa role-plays, hair brushing, and doctor role-plays induced the strongest sensations (Lochte et al 2018).

individuals showing symptoms of this condition (n = 70), and in chronic pain for many (38 of 91 sufferers). Twenty-nine individuals reported synaesthesia.

Barratt and Davis (2015) summed up: "ASMR can be defined as a combination of positive feelings, relaxation and a distinct, static-like tingling sensation on the skin. This sensation typically originates on the scalp in response to a trigger, travelling down the spine, and can spread to the back, arms and legs as intensity increases. An increase in intensity can be achieved through experiencing further triggers" (p11).

They continued: "While ASMR appears to be a genuine, relatively prevalent perceptual experience, the exact nature of the phenomenon is still unknown. There is the possibility that the tingles associated with ASMR result from a minor seizure, brought on by appropriate stimuli. This has been hypothesised in the past..., but as of yet remains uninvestigated" (Barratt and Davis 2015 p14).

1.2. PERSONALITY

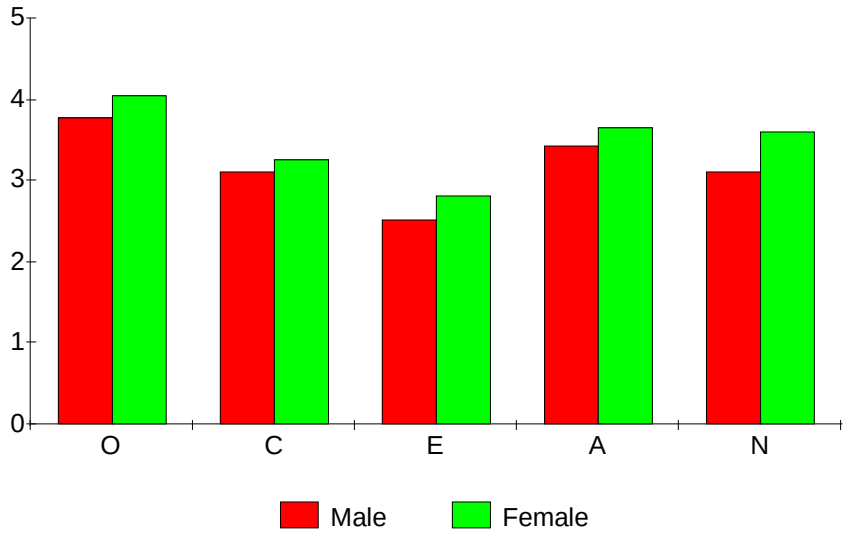
So, what are the differences between those who experience ASMR and those who don't? Fredborg et al (2017) investigated the link between personality traits and ASMR with 580 adults (half who self-identified as ASMR experiencers) recruited via social media and online. They completed a number of questionnaires including the Big Five Inventory (BFI) (Johns et al 1991) with 44 items which measured the "Big Five" personality dimensions [4]. There was also a specially constructed ASMR checklist with sixteen items covering triggers for ASMR, which was completed by the ASMR group only.

The ASMR group scored significantly higher on Openness and Neuroticism, but lower on the other three dimensions than the control group. There were some gender differences within the ASMR group (figure 1.1).

Individuals with high Openness scores are assumed to have "increased sensitivity and receptivity to sensations" (Fredborg et al 2017 p6), while high scorers on Neuroticism showed increased self-consciousness. The researchers had predicted these two dimensions and ASMR, but they were unclear about the reasons for the lower scores on the other three dimensions.

On the ASMR checklist, the strongest triggers were whispering, haircut simulation, and tapping sounds. Factor analysis of the ratings produced five factors, labelled "watching" (eg: watching others paint), "touching" (eg: watching someone touch their own hair),

[4] Neuroticism (N), Extraversion (E), Agreeableness (A), Openness to experience (O), and Conscientiousness (C).



(Neuroticism (N), Extraversion (E), Agreeableness (A), Openness to experience (O), and Conscientiousness (C).

(Data from Fredborg et al 2017 table 1)

Figure 1.1 - Mean scores for the five personality dimensions in the ASMR group based on gender.

"repetitive sounds" (eg: tapping sounds), "simulations" (eg: haircut simulation), and "mouth sounds" (eg: whispering). These factors suggested to Fredborg et al (2017) that "there may be multiple ASMR sub-types, each involving a greater sensitivity to one or more types of triggering stimulus" (p7).

In terms of methodology, Fredborg et al (2017) accepted that "there may be some inherent selection bias associated with our sample. The participants were likely regular-to-heavy internet users, as they were recruited through an online forum dedicated to discussions of ASMR triggers and experiences. A sample recruited from social media websites such as Reddit may be more willing to disclose information about their ASMR experiences and may be more naturally 'Open to Experience' than the general population. As such, the sample at hand may not be representative of the overall ASMR population, especially those who do not share their experiences online" (p8).

A different personality trait is sensory suggestibility (ie: "how an individual responds to sensory information that is covertly being influenced by someone else"; Keizer et al 2020 p114).

Keizer et al (2020) found that individuals who experienced ASMR were more likely to experience illusory sensory events than controls. The Sensory Suggestibility Scale (SSS) (Gheorghiu et al 1995) was used, and in the

experimental exercises, the administrator gives verbal hints that the respondent should be feeling a particular sensation (eg: a LED flashlight is placed on the cheek and it is hinted that warmth should be felt). "Despite the fact that it is physiologically impossible to perceive the suggested sensation in the experimental exercises, highly suggestible individuals will report otherwise" (Keizer et al 2020 p114). A five-point response scale is used. The SSS also includes real events as controls (eg: place cupped hand on ear and hear a noise like holding a seashell to one's ear).

There were 36 ASMR participants and 25 controls in the Netherlands. Keizer et al (2020) did not include details of recruitment.

For the control tests on the SSS (ie: real sensory experiences), there was no difference between the two groups, but for the sensory illusions the ASMR group scored significantly higher [5]. "These findings imply higher levels of sensory suggestibility in the ASMR group" (Keizer et al 2020 p114).

Within group analysis showed that the ASMR group did not differ in their reported intensity of experience for real events or sensory illusions, whereas the control group experienced the real events as significantly more intense than the illusions. This strengthened Keizer et al's (2020) conclusion that "individuals who have ASMR experiences are more susceptible to experiencing illusory sensory events" (p115).

From the above studies together, a pattern emerges of ASMR linked to openness to experience (ie: an interest in novel experiences), heightened fantasising, and elevated mindfulness (Janik McErlean and Osborne-Ford 2020).

This led Janik McErlean and Osborne-Ford (2020) to investigate absorption ("a trance-like state of consciousness characterised by an ability to fully focus one's attention on a particular object or situation and to become perceptually engrossed with the current experience"; Janik McErlean and Osborne-Ford 2020 p3).

Their participants were recruited via ASMR websites or UK psychology students (controls) (124 of each). The key measures were:

a) Tellegen Absorption Scale (TAS) (Tellegen and Atkinson 1974) - 34 items like, "While watching a movie, TV show or a play, I may become so involved that I may forget about myself and my surroundings and experience the story as if it were real and as if I were taking part in it" (scored 1-5; strongly disagree - strongly agree).

[5] Non-parametric statistical tests of difference were correctly used as the SSS scores were not normally distributed.

A higher score indicates higher absorption.

b) Mindful Attention and Awareness Scale (MAAS) (Brown and Ryan 2003) - 15 items including, "I could be experiencing some emotion and not be conscious of it until sometime later" (each scored 1-6; almost always - almost never). A mean score out of 6 is calculated.

c) Flow Experience Scale (FES) (Csikszentmihalyi 1988) - Eight statements like, "I lose track of time" (scored 1-7; not at all characteristic of me - very characteristic of me). The maximum score is 56.

The ASMR group mean was significantly higher than the controls on the TAS (108.74 vs 94.22 out of 170), but the differences were non-significant on the other two questionnaires. "This suggests that ASMR-experiencers display increased readiness for experiential involvement and heightened ability to become fully engaged with the current experience" (Janik McErlean and Osborne-Ford 2020 p7). But it is not the same as flow or mindfulness (Janik McErlean and Osborne-Ford 2020).

1.3. PHYSIOLOGY

In order to establish that ASMR is "genuine", Poerio et al (2018) systematically investigated physiological changes in two studies.

Study 1

This was an online experiment to establish the subjective characteristics of ASMR in "real-time" as many studies previously had used retrospective reports (with the risk of bias).

Participants - Volunteers who responded to social media advertisements, and an English university mailing list in England. They were divided into "ASMR" (n = 813) or "non-ASMR" (n = 189) based self-identification as "somebody who experiences ASMR".

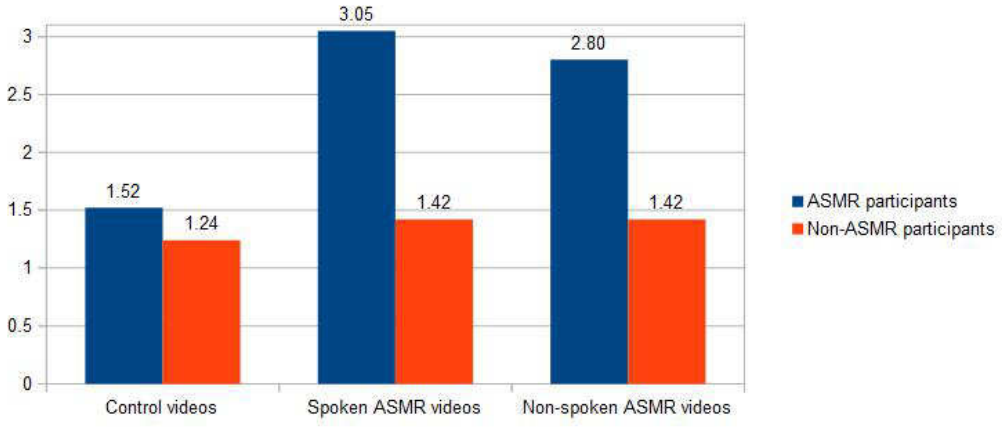
Procedure - Participants watched three sets of six 3-minute videos presented in random order: (i) soft-spoken ASMR videos (3 female voice/3 male voice), (ii) no-speaking but with sound ASMR videos, and (iii) control non-ASMR videos. The latter "mimicked the content of ASMR videos as closely as possible (eg: spoken instructive and demonstration videos with actors facing the viewers directly, and sound-only videos with the camera focused on a close-up scene). However, they did not contain ASMR triggers and were not deemed to be potentially ASMR-

inducing" (Poerio et al 2018 p4).

After each video, participants rated the frequency of tingling sensation experienced (from 1 (none of the time) to 7 (all of the time)). Other measures of affect were also self-reported.

Design - Technically, the study was a mixed design including both independent/between-groups (ie: ASMR or not), and within-groups/repeated design (ie: all participants watched all three types of videos). One independent variable (IV) was the type of video, and a second IV was self-reported as ASMR or not, while the dependent variable (DV)/outcome measure was the experience of a "tingling sensation".

Findings - The ASMR participants reported tingling sensations significantly more frequently to all three types of videos (figure 1.2). They also reported "increased levels of excitement and calmness, and decreased levels of stress and sadness. Notably, these effects were specific to ASMR videos: there were no significant differences between ASMR and non-ASMR participants in their affective responses to control videos" (Poerio et al 2018 p8).



(Data from Poerio et al 2018 table 2)

Figure 1.2 - Mean tingle frequency scores (out of 7) in Study 1.

Conclusion - "These results provide empirical support for anecdotal claims that ASMR videos promote pleasant affect and reduce negative affect in people who self-identify as having ASMR" (Poerio et al 2018 p8).

Evaluation

- (-) An online experiment meant that the researchers had

limited control over procedure (compared to a laboratory experiment) (eg: when and where the videos watched).

- (-) The participants were volunteers, so not a representative sample. Overall, 48% were female, and the mean age was 30 years old (with a range of 18 to 77 years). No details given of ethnicity.

- (+) Specially chosen control videos.

Study 2

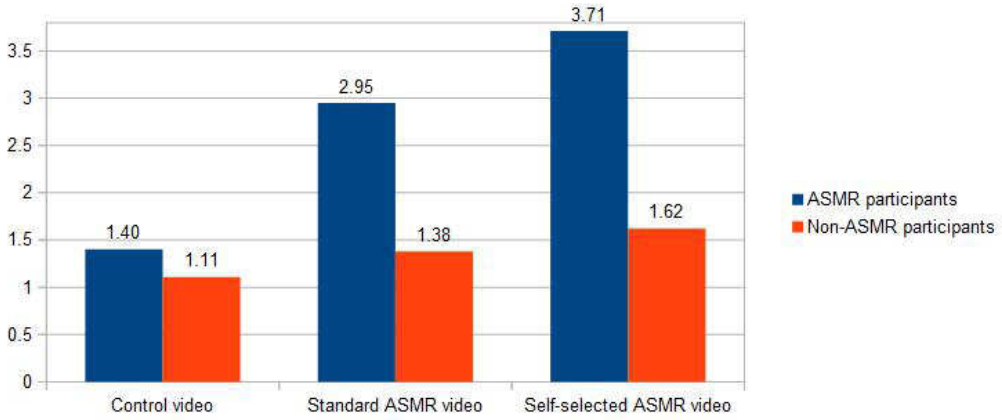
This was a laboratory experiment which increased the control of the researchers on procedure and confounding variables.

Participants - 110 volunteers recruited at an English university, of which half self-identified as ASMR experiencers.

Procedure - Participants watched 3 three-minute video clips that included a "standard" ASMR video, a self-selected ASMR video, and a control video. Self-reported measures of tingling and affect were taken as before, but physiological measures were also made (of heart rate and skin conductance).

Design - A mixed design as Study 1 with the same IVs and DV, except that the physiological measures were an extra outcome measure.

Findings - The tingle frequency and affect showed the same pattern as Study 1 (figure 1.3).



(Data from Poerio et al 2018 table 3)

Figure 1.3 - Mean tingle frequency scores (out of 7) in Study 2.

With the physiological measures, the ASMR participants had a significantly greater reduction in heart rate (ie: decrease in arousal) after watching the ASMR videos than the non-ASMR participants, and a significant increase in skin conductance (ie: increased arousal).

Conclusion - The physiological measures showed that ASMR was both "a pleasant, claming but also activating experience" (Poerio et al 2018 p13).

Evaluation

- (+) Both subjective and objective measures of ASMR in a controlled situation (eg: standard ASMR video chosen from Study 1 that produced the strongest reported tingle frequency score).
- (-) Volunteers at a university (mean age 26 years; range 18-59 years; 58% female).
- (-) Only one video of each type used.

Overall evaluation

- (-) In both studies, there was no independent verification of ASMR status, though there was no standardised protocol for doing so at the time of the research.
- (-) A wider selection of control videos to test if ASMR occurs in other situations.
- (-) In both studies, all the videos were watched together, and they may have influenced each other and the responses. Ideally, a suitable time gap should be left between the different videos (eg: a week).
- (-) The possibility of "demand characteristics" or "expectation effects" - ie: "ASMR participants experienced changes in affect and physiology because they expected to whereas non-ASMR participant had no such expectations" (Poerio et al 2018 p15).

Poerio et al (2018) responded: "Although we cannot be sure that expectation did not play a role in our findings, it is worth pointing out that ASMR participants in Study 2 indicated experiencing ASMR less intensely in the laboratory than in daily life. This suggests that the effects of expectation may have been minimal (ie: participants may have expected to experience ASMR in the study but the extent to which they did was less than they

would naturally). However, to rule out the potential confounding effects of expectation and familiarity with eliciting stimuli, future research would be required to determine the extent to which expectation and familiarity might account for any effects observed. That said, conducting research on ASMR without participant's awareness, as with any non-universal phenomenon, is likely to be a difficult if not insurmountable issue" (p15).

General discussion

The physiological findings in Study 2 were interesting - ie: a mixture of relaxation and arousal, and this "may be indicative of the emotional complexity of ASMR" (Poerio et al 2018 p14). Poerio et al (2018) continued that this "might seem intuitively contradictory, this response is physiologically possible. Despite the long-held view that heart rate and skin conductance level represent a unitary measure of autonomic arousal (meaning they are often used interchangeably), emerging research demonstrates that cardiac and electro-dermal measures are often separable, research which favours the view that autonomic arousal is not a unitary construct. Indeed, recent work indicates that responses in different somatic systems (eg: heart, skin) are likely to reflect different underlying patterns of neural interactions" (p14).

But "this physiological response profile differs from that of aesthetic chills, which are associated with increased heart rate. Therefore, it seems that whilst there may be general similarities between ASMR and aesthetic chills in terms of subjective tactile sensations in response to audio and visual stimuli, they are most likely distinct psychological constructs" (Poerio et al 2018 p13).

Other points to note from the two studies included:

a) Reports of feelings of connectedness after ASMR videos in Study 1. "One possibility is that ASMR simulates a form of social grooming (eg: being calmed and soothed by another through the tactile tingling sensations induced by ASMR triggers), which facilitates well-being and interpersonal bonding (eg: through reductions in heart rate and release of endorphins" (Poerio et al 2018 p14).

b) Low scores for sexual arousal after ASMR videos in both studies. Poerio et al (2018) were clear: "Despite most people describing ASMR as a distinctly non-sexual feeling, the idea that ASMR is sexual and that ASMR videos are used for sexual gratification is a common

misconception. This misconception may arise from the often interpersonal and intimate nature of some ASMR videos, but our research indicates that sexual arousal is not a reliable outcome of watching ASMR videos" (p14).

1.4. BRAIN RESEARCH

In trying to establish the nature of ASMR, similarity to other neurological states has been mentioned, including synaesthesia, "flow", or "frisson" (eg: shivering triggered by an emotional experience to, say, music [6]) (Marshall 2018).

A functional magnetic resonance imaging (fMRI) study by Smith et al (2017) found differences in functional connectivity of areas of the brain between ASMR-sensitive and insensitive individuals; summed up as the former "demonstrated regions of decreased connectivity in the precuneus and thalamus, and regions of increased and decreased connectivity in the frontal gyrus and temporal gyrus" (Lochte et al 2018 p296).

Lochte et al (2018) also used fMRI with ten ASMR-sensitive individuals. ASMR-sensitive was defined as "an ability to consistently report a relaxing and pleasurable tingling sensation multiple times while watching online videos tagged as 'ASMR'" (Lochte et al 2018 p296). While the participants watched seven-minute clips from ASMR videos in the scanner, they were asked to press a button when ASMR was experienced, or another button when relaxed without ASMR. The former lasted an average of six seconds, and the latter nearly 40 seconds.

Lochte et al (2018) reported "significant brain activation in the mPFC [medial prefrontal cortex] during ASMR. This brain region is associated with self-wareness, social cognition, and social behaviours including grooming. Although the participants were watching recorded videos, these results may indicate that ASMR videos activate the brain similarly to actual social engagement. Oxytocin has been shown to bind to receptors in the mPFC and mediate relaxation responses" (p300).

The researchers tried to explain their findings: "The broadest explanation of our results and for most ASMR triggers is that they are related to affiliative behaviours. Affiliative behaviours are the caring behaviours which occur between parents and children, romantic partners, and friends. These behaviours involve close interpersonal bonds and can include grooming behaviours along with a wider array of care-giving and care-receiving behaviours. The attention-receiving or observation-granting behaviours in many ASMR videos have

[6] "Musical frisson" and ASMR compared by del Campo and Kehle (2016).

similarities to being cared for or to looking after someone" (p302).

1.5. APPENDIX 1A - BODY CONSCIOUSNESS

An emerging idea is that "the body helps to generate our sense of self and is a key part of consciousness" (Spinney 2020 p29). This has been described as "embodied consciousness" (eg: Damasio 2003).

Interoception is key here. This is the sense of what is going on in the body. For example, the brain responds to the heartbeat with heartbeat evoked potentials (HEPs) [7], which can be measured by simultaneously recording the heartbeat and scanning the brain (Spinney 2020).

Work has suggested that "signals from the organs, together with signals from the outside world, feed a representation of the bodily self to the brain" (Spinney 2020 p31) (table 1.1). Plus the rhythmic nature of signals from the organs are involved in producing the feeling of the self as continuous in time (Spinney 2020).

- Park et al (2016) investigated HEP and bodily self-consciousness with virtual reality. The researchers made use of the "full body illusion", where the back of an individual is stroked while they viewed the stroking of the back of a virtual body. Individuals come to self-identify with the virtual body. Recordings were also made of HEP.

- The HEP was found to correlate with the full body illusion, which suggested the idea that "not only the neural processing of exteroceptive [external] bodily signals, but also neural responses to interoceptive [internal] signals contribute to the brain mechanisms of bodily self-consciousness" (Park et al 2016 p8458).

Table 1.1 - Park et al (2016).

The distinction has been made between the "I" and "Me" in relation to the self. The "I" is the agent of thoughts about the self (eg: "I am thirsty"), while "Me" is thinking about the self (ie: the content of thoughts; eg "she likes me") (Babo-Rebelo et al 2016).

Babo-Rebelo et al (2016) showed the link between HEP and these two aspects of the self, and two different areas of the brain. Twenty participants were asked to let their minds wander, and afterwards to score the thoughts on scales measuring "I" ("actor/author" scale) or "Me" ("content" scale). This happened while HEPs were measured by magnetoencephalography (MEG).

The researchers found activity in the ventral

[7] Or heart-evoked response (HER) (Park and Tallon-Baudry 2014).

precuneus area of the brain linked to "I", and the ventromedial prefrontal cortex to "Me". Both these areas showed HEPs, which the researchers interpreted as "rooting selfhood in the neural monitoring of internal organs" (Babo-Rebelo et al 2016 p7829).

Park and Tallon-Baudry (2014) argued that perceptual consciousness has to be seen in the context of "a neural subjective frame, corresponding to neural mechanisms defining the organism as a unified entity to tag biologically your conscious experience as belonging to you. The existence of such a mechanism is necessary for perceptual consciousness, to be able to report 'I see something' or 'I hear something'. It is indeed a hallmark of conscious percepts that they belong to the observer, and the observer never fails to perceive them as his or her own experience" (p1).

These authors continued that "the statement 'I saw the stimulus' contains two parts: one related to the stimulus, and the other, most often overlooked, related to the 'I'" (Park and Tallon-Baudry 2014 p2). Put another way, perception has an objective and a subjective part. The former can be measured as stimulus detection. The subjective element can be linked to heart rate (as measured by the HEP/HER).

Take a standard perception experiment where a participant is told that a certain stimulus will appear on a computer screen and their task is to press a button as quickly as possible when it appears (a reaction time task). Traditionally, the focus of the researchers has been on the reaction time ("objective" aspect of perception). But it is known that the heart rate decelerates during the anticipatory period (called the "bradycardia of attention" (eg: Lacey and Lacey 1978), and then the heart rate accelerates again when the stimulus appears. For Park and Tallon-Baudry (2014), the changes in the heart rate, which individuals are not normally conscious of, are part of the perceptual conscious experience. This is because "the brain registers each heartbeat occurrence" (Park and Tallon-Baudry 2014 p4).

So, Park and Tallon-Baudry (2014) have introduced "a neural mechanism to account for the subjective dimension of perceptual experience. This mechanism would be based on the constantly updated neural maps of the internal state of the body and create a neural subjective frame from which first-person experience can be reported. It is important to underline that the neural subjective frame does not have to generate a conscious feeling of bodily state to tag the subject’s conscious experience as belonging to the subject" (p6). More generally, then, perceptual consciousness is a whole-body experience.

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2. GROUPS AND CREATIVITY

2.1. INTRODUCTION

The image of the lone creator separate from society is popular, but Haslam et al (2013) argued that individual creativity is embedded in the group and the community [8]. Creativity can reflect the perspective of the group or originate in deviations from its norms (Haslam et al 2019). They stated that "shared social identity (or lack of it) motivates individuals to rise to particular creative challenges and provides a basis for certain forms of creativity to be recognised (or disregarded)" (Haslam et al 2013 p384).

These researchers explained that "when personal identity is salient, individuals' creations are more likely to reflect their own idiosyncratic style and that their evaluations of other creations are more likely to be guided by personal preferences... [but] when social identity is salient, creative behaviour and evaluation are more likely to be informed by group values, preferences, and norms" (Haslam et al 2013 pp385; 386).

2.2. NON-CONFORMITY

Non-conformity with the group has a role to play. In fact, there is "a great deal of research demonstrating that non-conformity bestows collective benefits, improving group decision-making, increasing creativity and innovation, and reducing polarisation" (Parker and Miners 2012 p317).

Parker and Miners (2012) explored non-conformity as engagement (rather than disengagement) with the group in two studies.

Study 1

One hundred US undergraduate psychology students at Ohio State University (OSU) read about the positive attitude to a "drinking culture" at their university.

[8] Hennessey and Amabile (2010) defined creativity as "the development of a novel product, idea, or problem solution that is of value to the individual and/or the larger social group" (quoted in Haslam et al 2013).

Then one of three conditions were experienced - they were asked to think about the harm of the "drinking culture" to the university (collective harm condition) or to individuals/self (individual harm condition), while a control condition did not reflect on the harm. The independent variable was harmed by the "drinking culture" - university or individuals.

The dependent variable was the willingness to express a view counter to the pro-drinking culture one in different ways (eg: sign a petition; give a public speech). Disengagement from the university was also measured (eg: "I feel disconnected from other students at OSU").

In the individual harm (and control) condition, willingness to express non-conformity increased with disengagement, but the willingness declined with disengagement in the collective harm condition. "Interestingly, the individual harm and control conditions revealed identical patterns, suggesting that individualistic concerns may have been the default trigger for non-conformity among participants who were not directed to think about any particular form of harm" (Parker and Miners 2012 p318).

This study established the idea of "two distinct forms of non-conformity" (Parker and Miners 2012).

Study 2

This investigated willingness to express non-conformity and group identification. Thirty-two undergraduate psychology students read about the pro-drinking culture before joining an online chatroom as the measure of their willingness to non-conformity with the comments made. Collective identification and disengagement with OSU were measured, and they were negatively correlated.

Two forms of non-conformity emerged. Individuals high in disengagement (and low in collective identification) expressed concern about the "drinking culture" in the chatroom. But individuals high in collective identification (and low in disengagement) were also willing to non-conform. The former case can be seen as individuals non-conforming because they reject the group, whereas the latter showed that "non-conformity is associated with a desire to engage with and presumably change important social groups" (Parker and Miners 2012 p321).

These studies challenge the traditional view of conformity and non-conformity/independence (eg: Asch 1956), which has seen conformity as the only route for individuals who identify with the group, and non-

conformity for individuals disengaged with the group [9]. The latter was confirmed. But the idea that an individual can feel part of the group and still non-conform was a new finding. It is almost as if the person is saying, "I love my group, and my disagreement with its norms will benefit the group as a whole".

2.3. BIAS AGAINST CREATIVITY

Mueller et al (2012) performed two studies on attitudes towards creativity and uncertainty.

In the first study, attitudes towards creativity were measured by explicit and implicit means. The former involved questions about creativity as positively or negatively rated. The implicit measure used reaction time to creative or practical words as linked to good or bad words. The assumption is that individuals will be faster to respond if the two sets of words are congruent for the individual (eg: good-creative vs bad-creative). The seventy-three participants completed these measures in a condition of uncertainty (eg: the possibility of winning money) or a control group.

There was no different in the explicit attitudes towards creativity between the two conditions, but there was an implicit bias against creativity in the uncertain condition.

In the second study, 140 undergraduates were divided into two based on their tolerance for uncertainty (high vs low). The high tolerance group wrote a short essay on the topic, "For every problem, there is more than one correct solution", compared to "For every problem, there is only one correct solution" in the low tolerance group. Explicit and implicit attitudes towards creativity were then measured. The participants in the low tolerance condition had higher implicit bias against creativity.

Both studies showed that uncertainty is associated with negative attitudes towards creativity (compared to practicality). This means that creative ideas would be rejected in situations of uncertainty.

Mueller et al (2012) reflected on the findings: "Beyond merely having a preference for the status quo or for familiar ideas..., people appear to have ambivalent feelings toward creativity. On the one hand, participants in the baseline condition of Experiment 1 and the high-tolerance-for-uncertainty condition of Experiment 2 demonstrated positive implicit associations with

[9] "Non-conformity has often, at least tacitly, been accounted for by the absence of factors known to trigger conformity: a lack of concern for others' impressions, little reliance on or trust of others for information, and low levels of interest in social identities and collective solidarity" (Parker and Miner 2012 p316).

creativity relative to practicality. Additionally, 95% of participants in the uncertainty condition of Experiment 1 and the low-tolerance-for-uncertainty condition of Experiment 2 rated their explicit attitudes toward creativity-related words as positive – higher than 4, the mid-point of a 7-point scale; these ratings were statistically equivalent to the ratings of attitudes toward practicality-related words. On the other hand, the implicit measure showed that participants in each high-uncertainty condition (ie: the uncertainty condition of Experiment 1 and the low-tolerance condition of Experiment 2) associated words such as 'vomit', 'poison', and 'agony' with creativity more than with practicality. Because there is such a strong social norm to endorse creativity, and people also feel authentic positive attitudes toward creativity, people may be reluctant to admit that they do not want creativity; hence, the bias against creativity may be particularly slippery to diagnose. The implicit measures may have picked up negative associations with creativity under conditions of uncertainty because the methodology is more resistant to social desirability bias" (p16).

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3. PERMISSIBLE CONSUMPTION

3.1. INTRODUCTION

"Permissible consumption" (PC) refers to "interpersonal judgments about what is acceptable (or not) for others to consume" (Hagerty and Barasz 2020 p14084), and lower-income individuals receive more negative evaluations of their consumption decisions and choices.

Hagerty and Barasz (2020) noted examples including "a round of social media shaming commenced after Syrian refugees were photographed coming ashore with smartphones in hand, and a United States politician chastised lower-income Americans for buying iPhones instead of health insurance" (p14084).

In terms of research studies, Olson et al (2016) found that individuals receiving welfare payments were viewed as less "moral" for buying "ethical goods", like organic foods, than individuals not receiving welfare benefits (appendix 3A).

PC is based on judgments of perceived necessity: "A purchase decision will be deemed permissible (or not) to the extent that it is perceived as necessary (or not)" (Hagerty and Barasz 2020 p14084). But the concept of perceived necessity is not absolute, and varies depending on the individual. Hagerty and Barasz (2020) reported eleven studies on perceived necessity and PC.

3.2. HAGERTY AND BARASZ (2020)

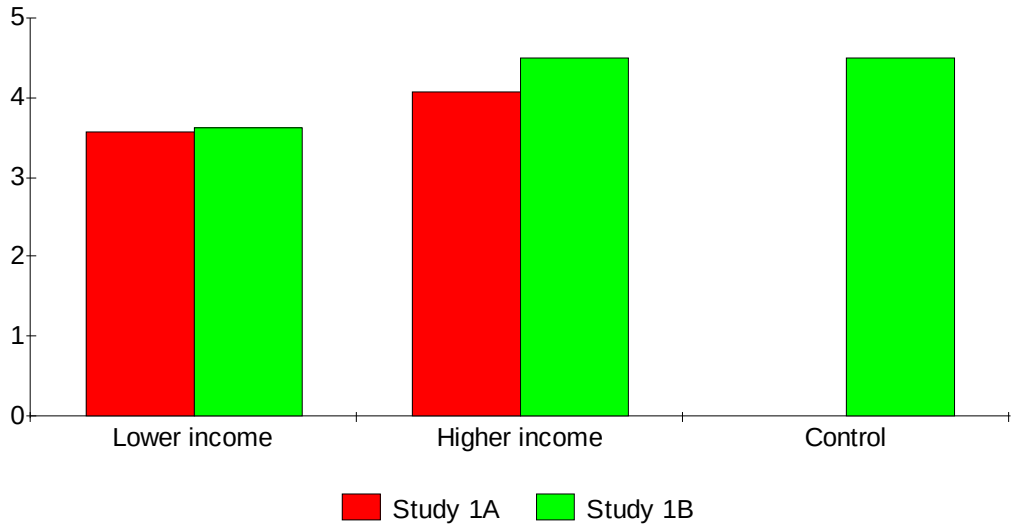
3.2.1. Establishing PC

Study 1A and 1B

Two hundred participants outside a subway station in a US city (Study 1A) and 300 individuals recruited online from Amazon's Mechanical Turk (Study 1B) read about "Joe" who purchased an expensive television with a windfall. Joe was described as a low paid worker, a high paid

worker, nor no mention was made of his income (control condition added in Study 1B). The study was independent groups, and the dependent variable was PC measured by statements, like "He made a responsible purchasing decision" (scored 1 to 7, where a lower score is less permissible).

"Despite the identical purchases, participants rated the consumption decision significantly less permissible for lower-income Joe... than higher-income Joe" (Hagerty and Barasz 2020 p14085) (figure 3.1).



(Data from Hagerty and Barasz 2020 table 1 p14086)

Figure 3.1 - Overall mean score for permissible consumption (out of 7) in Studies 1A and 1B.

Study 2

This study involved 1174 US participants recruited from a survey panel, who read about "Alex" and her partner and their saving up to buy a car seat for the baby. They chose the more expensive of two identically safe seats. The participants were divided into two groups based on whether they were told that Alex was a lower or higher earner.

Lower-income Alex's purchase was rated less permissible (mean 4.59 vs 4.90 out of 7).

Study 3

This study widened the choice of goods to ten non-food categories (eg: jewellery; new vehicle) by a lower or higher income "Joe". The participants were 500

individuals on a nationally representative survey panel. The same consumption decision was always rated les permissible for the lower-income Joe (mean 4.28 vs 4.96 out of 7).

3.2.2. Explaining PC

Study 4

This study aimed to establish "perceived necessity" and to test the hypothesis that "the characterisation of 'necessary' changes depending on who is consuming the item (eg: television is construed as 'necessary' for higher-income individuals but 'unnecessary' for lower-income individuals)" (Hagerty and Barasz 2020 p14086).

Two hundred and nine participants recruited from Amazon's Mechanical Turk read the scenarios from Study 2. The dependent variable of perceived necessity was measured by five dimensions - a must-have, necessary, something one could not do without, essential, and a need (each scored out of 7). A composite mean was constructed, and it was lower for the lower-income Alex (4.77 vs 5.27). In other words, the same item was perceived as necessary for one individual but not another (based on income).

Study 5

Four hundred and two more online participants read about the lower or higher income "Jackson" family. This family was house-hunting and had a list of ten requirements for their new home. Participants rated the perceived necessity of the requirements (eg: garage; laundry room). "On average, participants rated the exact same housing attributes as significantly less necessary for the lower-income Jacksons (mean = 3.88...) than for the higher-income Jacksons (mean = 4.94...)" (Hagerty and Barasz 2020 p14087).

3.2.3. The relationship between perceived necessity and PC.

Study 6

A scenario was created about "Jamie" purchasing his first car and whether to pay extra for a rear-view camera. Jamie was presented as lower or higher income, and the rear-view camera was framed as a convenience or a safety feature. There were, thus, two independent variables, and four independent conditions for 404 online participants.

The rear-view camera was rated less as a necessity in both lower-income conditions (compared to higher-income ones), and lowest in the lower-income/convenience framed condition. The findings supported the hypothesis that "the more necessary an item is perceived to be, the more permissible it is to consume" (Hagerty and Barasz 2020 p14089).

Study 7

This study compared the choice of a phone - basic model vs state-of-the-art smartphone (iPhone) by lower or higher income "Alex". The participants were 399 more online recruitees.

A double standard emerged: "The two phones were perceived to be similarly necessary for the higher-income Alex, and therefore similarly permissible, but the iPhone was perceived to be significantly less necessary for lower-income Alex, and therefore significantly less permissible" (Hagerty and Barasz 2020 p14090).

3.2.4. Effects of perceived necessity and PC.

Study 8

Two hundred online participants were told that the lower or higher income "Smith" family were to receive $200, and asked to rate ten product categories that the money should or should be spent on (eg: jewellery; internet services).

The ten product categories were classed by the researchers as low or high permissibility beforehand. "Participants were significantly less likely to select a 'low permissibility' product category for the lower-income Smiths (7%) compared to the higher-income Smiths (34%)" (Hagerty and Barasz 2020 p14090). The most common category chosen for the lower-income Smiths was personal care items.

Study 9A and 9B

These two studies explored permissible products categories further with 201 participants from a survey panel (Study 9A) and 200 more from the same panel (Study 9B). Participants were asked to vote on a gift card for a lower or higher income family. The choice of gift card was $100 at a grocery store versus $200 for an electronics superstore (Study 9A). In Study 9B, both gift cards were the same amount, and the family had indicated their desire for a television.

In Study 9A, significantly fewer participants voted

for the objectively more valuable electronics gift card for the lower-income family (25%) compared to the higher-income family (53%).

In Study 9B, even after the family indicated their high subjective value for the electronics gift card, fewer participants voted for this care for the lower-income family (73% vs 87% for the higher-income family).

Hagerty and Barasz (2020) explained: "Together with study 8, studies 9A and 9B elucidate the inefficient allocation of funds that may arise as a result of consumption impermissibility beliefs: an imbalanced concentration of strictly 'necessary' goods, and the forgoing of objective and subjective value for the sake of permissibility" (p14091).

3.2.5. Overall Evaluation

The eleven studies used a variety of US participants recruited online, on the street, and from a nationally representative survey panel. The scenarios were quite short and limited compared to real-life situations. However, the researchers were confident about their overall findings. They summed up: "It seems not to be the case that higher-income people are socially permitted to consume more because they can afford more; instead, lower-income people are socially permitted to consume less because they are presumed to need less. The latter point is of particular concern. If people judge lower-income individuals more harshly for buying things they do not 'need', but the definition of 'need' changes — narrowing and becoming more restrictive for precisely those individuals — a bleak predicament arises. Not only do lower-income individuals face harsher interpersonal judgment for deviating from 'necessary' purchases, but there are fewer items that fit within the permissible categorisation of 'necessary' in the first place" (Hagerty and Barasz 2020 p14091).

There is an implication to the negative evaluation of lower income individuals and PC in real life. Unconditional cash transfers (ie: giving money without restrictions) have been reported as beneficial, but "there remains a pervasive fear that funds will be used on the 'wrong things' and a tendency to instead choose more restrictive and conditional paternalistic aid. 'Permissible consumption' provides another lens through which to understand this dynamic. Donors understandably want to ensure their money is well-spent, but this desire for control is likely exaggerated by the lopsided notion that lower-income people spend more impermissibly. Furthermore, influenced by an impoverished view of perceived necessities, donors may contribute an overly

narrow set of goods or be overly restrictive in how they designate funds, all of which limits the ability of individuals and organizations to purchase what they actually need" (Hagerty and Barasz 2020 p14091).

3.3. APPENDIX 3A - OLSON ET AL (2016)

Olson et al (2016) explained the background to their study about "ethical" purchases: "Many ethical products benefit not only the self (eg: they are healthier and safer), but also others both directly (eg: fair wages, better working conditions) and indirectly (eg: fewer pollutants in the air and water). Because it benefits others, we propose that ethical consumption will be viewed as 'pro-social'..., and thus inherently moral. If this is true, by extension, consumers of such products should be viewed as more moral for buying them... However, ethical goods possess an extra feature (in addition to being pro-social) that may limit widespread access or acceptance: a higher price. Ethical goods are generally more expensive..." (p880).

The upshot is that those who make the purchase will be judged. The researchers hypothesised that "whereas individuals earning high incomes will be perceived as more moral for choosing costly, ethical (vs more affordable, conventional) goods, those in the lowest income bracket receiving government assistance will be perceived as less moral because they are seen as 'undeserving' of the right to make such choices" (Olson et al 2016 p880).

Olson et al (2016) performed five experiments.

Experiment 1

One hundred and thirty-five US students were presented with a shopper's grocery list, which included organic or non-organic foods (1st independent variable), and brief information that the shopper earned $85 000 per year (high income) or received welfare payments (2nd independent variable). The dependent variable was a seven-point "morality index" composed of ratings of the characteristics of the shopper (cruel/kindhearted, uncaring/caring, immoral/moral, and unethical/ethical). The perceived healthiness of the food was a confounding variable that the researchers controlled for in their analysis.

The high-income shopper was perceived as significantly more moral when buying organic than non-organic food (mean 5.03 vs 4.60), and significantly more moral than the welfare recipient buying organic food (mean 4.39). In fact, the latter shopper was perceived as less moral than the welfare recipient buying non-organic

food (mean 4.78).

Olson et al (2016) summed up that "while relatively poor individuals receiving government assistance are viewed as less moral when purchasing costly, ethical food products, relatively wealthy consumers are viewed as more moral" (p884).

Experiment 2

The participants were 608 US adults recruited from Amazon Mechanical Turk (MTurk), who were randomly assigned to one of twelve conditions about "Anna" buying a pineapple. Three types of pineapple were used (non-organic; higher priced organic; organic discounted to cost the same as non-organic), and five levels of income (high; low; welfare recipient; low income and welfare payments) (table 3.1).

	Non-organic pineapple	Higher price organic	Discounted organic
High income	1	2	3
Low income	4	5	6
Welfare recipient	7	8	9
Low income and welfare payment	10	11	12

Table 3.1 - Conditions in Experiment 2 by Olson et al (2016).

The high-income Anna buying the higher priced organic pineapple was rated as more moral (mean 5.31 out of 7), and the welfare recipient Anna making the same purchase was rated as less moral (mean 4.45). However, there was a "protective effect" on the discounted organic purchase (ie: a welfare recipient purchasing a discounted organic item was rated as more moral - mean 5.59).

Experiment 3

This study used the scenario of renting a more expensive hybrid car (ie: environmentally friendly) or a petrol one by "John" (who was either a high earner, low earner, or welfare recipient). The participants (181 adults from MTurk) were allocated to one of the six conditions.

The high earner was perceived as significantly more moral when renting the hybrid car, but the welfare recipient making the same choice was seen as least moral.

However, the low earners were perceived the same with either car choice.

Olson et al (2016) noted that these findings "provide initial support for the underlying psychological mechanism – individuals who earn versus do not earn their income are seen as relatively more deserving of choice and, as a result, they are viewed as more moral when choosing ethically" (pp888-889).

Experiment 4

This study used the scenario of "Daniel" donating money to charity. This time the source of the same amount of yearly income was varied for 121 MTurk participants - welfare, charity, family, or earned.

The welfare recipient was evaluated as significantly less moral than the earner. There was no difference for the other two groups. So, the participants were "most dissatisfied when low-income groups donate money received through government assistance—likely because consumers viewed the recipients as undeserving of the right to donate their money as they wish because they themselves contributed to this money via their own paycheck" (Olson et al 2016 p890).

Experiment 5 (A and B)

This study asked 153 students to donate their experiment fee to a charity that provided "meals" or "organic meals" to poor families (part A). The students did not know until the debriefing that the charity was fictitious.

Significantly less was donated when the meals were described as organic.

In part B, the study included four "food request conditions", where the poor families had requested "organic food only", "kosher food only", "lactose-free" or "dairy-free", and a control of "no request".

The "perceptions of the families were significantly less favourable when they had requested organic food compared to when there was no such request" (Olson et al 2016 p891).

Evaluation

Table 3.2. summarises the key aspects of the five between-participant designed experiments.

Other methodological issues included:

- Participants volunteered in exchange for a small fee, so not representative samples.

Experiment	Sample	Number of conditions	Independent variables
1	Students at "large midwestern university"	4	2 * organic/non-organic food * high income/welfare recipient
2	MTurk	12	2 * 3 types of pineapple * 4 levels of income
3	MTurk	6	2 * type of car * 3 income levels
4	MTurk	4	1 * source of income
5 (A & B)	Students at "large midwestern university"	2 & 5	1 & 1 * organic/non-organic food (part A) * food request (part B)

Table 3.2 - Key design elements of the five experiments by Olson et al (2016).

- Artificial scenarios used with limited information about the purchaser and their motivations (ie: compared to real life).

- The choice of particular incomes as high and low.

Olson et al (2016) argued that permissible consumption judgments are made, at least in the USA (and the West), because there is "a cultural belief that everyone, even those from the humblest of beginnings, is able to climb the socio-economic status (SES) ladder to prosperity. Indeed, a pervasive American ideology is that hard work leads to success and that lack of success is caused by the moral failings of self-indulgence and/or a lack of self-discipline" (p881). In simple terms, the belief is that people are poor because it is their fault, and so they have no right to choose more expensive things, even if it is a moral thing.

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4. RESPONSE ANCHORS AND COGNITIVE BIASES

4.1. RESPONSE ANCHORS

Summated rating scales are commonly used in surveys, and they involve choosing from a limited number of response options (anchors) (eg: "never", "sometimes", "always") in response to a stimulus question or item. Items are pooled to produce a composite score, for example (Casper et al 2020).

Equal spacing between response anchors is important, but this can be a problem for verbal anchors - eg: "never", "seldom", "occasionally", "frequently", "always". Casper et al (2020) pointed out that "the assumption that the interval between the first anchor and the second anchor is the same as the distance between the second and the third anchors. Conceptually, this is tantamount to concluding that the interval between the anchors 'never' and 'seldom' is the same as the distance between the anchors 'seldom' and 'occasionally'. Herein lies the crux of the problem – 'seldom' and 'occasionally' may be farther apart (or closer together), in psychologically perceived distance, than 'never' and 'seldom'. Likewise, the interval between 'occasionally' and 'frequently' may be wider (or narrower) than the interval between the other anchors" (p391).

Respondents may interpret the anchors differently ("lexical miscomprehension"), use different cognitive processes when responding to the language, or respond with different speed (with the risk of cognitive biases [10]). The meaning of terms also varies with time (eg: "a trifling amount of", "fairly many times", "scarcely any") (Casper et al 2020).

Casper et al (2020) investigated the descriptive words that could be used as anchors. They surveyed anchors used in published research in two journals of organisational psychology in 2005-9, and in five classic research methods textbooks. Over 1600 summated rating scales were found. Table 4.1 outlines the different types of summated rating scales.

US undergraduate volunteers were asked to rate each term on a 100-point scale for perceived distance and the

[10] Also called "heuristics" (ie: "cognitive short-cuts").

- Agreement - eg: "strongly agree", "agree".
- Similarity - eg: "very similar to me", "not similar to me".
- Frequency - eg: "sometimes", "often".
- Amount - eg: "a lot", "a little".
- Judgment - eg: "very good", "good"

(Based on Casper et al 2020 table 1 p392)

Table 4.1 - Different types of summated rating scales.

mean scores were calculated. Subsequently, the anchors were reduced to a five-point or seven-point option (eg: "never", "rather infrequently", "some of the time", "quite often", "always" (equal distanced)).

Then participants recruited from the Internet were surveyed using equal or unequal distanced response anchors. So, the unequal distance equivalent of the above example was "seldom, if ever", "hardly ever", "occasionally", "sometimes", "frequently, if not always". There were differences in responses depending on the use of equal or unequal distance anchors.

4.2. COGNITIVE REFLECTION TEST

Frederick (2005) introduced the "Cognitive Reflection Test" (CRT) as a way to measure snap judgments and cognitive biases in decision-making. Individuals are viewed as having two types of thinking - "System 1", which is fast, automatic, intuitive, and prone to cognitive biases, and "System 2", which involves reasoned and conscious decision-making (Stanovich and West 2000) [11]. High CRT scorers exhibit the latter, and low scorers the former (Noori 2016).

The CRT has three "puzzles" where there is an "impulsive answer" (wrong) (System 1 thinking), and a "reflective answer" (correct) (System 2 thinking) (table 4.2).

Criticisms of the CRT include (Stieger and Reips 2016):

a) It measures numerical ability rather than rational decision-making.

[11] Brain scanning data suggested activation of the right lateral prefrontal cortex with System 2 thinking, but the ventral medial prefrontal cortex was activated in impulsive decision-making (O'Sullivan and Schofield 2018).

Question	Impulsive Answer (wrong)	Reflective Answer (correct)
A bat and a ball together cost 110 cents. The bat costs 100 cents more than the ball. How much does the ball cost?	10 cents	5 cents
If 5 machines take 5 minutes to make 5 widgets, how long would it take 100 machines to make 100 widgets?	100 mins	5 mins
In a lake, there is a patch of lily pads. Each day the size of the patch doubles. It takes 48 days to cover the entire lake, so how long does it take to cover half the lake?	24 days	47 days

Table 4.2 - The three questions of the CRT.

b) It does not predict real-life decision-making.

c) Using only three items has limited reliability. Up to seven items have developed in revisions (eg: Toplak et al 2014).

d) "The CRT obviously only works well if participants are not aware of the rationale behind the task, ie: that the CRT items elicit a spontaneous, intuitive answer and that this answer is not the correct one" (Stieger and Reips 2016 pp2-3).

These researchers found evidence to support this statement with an opportunity sample of 2272 German-speaking volunteers in Austria and Germany. The participants completed the CRT (figure 4.1), and then were asked if they had done the test or a similar one before.

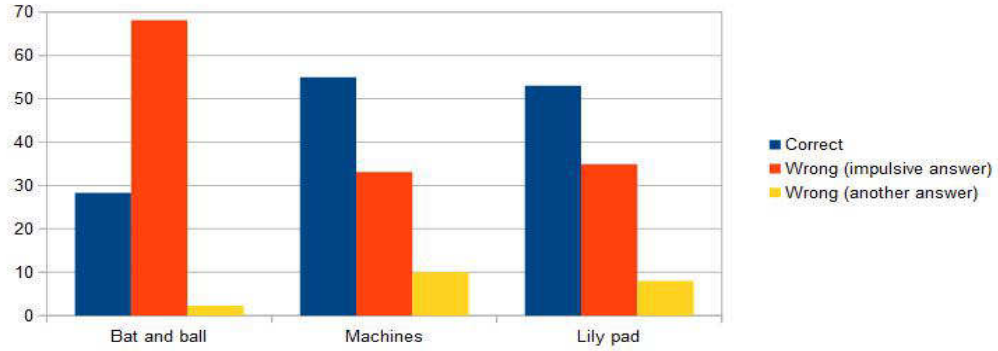
Just under half (45%) of those who provided complete data (n = 2137) had completed the CRT or a similar task before. These were grouped as "experienced participants", and compared to the others ("naive participants"). The experienced group had a significantly higher CRT score (ie: more correct/reasoned answers) (mean 1.65 vs 1.21)[12].

Education level was also important. "About one third of experienced participants with secondary education or a university degree reached the highest score possible (= 3), whereas again one third of experienced participants with lower education did not solve any CRT item" (Stieger and Reips 2016 p6).

Stieger and Reips (2016) concluded that "the CRT in its original three-item form... is not only limited by

[12] Frederick (2005) found that the overall mean score for Harvard students was 1.43 and 1.63 for Princeton students.

familiarity, it is also limited by range restrictions. Although the items seem to be of medium difficulty, the classical CRT is not suitable for the highly educated (because they solve all items) as well as the lowly educated (because they solve none of them)" (p8).



(Data from Stieger and Reips 2016 table 1 p4)

Figure 4.1 - Percentage of correct answers overall on each item of the CRT.

4.3. COGNITIVE BIASES

A number of cognitive biases have been distinguished. Here are a selection:

i) "Endowment effect" (Thaler 1980) - Kahneman et al (1991) defined it as "the fact that people often demand much more to give up an object than they would be willing to pay to acquire it" (p194).

A classic example was shown by Knetsch and Sinden (1984). Participants were given a lottery ticket or the value of the ticket in cash ($2). Later, before the lottery draw, the ticket-holders were offered $2 for their ticket, and they tended to refuse to sell (or wanted a higher price).

Other research has suggested that "the main effect of endowment is not to enhance the appeal of the good one owns, only the pain of giving it up" (Kahneman et al 1991 p197). So, the endowment effect can be linked to the "status quo bias".

ii) "Status quo bias" (Samuelson and Zeckhauser 1988) - A preference for maintaining the status quo when given a choice of stay the same or change, even when change is a better option [13].

[13] There is an opposite - "commission bias" - ie: "a tendency towards action rather than inaction" (O'Sullivan and Schofield 2018 p228).

iii) "Availability bias" - A decision will be influenced by information that is prominent at the time. For example, a doctor who recently missed a very rare disease will be influenced to diagnose it in the future when similar symptoms present. "The temporally recent events, and the emotional component of these events, have resulted in a brain that is now 'primed' for such a diagnosis" (O'Sullivan and Schofield 2018 p226) [14].

O'Sullivan and Schofield (2018) applied other cognitive biases to medical examples, including:

- "Conformation bias" - The tendency to focus on information that confirms a theory rather than the opposite, as in seeking data to support a pre-conceived diagnosis of a patient.

- "Overconfidence" - An inflated opinion of own diagnostic ability (and so trust own assessment above other evidence) leading to a subsequent error.

- "Search satisfying" - The tendency to cease looking for an answer/evidence when a plausible solution (but not necessarily the correct one).

4.4. APPENDIX 4A - EXTREME EVENT ATTRIBUTION

The extent to which a specific weather event can be said to be due to anthropogenic climate change is of great interest (known as "extreme event attribution"; EEA). "Weather concerns the instantaneous state of the atmosphere, but climate is generally understood to comprise its averaged behaviour (including higher-order statistics represented in probability distributions) over some period of time" (Shepherd 2016 p29).

Understanding weather events and population health events have similarity in that there is uncertainty. Shepherd (2016) noted that "it is essential to distinguish between quantifiable uncertainty and Knightian (ie: deep) uncertainty [Smith and Stern 2011]. Uncertainty associated with sampling variance is quantifiable, eg: through boot-strapping methods, but many of the uncertainties associated with climate change — especially the deep uncertainties associated with the atmospheric circulation response to climate change - are not easily quantifiable" (pp35-36).

Shepherd (2016) outlined two approaches to EEA:

[14] This bias can influence how individuals perceive rare events, which has led to statistical models for "extreme event attribution" (appendix 4A).

i) A "risk-based" approach - This is "where the change in likelihood of the effect arising from the presence of that factor is estimated. It is understood that the attribution is only probabilistic, much as smoking increases the risk of lung cancer but is neither a necessary nor a sufficient cause of lung cancer in any particular individual" (Shepherd 2016 p29). In practice, this approach models different outcomes with different factors over time, and estimates the likelihood of climate change causing that weather event.

ii) A "storyline" approach - Here "the causal chain of factors leading to the event is identified, and the role of each assessed" (Shepherd 2016 p29). This is similar to accident investigation where the contribution of different factors is assessed.

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5. PSYCHODERMATOLOGY

5.1. OVERVIEW

Psychodermatology is interested in the relationship between psychology and skin. It is the product of the merging of psychiatry and dermatology (Jafferany and Franca 2016).

"The skin and the nervous system share the same embryogenic origin. Both are originated from the same germ layer. The ectodermis differentiates to form the nervous system (brain, spine an peripheral nerves), tooth enamel and epidermis. It also forms the sweat glands, hair and nails" (Jafferany and Franca 2016 p35).

Psychological factors can lead to changes in the skin, while skin disorders can affect the psychology of the individual. "The exact impact of a skin condition on an individual will depend upon the way it interferes with their ability to meet their needs, and the extent to which it proves stressful for them and their family" (James 1995 p168).

Jafferany and Franco (2016) classified "psycho-dermatological disorders" into:

i) Psychophysiological disorders (eg: acne; hives (urticaria)) - Skin disorders triggered or worsened by psychological stress.

ii) Psychiatric disorders with dermatological symptoms (eg: eating disorders; obsessive-compulsive disorders) - Skin problems are self-inflicted as part of the psychiatric disorders (eg: excessive hand-washing and obsessive compulsive disorder).

iii) Dermatological disorders with psychiatric symptoms (eg: eczema) - Psychological consequences of skin diseases.

5.2. ECZEMA

Eczema (or atopic dermatitis) is a variety of conditions where the skin swells, weeps, and itches (James 1995). The urge to scratch is very strong, but it exacerbates the problem.

Reducing scratching behaviour has been tried with "behavioural habit breaking" (Melin et al 1986) (or "habit reversal" (HR) treatment) [15]. Firstly, individuals monitor their amount of scratching with a diary, and then identify early warning signs (to increase conscious awareness). Once the conscious awareness of warning signs is established, individuals learn behaviour incompatible to scratching to apply, like occupying their hands (James 1995).

Noren et al (2018) reported a recent randomised, single-blind, parallel trial comparing HR and steroid cream (intervention group) with steroid cream only (control group) among 5-13 year-olds with eczema. Thirty-nine participants were recruited by newspaper advertisements in Sweden. The SCORing Atopic Dermatitis (SCORAD) index (ETFAD 1993) was used to measure the severity of eczema. It involves a clinician scoring the areas of the body affected and the intensity, while the patient gives a subjective rating.

HR involved parents teaching their children to clench their fist for thirty seconds in place of scratching an itching area of the skin.

After three and eight weeks of the study, the intervention group showed a significantly higher improvement in skin compared to the control group.

The study was small scale, and five participants dropped out. The participants were volunteers responding to advertisements, so not necessarily representative of the population of eczema sufferers as a whole. There was no long-term follow-up (ie: beyond eight weeks). The scoring of the eczema was done at the clinic on four occasions, and no details were taken of symptoms and scratching behaviour inbetween the visits. There was also no record of the compliance of parents and children to HR (or use of steroid cream).

The study did randomise participants to intervention or control group, and the SCORAD index was used by a clinician blind to the child's experimental condition (ie: single-blinded study). It was not double-blinded because the parents could tell if their children were in the intervention or control condition.

Hoare et al (2000) produced a systematic review of 254 randomised controlled trials (RCTs) on 47 treatments

[15] "Habit reversal" treatment was developed by Azrin and Nunn (1973) to deal with nervous habits and tics. It is "based on the rationale that a nervous habit starts as a normal reaction to a stimulus, and then, with repetition and reinforcement, the reaction becomes a habit that is performed unconsciously and with increased frequency. An effective treatment required the habit to be first made conscious and then replaced by desirable competing responses that needed to be practised regularly" (Noren et al 2018 p666). The founders reported success with nervous habits including nail biting, and eyelash picking (Noren et al 2018).

for eczema. Nankervis et al (2017) updated this review (with studies published up to August 2013).

Four categories of evidence were distinguished to cover the 541 RCTs on 92 treatments and interventions (ie: 287 new RCTs since Hoare et al 2000):

i) Treatments for which there is reasonable evidence of benefits - Fourteen treatments or interventions (eg: topical corticosteroids; topical calcineurin inhibitors; ultra-violet light therapy; education).

ii) Where there is reasonable evidence of non-clinically useful benefits - Nine treatments or interventions (eg: evening primrose oil dietary supplement; probiotics; ion exchange water softeners).

iii) Where there is insufficient (or contradictory) evidence to make a decision, and more research is needed - 12 groups of treatments and interventions (eg: oral anti-biotics; complementary therapies like acupuncture and aromatherapy).

iv) Treatments with no RCT evidence - (eg: modified bathing habits including soap avoidance; impregnated bandages; routine allergen testing).

5.2.1. Quality of Life

Eczema is associated with poorer health-related quality of life (HRQoL). Andersen et al (2020) reported a cross-cultural internet-based survey with adults from France, Germany, the UK, and the USA. Severity of eczema was based on SCORAD scores. HRQoL was scored on impairments to aspects of everyday life.

In total, there were 1098 individuals with moderate-to-severe eczema and 134 with a mild version. There was a negative relationship between severity of eczema and score on HRQoL measures.

A generic measure of HRQoL used was the EuroQoL-SD (EQ-SD) (Herdman et al 2011), which covers all health conditions, and produces a total score between 0 and 1. Individuals rate their health condition on five dimensions - mobility; self-care; usual activities; pain/discomfort; anxiety/depression - using five levels (no problems; slight problems; moderate problems; severe problems; extreme problems). Respondents also rate their health overall from 0 to 100 (known as the EQ-VAS (visual analogue scale)) (table 5.1).

A specific HRQoL measure was used called the Dermatology Life Quality Index (DLQI) (Finlay and Khan 1994), which covers ten aspects of everyday life in the last week (eg: leisure; personal relationships) (each

Severity	EQ-SD (out of 1) (Europe/USA)	EQ-VAS (out of 100) (Europe/USA)
Mild	0.77 / 0.74	75.6 / 75.0
Most severe	0.42 / 0.56	45.0 / 55.4

(A higher score = higher HRQoL)

(Data from Andersen et al 2020 figure 1 and table 2 p1180)

Table 5.1. - Mean scores on EQ-SD for selected eczema severity.

scored 0-3). A higher score signified a greater HRQoL impairment. The mean score for the most severe eczema sufferers was 19.8 (in Europe) and 15.2 (in the USA) compared to 6.0 and 5.2 respectively for moderate eczema.

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6. ATOMIC BOMB SURVIVORS

6.1. LIFE SPAN STUDY

The Life Span Study (LSS) was begun on the 1st of October 1950 with 120 321 individuals including atomic bomb survivors [16], and residents of Hiroshima and Nagasaki who were not in the cities (NIC) at the time of the bombing in 1945 (Beebe et al 1962) [17]. The aim is to see the long-term effects of ionising radiation from the bombs on health (Ozasa et al 2012).

Data are analysed intermittently, and the 13th report (Preston et al 2003) covering 1950 to 1997 showed the increased risk of cancer mortality throughout life. "The rates of excess solid cancer [eg: tumours] deaths have continued to increase in approximate proportion to radiation dose as the cohort ages" (Ozasa et al 2012 p229).

The 14th report (Ozasa et al 2012) (covering 1950 to 2003) confirmed the previous work, and "showed that the risk for all solid cancer deaths has continued to increase throughout the survivors' lifetimes in approximate proportion to radiation dose" (Ozasa et al 2012 p236). Over 50 600 individuals had died by January 1st 2004. Less than 1% of those exposed to radiation at aged 40 years and above still survived.

Age of exposure to radiation was important in that younger-exposed individuals were affected more. "There was no evidence of a radiation effect for infections or external causes of death" (Ozasa et al 2012 p229).

The LSS is a unique study. Other research tends to use high-dose short-term radiotherapy exposure or radiation workers with low-dose long-term exposure [18]. "Thus the LSS is often thought to provide the most reliable estimates of radiation effects because of its large size, wide range of relatively precise individual doses, observation of numerous diseases, and long follow-

[16] Grouped as within 2.5 km of the blast centre (hypocentre), and 2.5 - 10 km.
[17] The NIC group were replaced later by a nationally representative sample as the controls.
[18] Eg: male nuclear industry workers in France, the UK, and the USA (Richardson et al 2015; appendix 6A); Mayak Production Association workers (Sokolnikov et al 2015; appendix 6B); Techa River cohort - contaminated river and soil (Davis et al 2015; appendix 6C).

up period" (Ozasa et al 2012 p240).

Here are a summary of the key methodological strengths and weaknesses with this cohort:

a) (+) Large, representative sample of A-bomb survivors of varied ages still alive in 1950).

(-) But selection bias in that severe cases died before the study began.

b) (+) "Reasonably precise estimates" of radiation dose based on knowledge about the bombs, and a variety of levels of dose in the cohort.

(-) But dose estimates not available for 7058 survivors.

c) (+) Long follow-up period, and information about cancers and deaths from extensive official records (eg: family registry system - koseki).

d) (-) The participants were "the 'survivors' of physical injuries and burns from the A-bomb explosion and biological injuries due to deterministic radiation effects. Additional stressors included poor nutrition and bad hygienic conditions in Japan in the post-war period. Those conditions might have led to early mortality and hence selective exclusion of vulnerable people, including vulnerability to radiation, from the available subjects in 1950" (Ozasa et al 2012 p241).

A subsequent report of the LSS covered the incidence of cancers between 1958 and 2009 (Grant et al 2017). The researchers stated that "the most fundamental finding was that a single, acute whole-body exposure to ionising radiation continued to increase solid cancer risks even after 50 years" (Grant et al 2017 p527).

In this study, "[D]ose estimates were improved using more accurate information on the survivors' locations and shielding characteristics at the time of the bombings" (Grant et al 2017 p527).

It is important to control for smoking, which is a major cancer risk, and it was estimated that 15% of the solid cancer cases in the cohort were linked to that.

6.2. PSYCHOLOGICAL EFFECTS

Not surprisingly, most of the research on the atomic bomb survivors relates to physical health. Kim et al (2011), however, is an example of a study of the mental health effects "in the absence of substantial radiological health effects" (p411).

The sample studied were 347 individuals who lived in the areas surrounding Nagasaki (site of the second atomic

bomb explosion after Hiroshima) since 1945. These areas had been officially rated as uncontaminated, and the radiation exposure was calculated at 10 mGy on average ("thus posing no significant risk to health"; Kim et al 2011 p411). A matched control group of 288 individuals who migrated to Nagasaki in the 1950s and 1960s was recruited. The outcome measure of mental health problems was measured by the 28-item General Health Questionnaire (GHQ-28) in the context of a face-to-face interview.

The exposed sample had a significantly higher mean GHQ-28 score than the control group, which suggested the presence of mental health problems.

Kim et al (2011) noted the correlates with poor mental health: "Presence of physical illness, increased age, fewer years of education, fewer family members living together and number of traumatic life events were common stress-related factors, whereas loss of a spouse or of third-degree or closer relatives, erroneous knowledge about radiation and conviction of being contaminated by the atomic bomb explosion were specific to this research topic. Being involved in farming or fisheries was correlated with poorer mental health, presumably because of fear over soil or seawater contamination" (p413).

Erroneous knowledge about radiological issues, like the incorrect belief that the flash at the time of detonation was the same as radiation, was a key variable [19]. Learning at a later date about the effects of radiation on health increased anxiety. This was post hoc negative information, and the term "psychological fallout" has been coined (Stiehm 1992). Perception of potential harm was also important in increasing distress among individuals living near the Three Mile Island nuclear reactor accident in the USA (Goldsteen et al 1989).

In terms of the limitations of their study, Kim et al (2011) noted the possibility of bias in two ways - over-reporting of mental health symptoms by the respondents, and rater bias. "Rater bias based on sympathy for the sample group may have led to over-estimation of their sorrow and distress, as the atomic bombing is a widely recognised national tragedy and the interview was not masked; its effects were minimised by recruiting interviewers from among those who had no familial or geographical association with the atomic bomb explosion or its victims, using a semi-structured interview and randomly auditing one in ten interviews for biased questioning, although none was detected" (Kim et al 2011 p414). There is also the possibility of "survivor bias" (ie: the healthiest individuals are those still

[19] Note that the control group held similar beliefs, and in some cases, more so.

alive).

The study was cross-sectional, and the data were collected at one point in time (March 2001). Kim et al (2011) explained that "it was uncertain whether the level of distress had remained the same throughout the decades since the atomic bombing, or whether it had been affected by various forms of post hoc information or social events that we did not assess" (p414).

The control group was not the same as the Japanese general population in that they could have had poorer mental health from fears of soil contamination.

On the positive side, Kim et al (2011) pointed out that "this is the first study to have focused upon the mental health effects of psychological exposure to nuclear disaster, without radiological exposure. This issue has been touched on in earlier studies, but the findings were contaminated by the effects of radiological exposure or obscured by poorly designed controls. The observation period we employed is far longer than that of any previous studies, including those conducted after the Chernobyl nuclear accident in 1986" (p415).

6.3. APPENDIX 6A - INWORKS

The International Nuclear Workers Study (INWORKS) was set up to study radiation workers in France, UK, and the USA using personal dosimeters (Cardis et al 1995) [20]. Data on occupational exposure to ionising radiation was available from personal records, and so individual annual quantitative estimates of whole body dose could be calculated (but converted to absorbed dose to the colon expressed in grays; Gy) (Richardson et al 2015) [21].

Richardson et al (2015) analysed data from France (for 1968-2004), the UK (1946-2001), and the USA (1944-2005). The cohort included 308 297 workers (who had been employed in the nuclear industry for at least one year), of which 22% were known to have died by 2001-5 follow-up. Solid cancer was identified as responsible for 19 748 of the 66 632 deaths.

Greater cumulative dose of radiation was associated with higher risk of cancer death with a ten-year lag between dose and death. It was calculated that the relative risk of death by cancer increased by 0.48 for each Gy of exposure. Adjustment was made for socio-economic status, and duration of employment, but not for

[20] INWORKS has been expanded to include fifteen countries in total (Cardis et al 2005).

[21] "However, exposure measurement errors related to personal dosimeters, monitoring practices, and historical records, particularly in the early years of operation, remain a study limitation. Radiation exposures might also have occurred outside of employment at facilities for which we have dosimetry records, and some workers could have had occupational radiation exposures that were not identified in the records available for this study" (Richardson et al 2015 p6).

smoking or occupational asbestos exposure.

Richardson et al (2015) noted: "Although high dose rate exposures are thought to be more dangerous than low dose rate exposures, the risk per unit of radiation dose for cancer among radiation workers was similar to estimates derived from studies of Japanese atomic bomb survivors" (p1).

6.4. APPENDIX 6B - SOKOLNIKOV ET AL (2015)

The Mayak Production Association was set up in Ozyorsk in Russia in 1948 to provide plutonium for Soviet nuclear weapons. From the 1980s a study of the Mayak Workers Cohort (MWC) was begun.

Sokolnikov et al (2015) presented an analysis of the data of 25 757 individuals of the MWC who worked at five plants between 1948 and 1982 (nuclear reactor, radiochemical and plutonium production plants plus the auxiliary depots of water treatment and mechanical repairs). Follow-up was made until 2008 [22].

The number of known deaths by the end of 2008 was 12 438. The radiation effects on specific death rates was calculated as excess radiation risk (ERR) (ie: how much greater the risk of cancer from working at the plant compared to the general public, controlling for age, gender, and smoking status).

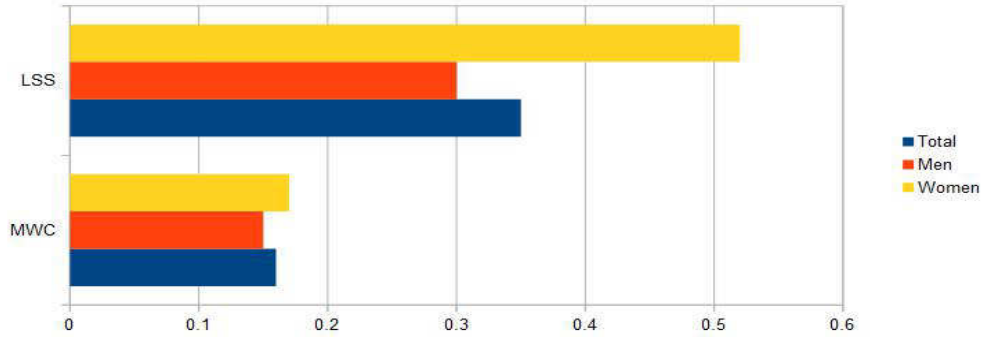
Of the deaths, 2980 were cancer-related (including 1825 from solid cancers other than lung, liver and bone).

The ERR for cancer of the oesophagus, for example, was 1.26 per Gy of exposure, but only 0.12 for stomach cancer. The average for all cancers studied was an increased relative risk of 0.16 per Gy of exposure (compared to 0.35 in the LSS; Preston et al 2003) (figure 6.1).

Sokolnikov et al (2015) concentrated on solid cancers other than lung, liver and bone, whereas Hunter et al's (2013) analysis of MWC data on 1447 incidence cases of the same diseases estimated ERR at 0.07 per Gy. Sokolnikov et al (2015) explained: "The 1447 cancer cases evaluated in [Hunter et al 2013] included cancer cases that had not resulted in death and thus were not included in our analyses. The 1825 deaths in our analyses included cancer deaths occurring in migrants, in the period 2005–2008, and in auxiliary plant workers, none of which would have been included in [Hunter et al 2013] unless the cancer was diagnosed in Ozyorsk before the end of 2004" (p16).

Reviewing their methodology, Sokolnikov et al (2015)

[22] Nearly one-quarter of the MWC have been lost to follow-up - eg: migrated.



(Data from Sokolnikov et al 2015 table 8)

Figure 6.1 - Excess relative risk (ERR) per Gy in the Life Span Study (LSS) of atomic bomb survivors and the Mayak Workers Cohort (MWC) at Soviet plants.

stated: "Our analyses are subject to limitations caused by using information on cause of death from death certificates and autopsy findings. Although this information was obtained primarily from death certificates, autopsy findings were used when available and for 9% of the deaths the cause was coded based on information obtained from relatives. The agreement between death-certificate and autopsy-based cause of death information for Ozyorsk residents was examined in [Koshurnikova et al 1999] and found to be quite good, but some misclassification can't be ruled out" (p17).

Data were available on alcohol consumption, which could be a confounding factor, particularly for cancer of the oesophagus (Sokolnikov et al 2015).

6.5. APPENDIX 6C - TECHA RIVER INCIDENCE COHORT

Radioactive material from the Mayak plants was released into the Techa river between 1949 and 1956, and approximately 30 000 residents received low-dose exposure via contamination of the water and soil, and consumption of water, milk and food from the contaminated area. Studying individuals in the area is known as the Techa River Incidence Cohort (TRIC) (n = 17435) (Davis et al 2015).

Davis et al (2015) reported data for 1956 to 2007 covering 12 759 individuals. In total, 26% of the cohort were alive and cancer-free on 31st December 2007, while 1933 individuals were diagnosed with solid cancers. The increased risk of cancer was linked to the length of exposure to radioactive contamination in the environment (ie: the dose-response model).

For example, the crude cancer incidence rate was 103 per 10 000 person-years for individuals 70 years and

above compared to 11 for under 50s. After taking account of smoking, solid cancer rates were around 60% greater for smokers than non-smokers.

Smoking history was categorised as "ever-smoke", "never-smoke" or "unknown" based on self-reports. Information was not collected on smoking intensity and duration (Davis et al 2015).

It was calculated that the TRIC had around sixty excessive cancer cases from the contamination compared to the general population (Davis et al 2015).

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7. DIFFERENT STUDIES ON DEPRESSION

7.1. TUBERCULOSIS AND DEPRESSION

Tuberculosis (TB) and depression commonly go together. For example, Ambaw et al (2017) estimated a prevalence of 54% of "probable depression" among newly diagnosed TB cases in Ethiopia.

The relationship between the two conditions may be explained as (Ambaw et al 2020):

i) Both share a common risk factor.

ii) Depression leads to a compromised immune system and poor self-care which makes the individual vulnerable to TB.

iii) Depression develops after TB diagnosis "through various mechanisms including chronic infection and related disability and psycho-socioeconomic stressors..., effects of TB medications such as isoniazid..., chronic infectious conditions which may lead to overproduction of proinflammatory cytokines such as interleukin 6, which facilitate cascades of endocrine reactions that are suggested to result in depressive symptoms..., and general physical and psychological losses" (Ambaw et al 2020 p1).

Ambaw et al (2020) reported further the Ethiopian study mentioned above, which ran from December 2014 to July 2016 in fourteen primary care centres in the country (Ambaw et al 2015). The sample involved 648 outpatients newly diagnosed with TB.

Depression was measured using the Patient Health Questionnaire (PHQ-9), which asks about nine symptoms of depression in the last two weeks, each rated as "not at all" (0), "several days" (1), "more than half of the days" (2), or "almost every day" (3). The maximum score is 27, and a cut-off of 10 is commonly used for "probable depression".

Ambaw et al (2020) followed-up the sample at two and six months post-TB diagnosis and starting medication (baseline), focusing on the 299 individuals who did not have "probable depression" at baseline. At two months

follow-up, 7.4% had developed "probable depression", and this became 8.7% at six months. Female participants had a greater risk, while perceived social support was a protective factor.

Methodological issues with this study include:

a) An opportunity sample of those attending selected clinics, and not to ill to be interviewed. "Nevertheless, as the consecutive sample met criteria for robustness (multiple sites, long data collection period, all eligible participants approached to participate)... it should be reasonably representative of adults with newly diagnosed TB in the outpatient department" (Ambaw et al 2020 p7). Only outpatients, so the findings "cannot be extended to TB patients who are hospitalised, are being re-treated or have multi-drug-resistant disease" (Ambaw et al 2020 p7).

b) A measure of depression that is widely used in various populations, and the translated version has been validated in two studies (Ambaw et al 2020). Though it is self-reported and reliant on memory (for past two weeks) and understanding of symptoms. It is not a formal diagnosis of depression (thus the use of the term "probable depression").

c) The control of variables in the analysis including socio-demographics, perceived social support, TB-related stigma, co-morbid illness, and substance use. Potential confounders included undiagnosed physical illness, poverty, and loss to follow-up. Ambaw et al (2020) explained: "Because the study was conducted in a setting where the health system is not as such strong, our participants could have had undiagnosed co-morbid physical illnesses that might have increased incidence of depression. Another potentially confounding factor is poverty which may not have been fully captured by our socio-demographic variables. Lastly, we had no information on whether participants transferred out of the study area differed significantly from others in terms of developing depression" (p7).

d) The follow-up period of six months is less than other studies (eg: 12 years in a Taiwan study; Yen et al 2015).

7.2. ADOLESCENT DEPRESSION

Major depressive disorder in England in 2017 was estimated to affect 2-5% of adolescents (Zhou et al 2020). "The course of this disorder is often characterised by heterogeneous symptoms (eg:

irritability, aggressive behaviours, and school refusal), protracted episodes, frequent recurrence, and co-morbid psychiatric disorders. Young patients with depression have more serious impairments in social and educational functioning and have an increased risk of smoking, substance misuse, obesity, and suicide compared with adults with depression. Moreover, depression is the second or third leading cause of death in adolescence" (Zhou et al 2020 p582).

The need for treatment is thus great. Pharmacological and psychological interventions are used, and they can be effective. Zhou et al's (2015) meta-analysis, for example, found that the psychological interventions of cognitive-behaviour therapy (CBT) and interpersonal psychotherapy were better as first line treatments when compared to controls, while Cipriani et al's (2016) meta-analysis suggested that not all anti-depressants (pharmacological intervention) had an advantage over a placebo.

Zhou et al (2020) updated the two aforementioned meta-analysis with a meta-analysis. In total, 71 randomised controlled trials (RCTs) were included. Zhou et al (2020) summed up their conclusions: "We found that, of all the included active interventions, only fluoxetine plus CBT and fluoxetine were significantly more efficacious than pill placebo in children and adolescents with depressive disorders. We also found that interpersonal psychotherapy was more efficacious than all psychological controls, but with very low confidence of evidence. Fluoxetine plus CBT was associated with a greater reduction in depressive symptoms than either CBT or psychodynamic psychotherapy, with very low confidence of evidence" (p597).

The researchers also gave a warning: "However, the effects of these interventions might vary between individuals, so patients, carers, and clinicians should carefully balance the risk-benefit profile of efficacy, acceptability, and suicide risk of all active interventions in young patients with depression on a case-by-case basis" (p581).

The findings of this meta-analysis are different to studies on adults with major depression, where all anti-depressants are better than placebo, and all psychotherapy superior to controls (Zhou et al 2020). Zhou et al (2020) considered the reasons - hormone levels in adolescence that make the experience of depression different to adults; smaller samples in studies with adolescents; or other differences in methodology.

Methodological issues and differences are always involved in meta-analyses. Zhou et al (2020) noted that "the quality of most comparisons was low or very low. Many trials did not report adequate information about

allocation concealment, and it is difficult to use a double-blind design for patients in trials of psychotherapy..." (p598). The ways the studies varied included:

- Anti-depressant dose.
- Length of follow-up.
- Criteria for diagnosis of depression.
- Measurement of depression.
- Co-morbidities or not (eg: anxiety; ADHD).

7.3. SUB-SAHARAN AFRICA

Studies suggest that the prevalence of depression is similar throughout the world, but the levels of treatment vary greatly between high-income countries and elsewhere. This "treatment gap" is an inequity, and there is an "ethical imperative to provide access to scientifically evidence-based treatment for mental disorders, regardless of the socio-economic context in which people live" (Mayston et al 2020 p1).

But the Western (psychiatric) understanding of depression is not necessarily the same in other places. Focusing on sub-Saharan Africa (SSA), Mayston et al (2020) noted the reification of the category of "depression", and preferred it should be "situated somewhere between disease and sickness, spiritual disturbance or life problem" (p2) (appendix 7A).

These researchers reviewed 23 studies exploring the meaning of "depression" for individuals in SSA. Overall, "depression was rarely perceived to reside purely in the body or in the mind but was seen to unfold across both domains" (Mayston et al 2020 p10).

Depression-like illnesses were described in different ways in different communities, but in terms of importance it was ranked below economic problems. Difficult life circumstances were perceived as the main cause, including living with HIV/AIDS, economic dependence of women, and possession by spirits was also mentioned.

Mayston et al (2020) made this point: "For participants, depression was one problem among many, indelibly linked to other life challenges, in terms of its origins, evolution and consequences. Social relationships were the key features in these landscapes. Spousal relationships that were found to be wanting in terms of reciprocal emotional and economic support, sometimes dislocated by HIV, were central to the fabric

of descriptions of 'burdened hearts'" (p10). These researchers emphasised "how experiences of depression affect 'one's way of being-in-the-world' in SSA, grounded in the intermingling of concepts of the connectedness of intrapersonal (self), interpersonal (social) and transpersonal (spiritual) worlds with ideas about the importance of actualising personal goals and preferences..." (Mayston et al 2020 p11). Put simply, a "context shaped narrative".

7.4. URBANICITY AND DEPRESSION

One model of urbanisation and health (Galea et al 2005) involves three levels of influence, and Sampson et al (2020) applied these to depression:

i) Major global and national trends - eg: immigration; globalisation.
For example, Generaal et al (2019) found that high levels of immigration in a resident's neighbourhood was associated with higher levels of individual depression in the Netherlands.

ii) Municipal-level determinants - This "includes activities of government, markets, and civil society, including housing and food markets, community organisations, and public transportation" (Sampson et al 2020 p234).

iii) Urban living conditions - eg: physical built environment; health services; social factors.
For example, greenspace was inversely associated with depression in more densely populated areas, but not less dense ones (eg: Sarkar et al 2018).

Commenting on eleven studies on urbanicity and depression published in 2018 and 2019, Sampson et al (2020) stated: "While overall, depression symptoms were more common or severe in urban areas, results were nuanced, mediated by various factors, and modified by country as a likely proxy for larger contexts" (pp241-242). So, there is no simple answer to the relationship between urbanicity/urban life and depression.
One problem is that "it is difficult to separate the effect of living in an urban area from the effects of higher income or other resources that are often necessary for someone to either migrate to or remain in an urban area. This can lead to issues such as the 'healthy migrant effect' – the idea that individuals who leave their rural homes to travel to urban areas are often healthier or otherwise better off than those who do not leave rural areas, confounding comparability between these two groups. Similarly, for those who migrate,

it can be difficult to disentangle effects of urban living from effects of the process of migration itself or the underlying reasons for migration" (Sampson et al 2020 p242).

Sampson et al (2020) did highlight the role of climate change and the related increase in natural disaster frequency (appendix 7B): "For example, the infrastructure of population-dense areas may be particularly vulnerable to natural disasters such as hurricanes and to extreme climates such as the urban heat island effect, both of
which are associated with depression" (p242). Other global trends include income inequality, internet addiction, violence and discrimination experienced by minorities, and the availability of health services, which can all impact depression (Sampson et al 2020).

7.5. APPENDIX 7A - THE REALITY OF DIAGNOSIS

Dealing with trauma as in post-war situations can fall into two approaches - focus on the individual and therapeutic techniques, or "a psychological model originating in community psychology focused on 'repairing and strengthening a supportive social environment for overcoming psychological difficulties' (Ventevogel 2018)" (Kienzler 2019 p61). This latter approach links the stress of war to material conditions like poverty and discrimination (Kienzler 2019).

But both these approaches "promote the translation of local expressions of distress into 'locally untranslatable Western disorders' such as 'depression', 'anxiety', or 'PTSD' (Abramowitz 2010...). Thus, they apply standardised treatment protocols following a top-down reductionistic formulation of well-accepted biomedical logic, as follows: If symptoms are correctly identified, they can be reduced to discretely named mental disorders that are tied to specific forms of treatment. Treatment success, in this scenario, is measured in terms that are broader: a positive influence on the course and outcome of distress and illness and an increase in resilience and effective coping" (Kienzler 2019 pp61-62).

Kienzler (2019) talked of an alternative - the process of "making patients", with particular reference to post-war Kosovo in 1998-9. She explained "how Kosovar health practitioners adopted and adapted international mental health standards and requirements by resorting to practices that were responsive to their particular post-war and resource-scarce context. In fact, they did much more than follow evidence-based guidelines or simply describing and ascribing symptoms based on established

diagnostic frameworks and particular disease patterns and providing standardised treatments to their patients. Rather, they 'made' patients who fit diagnostic and treatment models by creating particular patient 'subjectivations' (Fassin 2012) or 'characters' (Desjarlais 1999). This was particularly visible with female patients, where it involved reducing their patients' complex experiences of distress to singularly mapped war traumas that sidelined the detrimental impacts of 'routine ruptures' (James 2010), including poverty, unemployment, gender inequality, and socio-political uncertainties. By rendering women 'traumatised' by war, they could fit ready-made diagnostic categories that, in turn, matched the limited treatment options available to practitioners in the resource-scarce context. 'Making diagnosable and treatable patients' was, thus, both a clinical and socio-political response to a situation where only 2% of an under-funded health budget was spent on mental health, the referral system was underdeveloped, there was a lack of adequately trained staff, and professionals worked under extreme time constraints" (Kienzler 2019 p60).

Kienzler (2019) interviewed seven GPs, six psychiatrists, six psychologists, and four psycho-social workers starting in 2004.

From the interviews, it became clear that the diagnosis process was an ethical dilemma, as Kienzler (2019) outlined: "On the one hand, health practitioners understood women's suffering as related to memories of extreme war violence and the 'routine ruptures' of structural violence and profound everyday and political insecurities; on the other hand, they had no way to address these complexities as they were forced to work in a poorly functioning mental health system with limited resources that did not allow for the provision of meaningful holistic treatment. This situation locked them in a 'double bind' (Bateson 1972) as they were trying to reconcile the knowledge of not being able to provide adequate support with the obligation to do something. The outcome of this was the routine reduction of female patients' suffering to trauma-related mental health problems to be able to provide standardised treatment, the handing out of placebos, giving more or less helpful life advice, and referring women to often dysfunctional social services. My point is that the limited available treatment options appeared to drive diagnostic practice. While this might, at first, appear unprofessional and ethically questionable, seen from the perspective of the health practitioners, the lines between the ethical and unethical behaviours are blurred in ways that no normative rules can change. Indeed, I would argue that normativity might lead to paralysis rather than meaningful care" (pp71-72).

7.6. APPENDIX 7B - DROUGHT

More frequent, severe and longer-lasting droughts are a risk with global climate change [23]. Ault (2020) observed: "Unlike most natural disasters, but like a disease, a drought begins before it presents any symptoms. To understand this, imagine that it is May of 2013 and that you are a farmer in the Caribbean. It has been a little dry recently but otherwise all seems well ahead of the summer rains. The weather is warm, the skies are clear, and the horizon has a yellowish hue from dust carried across the Atlantic from the far-off Sahel. Although you do not know it yet, the worst drought in at least half a century has already begun. Before it is over, it will persist for 3 years, push 2 million people into food insecurity, and affect nearly every island in the Caribbean" (p258).

There is no universal accepted criterion for a drought (Ault 2020). Redmond (2002) referred simply to periods of time when "the supply of moisture fails to meet its demand" (quoted in Ault 2020). However, Ault (2020) pointed out: "Whereas the atmosphere delivers the supply of moisture, the demand for it arises from countless sources—a hot, dry atmosphere demands water vapour from the surface; plants demand water for transpiration; and our infrastructure demands water resources for irrigation, municipal water supply, and hydro-electric power generation, among many other uses" (p256).

Droughts are classified based on their length (Ault 2020):

- Meteorological drought - rainfall shortages over weeks;
- Agricultural drought - over months and includes crop losses;
- Hydrological drought - seasonal to over years with depleted streams and rivers.
- Socio-economic drought - so long that there water shortages in everyday life.

[23] "Climate change alters the balance of moisture throughout the world by disrupting its supply through changes in the general circulation. Meanwhile, higher temperatures can increase moisture demand from the land surface for the same reason that a sauna will dry out a towel faster than a steam room. Accordingly, regions seeing both a decrease in supply and an increase in demand are very sensitive to even low levels of warming" (Ault 2020 p258).

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8. FOOD AND BODY

8.1. APPETITES

Balancing the intake of carbohydrate and protein has been studied in different species. For example, an observation of a female wild Cape baboon for thirty days (Johnson et al 2013), who ate many different foodstuffs, found that daily calories from carbohydrates and fats compared to calories from protein was steady at 4:1 (Raubenheimer and Simpson 2020).

Raubenheimer and Simpson (2020) reported their work with young locusts (eg: Simpson and Raubenheimer 2000) that experimentally manipulated the diet in various proportions of carbohydrates and protein from high-protein/low-carbohydrate to high-carbohydrate/low-protein with no restrictions on quantity. The ideal diet was calculated at 300 milligrams of carbohydrate and 210 milligrams of protein per day. Whatever the diet condition, the locusts attempted to reach the ideal protein intake. The low-protein conditions overate carbohydrates and became fat, while the high-protein conditions ate too few carbohydrates and were unhealthily lean.

Raubenheimer and Simpson (2020) explained: "This experiment documented for the first time the battle between two nutrients: protein and carbs. When the locusts' food didn't allow them to eat a balanced diet, they prioritised protein over carbs at great cost to growth and survival. In fact, we later realised that what we were seeing wasn't so much a competition between nutrients as between two appetites - one for protein, the other for carbs. Locusts had two separate appetites" (p32).

Subsequent studies with other animals have distinguished five appetites - protein, carbohydrates, and fat (macro-nutrients) and sodium and calcium (micro-nutrients) (Raubenheimer and Simpson 2020).

The non-human animals studied and showing "protein leverage" include primates, pigs, rodents, birds, fish, and insects (Gosby et al 2011). Spider monkeys (Felton et al 2009) showed the strongest evidence that "when the percentage of protein in the diet is lowered, total

energy intake increases in an effort to maintain constant protein intake" (Gosby et al 2011 p1).

What about humans? Where studies have been able to manipulate the content of diets in a controlled situation, similar findings to the locust experiments emerge - in particular, a low-protein diet leads to increased consumption of total calories (Raubenheimer and Simpson 2020).

For example, Simpson et al (2003) studied ten adults in a controlled environment for six days where half received foods high in protein and low in carbohydrate and fat (group 1), while the others low protein/high carbohydrate and fat (group 2). The "over-riding" message of this study was that participants maintained their protein intake. Group 2 overate carbohydrates and fats to gain sufficient protein, while group 1 under-ate them (Simpson and Raubenheimer 2005).

USA official data on the average diet estimated that in 1961 14% of energy intake was protein compared to 12.5% in 2000 (Simpson and Raubenheimer 2005). Thus to maintain protein intake would require increased consumption of carbohydrates and fats. This is the "protein leverage effect" (or hypothesis; PLH) (Simpson and Raubenheimer 2005) [24].

Add to this tendency a food environment in the West with ultra-processed foods that are protein-poor but energy-rich, then overeating of carbohydrates and fats leads to obesity (Raubenheimer and Simpson 2020). The level of exercise is also important (Simpson and Raubenheimer 2005).

Put simply, the modern diet has a higher ratio of carbohydrate and fat to protein than is "optimal" (Simpson and Raubenheimer 2005).

Simpson and Raubenheimer (2005) asked (and answered): "if humans do regulate protein intake, why do we not simply select protein-rich foods to rebalance our diet? This would suggest that the feedbacks regulating excessive fat and carbohydrate intake are less acute than those for protein, as is consistent with evolutionary accounts of human nutrition, and is also seen in other animals. For most of our existence the human diet consisted of a high proportion of animal foods, partly reflecting the scarcity of readily available simple carbohydrates. Further, wild animals typically have considerably lower fat content... than does modern commercial meat... As a result, we have limited

[24] Austin et al's (2011) analysis of US data from the National Health and Nutrition Examination Survey for 1971 to 2006 has found a drop in protein intake as a percentage of total food intake while total energy intake increased. This fits the PLH as individuals "compensate" for the reduction in protein by increasing their overall food consumption.

evolutionary experience of excess carbohydrates or fats, and it seems reasonable to infer that natural selection against their overconsumption would not have been strong" (p140).

Gosby et al (2010) observed: "Experimental data indicates that protein is the most satiating macro-nutrient group for humans and may therefore protect against over-consumption" (p367).

These researchers manipulated the protein to energy ratios in a variety of sweet and savoury foods in a study with seventeen volunteers at the University of Sydney, Australia, and fourteen individuals at the University of West Indies Mona, Jamaica. The foods were varied to contain 10, 15 or 25% energy as protein, while carbohydrate was adjusted to be 60, 55 or 45% energy, but fat was constant at 30% energy. There were common and some different foods at each site (eg: raspberry muesli in Australia, red pea soup in Jamaica, and banana bread at both sites).

In terms of rating the foods, participants were able to detect sensory differences, "but were generally unable to associate these changes with an increase in protein. This suggests that humans find it difficult to detect protein per se, but can detect it in a form with which they are familiar (eg: meat)" (Gosby et al 2010 pp369-370). Participants were not able to detect the differences in carbohydrate levels.

In a similar study, Gosby et al (2011) studied 22 lean volunteers from universities in Sydney, who spent three periods of 4 days in a controlled environment. Foods were modified to contain 10%, 15% and 25% of energy as protein, and 60%, 55% and 45% of energy as carbohydrate, but fat was constant at 30%. Twelve sweet and sixteen savoury foods were used with some of them being available throughout the study ("anytime foods"), and others only at meal times ("meal time foods") (table 8.1; figure 8.1). The foods were "ad libitum" (ie: eat as much as want) with no access to foods not in the study. One 4-day period has foods with 10% protein (and carbohydrate varied), the next 15%, and the third period 25% (ie: repeated measures design experiment). "Food intake was measured by recording the weight of the food before and after serving, to the nearest gram. Energy intake was then calculated using the nutritional information for each recipe" (Gosby et al 2011 p8).

Participants consumed significantly more over food over the 4-day period of 10% protein (around 12% more) than the other two occasions. About three-quarters of this increase was "anytime foods" (ie: snacking behaviour) (figure 8.2). "Over the 4-day study periods, for every 1 kJ [kilojoules] decrease in protein intake below the 15% level, non-protein intake increased by 4.5

	Study day 1	Study day 2	Study day 3	Study day 4
Breakfast		**Savoury breakfast muffin**	**Savoury breakfast muffin**	**Savoury breakfast muffin**
8.30–10.00am				
		Apricot yoghurt muesli	Raspberry yoghurt muesli	Apricot yoghurt muesli
		Pear, raspberry & coconut bread	**Banana bread**	**Pear, raspberry & coconut bread**
Lunch	Tuna bake	Mexican wrap	Tandoori wrap	Sweet potato wrap
1pm				
	Beef and vegetable pastry	Teriyaki sushi roll	Beef and vegetable pastry	Pasta salad
	Salad & dressing	Salad & dressing	Salad & dressing	
	Fruit salad yoghurt	**Apple crumble muffins**	**Fruit salad yoghurt**	**Apple crumble muffins**
Dinner	Goulash	Mushroom Pasta	Pasta Bolognaise	Hokkien noodles
6.30pm				
	Cheese Scones	Chow mein mince	**Cheese Scones**	Massaman curry
	Salad & dressing		Salad & dressing	
	Orange & poppyseed cake	**Chocolate, apple & ricotta cake**	**Orange & poppyseed cake**	**Chocolate, apple & ricotta cake**
	Custard	**Custard**	**Custard**	**Custard**
Snacks	**Savoury scones**	**Cheese scones**	**Savoury scones**	**Cheese scones**
all day				
	Carrot cake	**Raspberry yoghurt**	**Apricot muffins**	**Raspberry yoghurt**

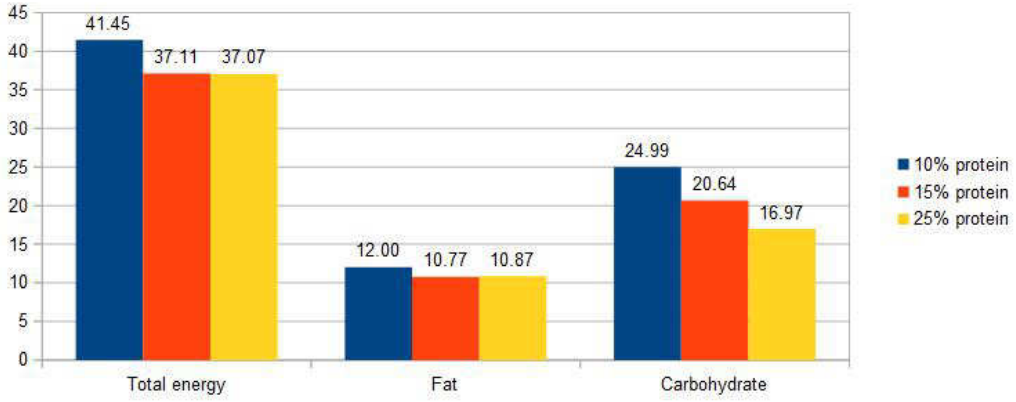
(Source: Gosby et al 2011 table 6)

Table 8.1 - 4-day menu used by Gosby et al (2011).

(Source: Gosby et al 2011 figure 4)

Figure 8.1 - Breakfast (left hand) and dinner (right hand) meals with 10%, 15% and 25% protein (top to bottom).

kJ; whereas for every 1 kJ increase in protein intake above the target, participants decreased non-protein intake by 1 kJ" (Gosby et al 2011 p4).



(Data from Gosby et al 2011 table 1)

Figure 8.2 - Mean intake over 4-day period (megajoules; MJ) based on protein level.

Gosby et al (2011) summed up: "In this randomised, controlled, experimental study we have shown that even when the macro-nutrient composition of foods was disguised and variety controlled, increased energy intake occurred on diets containing a lower proportion of energy from protein and persisted throughout the four days of the study" (p3). If the pattern of increased eating continued over the longer term, without an increase in energy expenditure/physical activity, "a 1.0 kg weight increase per month would be expected" (Gosby et al 2011 p3).

Martinez-Cordero et al (2012) tested the PLH with data from a free-living population (the Cebu Longitudinal Health and Nutrition Survey (CLHNS) began in 1983 in Cebu city in the Philippines). During the 1980s and 1990s, mean household income increased, and there was a shift in diet and exercise patterns.

Data were available from food diaries for up to 2031 women completed in 1986, 1994, 1998, 2002 and 2005. Calories of protein, carbohydrate and fat were calculated.

Calories of protein remained constant over time as predicted by the PLH, irrelevant of changes in food eaten, and changes in carbohydrate and fat intake. "These findings are consistent with the interpretation that the total amount of protein consumed is more tightly regulated than intake of carbohydrates or fat" (Martinez-Cordero et al 2012 p214).

8.2. EATING DISORDER ANIMAL MODELS

Human eating disorders are currently believed to be caused by a combination of genetic, developmental and environmental factors (Treasure and Eid 2019).

Animal models are seen as useful in understanding the physiological factors in appetite control and dysregulation. But the "relevance of any animal model is increased if it can take into account the known risk factors and epidemiology. For example, a model of binge eating needs to explain the increasing prevalence in successive cohorts born after 1950. Changes in the food environment over this period, such as the increased availability of foods with a high caloric density and palatability..." (Treasure and Eid 2019 p472).

Loss of control of eating as in bulimia nervosa or binge-eating disorders has been studied with animal models by creating environments with processed foods and highly sugared drinks. For example, particular genetic strains of rats are at higher risk as well as evidence of neurochemical changes. "The brain and behavioural changes that develop in these animals resemble those that develop as a result of substance abuse leading to the hypothesis that these disorders are a form of food addiction" (Treasure and Eid 2019 p475). With this situation there are anomalies in certain brain areas (eg: ventral striatal circuits) and dopamine (the "addictive appetite model"; Wiss and Brewerton 2017). Simplistically, the upshot is that "the drive to eat is no longer dependent on the goal to reduce hunger but is triggered by food cues in the environment" (Treasure and Eid 2019 p473).

Two animal models have been developed to explain anorexia nervosa (Treasure and Eid 2019) - the activity-based model (Klenotich and Dulawa 2012), and a genetic vulnerability/social stress model (Madra and Zeltser 2016). The former model mirrors exercise-based anorexia nervosa, where some rats on a restricted food schedule with access to a running wheel developed a preference for exercise over food (even to a fatal conclusion) (Treasure and Eid 2019).

In the second model, adolescent rats with a genetic predisposition to anxiety were exposed to social stress (eg: isolation) followed by a restricted diet. Subsequently, 40% of female rats developed self-imposed dietary restriction when food was available ("sometimes to the point of death") (Treasure and Eid 2019).

8.3. EXTREME WEIGHT LOSS

In the face of obesity in the world today, pharmacological aid to weight loss is the "holy grail of

obesity research". But many such products have severe side effects (Petroczi et al 2015).

"From the public health point of view, it is concerning that hazards from the past (eg: weight loss medications that have been stopped decades ago) seem to be a returning feature of today's off-street supplement market, mainly through retail networks that fall outside standard safety regulations: the Internet" (Petroczi et al 2015 p2). These authors highlighted one such drug category - "rainbow diet pills" - which they say is "an array of potent combinations of prescription medications, that are prohibited in medical practice but nonetheless available in disguise as herbal diet pills" (Petroczi et al 2015 p2). There is often an incorrect assumption that herbal diet pills and supplements are from a "natural source" and so not harmful (Petroczi et al 2015).

The "underground" supplement market also includes 2,4-dinitrophenol (DNP), a manufactured chemical used in the 1930s to treat obesity, but stopped because of its toxicity. DNP is known for its "fat burning properties". Very simply, it increases fat metabolism. "However, the weight-loss effect comes with serious, and in some cases potentially fatal, adverse side effects, namely hyperthermia [abnormally high body temperature] (the leading cause of fatality with acute DNP toxicity) and cardiac arrest, but also diaphoresis, tachycardia, tachypnea, skin toxicity, Fourier's gangrene and cataracts with low dose chronic exposure" (Petroczi et al 2015 p2) [25].

DNP is currently used legally as a herbicide, dye, and film-developer, for example. But DNP is available on the Internet as an ingredient of some herbal dietary supplements, under disguised names (eg: nitophen; dnoc) (Petroczi et al 2015).

The Food Standards Agency (FSA) in the UK has attempted to regulate this market. "Counterbalancing the efforts of regulatory bodies, a culture exists among bodybuilders that encourages and provides advice for DNP use. Other than bodybuilders at risk groups are comprised of adolescents, extreme dieters and those who are suffering from an eating disorder, people with drug abuse history and athletes willing to experiment with dangerous chemicals" (Petroczi et al 2015 p2).

Petroczi et al (2015) reported three studies as part of a collaboration with regulatory authorities in the UK like the FSA between 2013 and 2015.

[25] Excessive sweating (diaphoresis), very high heartbeat (tachycardia), and abnormally rapid breathing (tachypnea). Fourier's gangrene is an acute necrotic infection of the male genitals.

Study 1

A survey of the Internet for the availability of DNOP and advice on its use. Well-known search engines were used, but newspaper articles, YouTube videos, and official health advice were excluded. Online retail sites, bodybuilding forums and blogs were searched.

As of August 2015, thirty-six websites globally were found to supply DNP to the UK. The suppliers apparently based outside the UK were aware of the legal position of DNP. "Under shipping information, retailers explain in detail that they avoid identifying themselves as pharmaceutical-related or labs to avoid suspicion, using discreet packaging that does not identify the content and employ frequent changes to their packaging not to alert customs (ie: using non-descriptive labels or disguise DNP as some other product, eg: turmeric if DNP is shipped in powdered form)" (Petroczi et al 2015 p7).

Forums and blogs gave advice on where to find DNP, and details of experiences with it. The "recommended" dosage was highly variable. Petroczi et al (2015) stated: "Most concerning is that in the absence of easily accessible information and a universal safe zone for dose and exposure duration, this individual, personal-experience based advice for length and pattern for the 'treatment' regime is highly concerning for the public. None of these information sources draw people's attention to the fact that DNP's harmful effects are highly dependent on the individual's tolerance. The only recommendation is to start at a lower (200 mg per day) dose and increase if tolerated well. Based on the available scientific evidence, even this lower dose can be harmful for some" (p8).

This was not helped by some postings appearing to have in-depth knowledge of biochemistry, including references to scientific literature.

"Experienced users'" comments were important. "However, the fact that these experienced users have managed to use DNP safely' (that is, using DNP without death or apparent indication for long-term health consequences) does not necessarily translate to 'safe use' for others, particularly among drug-naive users or those with minimum experience. On the contrary, it creates an illusory sense of safety which - coupled with a potential lack of knowledge about the strengths of different forms and the complete lack of regulatory control over these substances and labels - indeed poses grave danger to the general public. Furthermore, owing to the lack of established level of toxicity, a dose well-tolerated by one user is not applicable to another" (Petroczi et al 2015 pp8-9).

Study 2

This study investigated the adulteration of dietary supplements and performance enhancers with DNP. Ninety-eight samples collected by regulatory authorities in Southern England from high-street outlets, gyms, and the Internet were chemically analysed. The majority of samples were non-Internet (n = 82), and a small number had trace amounts of DNP (14%). "In contrast to high street retailers, a concerning proportion of the Internet samples were contaminated with DNP" (Petroczi et al 2015 p9) [44%]. Pure DNP was not found in any supplements.

Study 3

This study investigated the motivations, expectations, and risk-management with DNP of thirty-five users recruited from Internet forums for an anonymised surveys. Fifteen participants were based in the UK.

The reason for using DNP was predominately weight loss (eg: "Just looking to drop some fat quickly"). Curiosity (eg: "to verify the hype") and image enhancement (eg: "improve image, and tone up") were also mentioned.

Concerning weight loss, the researchers noted the use of DNP after other methods of weight loss to deal with "very stubborn fatty areas". For example, a male in his 20s said: "I have lost over 60lbs in the past 24 months, yet still have some very stubborn fatty areas. No matter the level of cardio or calorie intake I cannot shift this fat... DNP can literally and effectively burn fat from your body in a limited time period. As you can imagine this appealed to me" (p10).

Only one participant admitted to DNP use as a shortcut to exercise and dieting for weight loss.

Most participants talked of positive results (eg: "lost approx 1 lb of fat per day"), but some admitted to disappointment (eg: "less weight loss than expected"). Side effects were reported (eg: headaches; cravings; uncomfortable sweating).

Petroczi et al (2015) explained: "All 35 users in our sample knew the health risks associated with DNP intake and made an informed choice. Characteristically for the sample, DNP users were not only aware of, but were also prepared for or even took pro-active steps to manage the expected side effects. Participants typically said that 'I was on top of water and electrolytes' and '[I expected to] feel ill, heat, dehydration.
I planned ahead for all foreseeable side effects'" (p12).

As the majority of participants used the Internet to acquire DNP, there was a risk about the quality. Reputation of the website based on reviews was important

in purchasing, and in quality of DNP (eg: "ensured that I got it from a reputable source with lots of good reviews"). A small number of users did chemical tests, but self-experimentation was more common. One user said: "I opened that capsules and looked at the crystals. I took the pills and started feeling the side effects. There was nothing else I could do to ensure the quality, but it was bought from the most reputable seller at the time" (p12).

Official health warnings about DNP were viewed as "scare tactics", but users did want "accurate and impartial information". Media reports on DNP-related deaths were rationalised as reckless use or accidental overdose, say, as summed up by a 31 year-old male: "DNP with the right education and supplementation is fine! However, people are stupid. If you can die from something, people WILL die from something. DNP is no exception. However to the educated people who research, DNP is an effective supplement" (p13).

The general perception of risk was expressed by this 33 year-old man: "I believe this chemical is dangerous but with proper precaution the side effect and danger is worth the risk. I do not consider it any more dangerous than alcohol or cigarettes. I believe medical authorities should research this as a partial cure for obesity. Under the supervision of a medical professional I believe this could improve the quality of life of millions" (p13).

DNP use was perceived as relatively normal among bodybuilders. But responses suggested that "DNP practices and experiences are shared online, but not in real life. DNP use appears to take place in isolation. This may partly so because of the social disapproval of DNP use, even among bodybuilders; but also because managing the side effects (profuse sweating, skin discoloration etc) in public is difficult" (Petroczi et al 2015 p15).

Petroczi et al (2015) summarised the findings of Study 3: "The survey results, coupled with the Internet forums, provided immutable evidence that DNP is knowingly used whilst the risks associated with such use is acknowledged. Motivated by the desirable goal (fat loss, either as an end result or a mean to an end), dedicated bodybuilders and exercisers have used and, by large, plan to continue using DNP. This group appears to be qualitatively different from those described in the media for DNP death- or near-death incidents. DNP users in our sample specifically sought DNP with the intention to use or try; as opposed to using a slimming aid that happens to be or contains high dose of DNP" (p17).

Reviewing the three studies, Petroczi et al (2015) stated: "Contamination or adulteration with DNP may violate labelling and manufacturing requirements for dietary supplements but accidental ingestion, owing to the low level found, does not appear to pose significant

health risks to the public. Public health concern however is linked to the deliberate use and willingness to use uncut compound despite the health warning and the lack of control that surrounds the quality and availability of this highly dangerous substance to inexperienced or naive users" (p19).

8.4. MISCELLANEOUS

8.4.1. Sugar and Gut Bacteria

Noble et al (2020) found that young rats fed on a high-sugar diet had poorer memory for objects (ie: distinguishing novel or seen before) than the standard diet. These rats had greater amounts of particular bacteria in their gut.

Other rats given these bacteria (injected directly into the gut after removal of other gut bacteria with anti-biotics) had poorer memory (Hamzelou 2020).

8.4.2. Food Itself

Much of the components in food are unknown (eg: of 2306 compounds in garlic, 146 have been quantified, according to US official data) (Lawton 2020). "These vast tracts of uncharted complexity could be the reason why nutrition science so often produces inconsistent and irreproducible results" (Laszlo Barabasi in Lawton 2020).

Tim Spector commented: "Food is incredibly complicated: the chemicals are complicated; when it enters our guts, it interacts with microbes which make it into other chemicals, which also have complicated effects on our body" (quoted in Lawton 2020). Studies on the benefits of different foods tend not to control individual gut microbiota and the interactions with compounds in food (David Wishart in Lawton 2020).

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9. BODY DYSMORPHIC DISORDER AND COSMETIC INTERVENTIONS

9.1. BODY DYSMORPHIC DISORDER

Body dysmorphic disorder (BDD) is "characterised by an overwhelming preoccupation with a perceived defect in one's appearance. However, in the eyes of others, this 'defect' is non-existent or very slight, and thus out of proportion to the psychological distress and impairment in social functioning that it generates" (Lane 2020 p1). This preoccupation leads the sufferer to certain behaviours like repetitive mirror checking, or use of cosmetics or clothing to camouflage the "defect". The most common "defects" relate to skin (eg: acne; visible veins; wrinkles) (Lane 2020).

Though the population prevalence is low (around 2%), the impact is great upon sufferers (eg: one-quarter attempt suicide) (Lane 2020). Cosmetic procedures are common (eg: 75% of 289 individuals with BDD; Phillips et al 2001). However, there are ethical (and safety) concerns about non-surgical cosmetic procedures.

Lane (2020) interviewed two senior clinical psychologists, one consultant psychiatrists, one consultant dermatologist, and two cosmetic practitioners in the UK in 2017 about these issues.

Two themes were drawn out of the interview transcripts - (i) "best interests of the individual with BDD", and (ii) "impact of BDD on capacity to consent to non-surgical cosmetic procedures".

Concerning the first theme, the interviewees agreed that cosmetic interventions were not in the best interests of individuals with BDD. It was felt that cosmetic procedures reinforced the "appearance preoccupation", and the individuals remained dissatisfied with their appearance after the procedure(s) (table 9.1). "Apprehension was also expressed regarding the physical risks associated with non-surgical interventions (... dermatologist). A cosmetic practitioner described a raft of adverse effects of dermal fillers including blindness, blood vessel occlusion and face 'break down' (... cosmetic practitioner)" (Lane 2020 p2).

- Lane's (2020) findings fit with a retrospective study of 26 individuals with BDD who had non-surgical cosmetic procedures. Around a quarter reported subjective improvement in their appearance related to their "defect", and about one-fifth were less preoccupied with the "defect".

- But these positive changes, according to other research, could be "attributed to participants either becoming concerned about another body part; remaining distressed about lesser 'imperfections' in the treated area; or worrying that it would become 'ugly' again" (Lane 2020 p3).

Table 9.1 - Crerand et al (2010).

The second theme can be summed up by the comments of the psychiatrist in an imaginary scenario with a BDD sufferer: "This really isn't a good idea... it's unpredictable... you may be dissatisfied... you're still going to have your BDD symptoms and so on. And the patient who says, 'yeah I understand that, but there's a chance here that I will get some improvement of my particular defect'... Are they really able to weigh up that decision making?" (p3).

A parallel may exist with consent by severe anorexia nervosa (AN) sufferers who refuse life-sustaining treatment - "both conditions appear to evoke a sense of affected individuals being unduly influenced by features of their illness, when making decisions regarding interventions related to body image. Yet, as this does not occur in a manner that overtly impairs cognitive abilities (such as memory loss in Alzheimer's dementia, or thought disorder in psychosis) it does not obviously impact capacity assessment" (Lane 2020 pp3-4).

Tan et al (eg: 2003) used the idea of "pathological values" with AN sufferers. The values that the individual hold arise from the mental disorder, and "are inauthentic, as they do not reflect the values the individual would likely hold in the absence of mental disorder. As such, decisions dictated by these values are not genuine exercises of autonomy and can, if associated with significant risk of harm, be legitimately over-ridden" (Lane 2020 p4). This has relevance to BDD.

The psychiatrist interviewed by Lane (2020) raised a concerned question: "how can we assess the impact of another's values on their decision-making, without risking branding those with seemingly unwise values, giving rise to subjectively foolish decisions, as lacking capacity. This is objectionable in a liberal society, where the 'negative liberty' [Berlin 1969] to pursue one's own ends without external interference is

celebrated" (Lane 2020 p4) [26].

Lane (2020) then offered a counter-argument that "tests of capacity in widespread clinical use already incorporate an element of subjectivity in the clinical judgement required to determine whether an individual is able to understand, and weigh up relevant information to reach a decision. To completely standardise this process appears untenable. In fact, various domains of psychiatry (and clinical medicine generally) rely on subjective evaluation in conjunction with objective evidence, including diagnosis, risk assessment and monitoring of treatment response" (p4).

Though she did not accept this point, and concluded that "decisions dictated by pathological values can, and should, be justifiably over-ridden when they risk harm, such as that associated with non-surgical cosmetic intervention" (p4).

9.2. FEMALE GENITAL COSMETIC SURGERY

Female genital cosmetic surgery (FGCS) is "non-medically indicated cosmetic surgical procedures which change the structure and appearance of the healthy external genitalia of women, or internally in the case of vaginal tightening. This definition includes the most common procedure, labiaplasty, as well as others, such as hymenoplasty and vaginoplasty, also known as vaginal reconstruction and vaginal rejuvenation" (RCOG Ethics Committee 2013 p1) [27].

Demand for these procedures has been fuelled by marketing from private companies (eg: Crouch et al 2011; appendix 9A). However, the RCOG Ethics Committee (2013) did not support an outright ban. They drew a parallel with other types of cosmetic surgery, like breast augmentation. "The main ground for such a ban would have to be that FGCS is generally harmful. If the evidence showed that the practice brings a high risk of significant harm to the women involved, with little benefit, this would be a strong reason for restricting procedures such as labiaplasty to situations where there is a clinical justification for it. However, the current evidence, such as it is, does not support this conclusion" (RCOG Ethics Committee 2013 p6).

It is important that the variability in female external genitalia is emphasised, argued the RCOG Ethics Committee (2013). "Because there is limited authoritative information on normal female genital anatomy, women and

[26] Spriggs and Gillam (2016) noted that "[A]utonomy should be assessed according to the way a person reasons rather than the content of their choice" (p712).

[27] FGCS is also sought by women with congenital conditions like intersex (though the success rate is not high) (Lloyd et al 2005).

girls who are self-conscious about their genital appearance have to refer to cultural representations of female genitalia for self-evaluation. These sources are currently found mainly in photographic pictures on the web, in the media and in advertising for FGCS services..." (RCOG Ethics Committee 2013 p3) [28].

9.2.1. New View Campaign

The "New View Campaign" [29] was set up in 1999 by Leonore Tiefer, and "focused on raising awareness about the limits and dangers of medicalising sexuality and the treatment of sexual problems" (Tiefer 2008 p476).

Tiefer (2008) considered FGCS in this context. Most important is FGCS marketing, which has grown in the USA with cosmetic medicine and other direct-to-consumer advertising of pharmaceuticals since permission in the mid-1990s.

In the style of the business model, Los Angeles FGCS surgeon David Matlock has trademarked his techniques ("Laser Vaginal Rejuvenation"), and sells via a franchise model (eg: "G-Shot") (Tiefer 2008).

Television "make-over" shows have also boosted cosmetic surgery (eg: "Extreme Makeover"). "The surgical 'reality' shows (which did not, of course, depict the full reality of pain, recuperation, unpaid time off from work, medical complications, and mixed reactions from friends and family) inspired many patients to seek surgery" (Tiefer 2008 p469).

She continued: "The television shows capitalised on transformational 'makeover' language. Their appeal to a fantasy body fix is the same as for the new sex drugs. Change the body to change the (sex) life, goes the story, underscoring beliefs that the body is the prime factor limiting initiative, connection, and happiness. The focus is on instant success. There is only a short follow-up on surgical makeover shows, analogous to the typical six-week or six-month clinical drug trial. No company seems to fund long-term follow-up" (Tiefer 2008 p469).

Tiefer (2008) ended this part of her discussion: "Unfortunately, the regulatory environment of cosmetic medicine, like that of pharmaceuticals, lacks the safeguards the public expects. Advertising walks dangerously close to misinformation when it seems to promote magical and painless transformation" (p470).

This fits with overexaggerated claims (eg: sexual enhancement after FGCS), and "misinformed consent" (or under-informed) for women seeking such surgery (Tiefer

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[28] Lloyd et al (2005) observed: "Although representations of female nudity are common, detailed accurate representations of female genitals are rare" (p643).

[29] The campaign ended in 2016 (http://www.newviewcampaign.org/; accessed 27th March 2020).

2008). The New View Campaign was concerned that advertisements for treatments and drugs related to sex "distort rather than educate, and raise expectations to create dissatisfaction and a market. These areas cry out for better consumer protection" (Tiefer 2008 p473).

Marketing campaigns make it difficult for women to make decisions for themselves, according to Chambers (2004), for instance. She advocated banning cosmetic surgery: "The fact that preferences are socially formed in ways which can perpetuate harm and inequality [referring to the physical harms of surgery and the inequality that results from objectification, shame and self-consciousness] means that the state must pay attention... and take... action where it is required to secure justice" (Chambers 2004 quoted in Tiefer 2008).

Tiefer (2008) explained the New View Campaign position: "the argument is not choice versus protection, but choice in what context? When it seems evident that a new technology will provide more harm than good under the prevailing commercial conditions, we have argued that the precautionary principle dictates our focus on delaying the technology, although this will frustrate some women's immediate wishes. We have publicised the conflicts of interest behind the drug testing, called for independent research, challenged the assumptions underlying the model of sexual satisfaction in drug research, supported a ban on direct-to-consumer advertising of drugs, and testified against approval of sex drugs. All of this has been and will be attacked using the rhetoric of 'women deserve choices" (Tiefer 2008 pp474-475) [30].

9.3. BDD AND FGCS FOR ADOLESCENTS

FGCS is a greater issue for adolescents (as compared to adults), who, "even when they have adult-level cognitive capacity, are generally held to lack maturity. This is seen to reduce their capacity for autonomy, bringing the validity of their consent into question" (Spriggs and Gillam 2016 p708). Thus, parental consent may be sought alone or in addition to the adolescent's consent. But "there are ethical concerns about the ethical legitimacy of a parent consenting for a procedure that is not considered medically necessary. Such a decision arguably exposes the adolescent to unjustified risk of harm, and may thus violate the Harm Principle, or fall outside the Zone of Parental Discretion [Gillam 2015]" (Spriggs and Gillam 2016 p708).

[30] Interestingly, David Matlock is quoted as describing himself as feminist "because I'm here for the woman and I'm all about the woman" (quoted in Tiefer 2008).

Other issues include peer pressure, or parental pressure. Some studies suggest that "it is mothers who are identifying concerns about their daughter's appearance, in which case it may be the mother's concerns about appearance that are driving labioplasty. Boraei and colleagues [2008] wonder whether the issue is 'the child not coming to terms with pubertal body changes' or, perhaps it is the 'child's or mother's poor self-esteem' that is being treated" (Spriggs and Gillam 2016 p708).

FGCS is even more problematic for adolescents with BDD. Spriggs and Gillam (2016) took a particular position: "We find ourselves arguing for the ethical justifiability of cosmetic labioplasty for an adolescent with Body Dysmorphic Disorder, even though we recognise that it is a counter intuitive position" (p706). Most important, ethical decisions need to include the effects of being refused cosmetic surgery. For example, Phillips and Menard (2006) found suicidality to be forty-five times higher among individuals with BDD than the general population.

There is some evidence that FGCS reduces BDD. Veale et al (2014) found that nine of 49 adults seeking labioplasty met the criteria for BDD before surgery, but only one at three months post-surgery. "The participants in this study were adult women, but there is no obvious reason to believe that the situation would be significantly different for adolescents. Labioplasty for an adolescent with BDD could be compared to puberty-suppression treatment for an adolescent with Gender dysphoria: in the latter case, the benefit that comes from the relief of distress may make us wonder if it really matters if the surgery is not 'medically necessary' in any physical sense" (Spriggs and Gillam 2016 pp711-712).

9.4. APPENDIX 9A - CROUCH ET AL (2011)

Crouch et al (2011) observed that the "most popular first-line request for FGCS is reduction of the labia minora. Complaints that lead to a woman seeking help can be seen as falling into two broad categories — physical and psychological. Physical complaints include discomfort and chafing, either while wearing tight clothing or during activities such as cycling. Psychological complaints include embarrassment about the genital appearance leading to anxiety about certain sexual activities There is no known increase in labial pathology in recent years. There is also no available evidence on the safety or efficacy of labial reduction surgery [LRS]. Women's complaints may reflect social expectations about the female genitalia and medical consumerism" (p1507).

These researchers presented data on "well women"

seen in a general gynaecology clinic between 2007 and 2010 in London requesting LRS after referral by their doctor. There were thirty-three women in the sample.

In terms of the broad categories of reasons for LRS, "pain and discomfort" was the most common physical complaint (57% of women), followed by "difficulties with intercourse" and "problems with underwear or clothing", while "appearance" was the psychological complaint reported by most women (78%) (then "anxiety, embarrassment and distress" and "relationship difficulties"). Multiple reasons were often given.

Eleven women had seen advertisements for FGCS [31], and nine reported seeing pictures (medical illustrations or pornography).

All but three women in the sample had labial dimensions "within the normal range" [32], and so surgery was declined for those thirty. Crouch et al (2011) commented: "It is therefore surprising that all of the study participants and their referring doctors should have felt that surgery was an appropriate treatment. Despite reassurances that their labia were normal, 40% of the participants remained keen to pursue surgery by any other available route" (p1509).

The researchers ended with a strong point: "Legislation in the UK prohibits incision, excision and infibulation of the labia majora, labia minora or clitoris for cultural or non-therapeutic reasons [ie: female genital mutilation; FGM], even if an adult woman were to give consent and even if it were carried out by medical practitioners. The legitimacy of all forms of FGCS in westernised nations involves valorising FGCS as 'therapeutic' and but positioning by othering the genital cutting in non-westernised nations as 'cultural' [Conroy 2006]. This is slippery ground indeed. It is difficult to see how operations on normal sex organs in the absence of quality data could be therapeutic. It is equally difficult to see how FGCS could be anything other than cultural" (Crouch et al 2011 p1509-1510).

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[31] Crouch et al (2011) commented: "Given the reason for these sites is to generate demand for FGCS, it is unlikely that women and girls would be exposed to illustrations that celebrate diversity. Rather, the image of a smooth exterior with the labia minora tucked inside the labia majora is idealised and negative comparisons are encouraged" (p1509).

[32] Eg: labial width <50 mm, and <30 mm difference between the right and left labia (Lloyd et al 2005). These data were based on 58 "healthy" women at a London hospital aged between 18 to 50 years old. Lloyd et al (2005) summed up: "We have examined the normal ranges of genital measurements in women and demonstrated that there is far greater diversity than previously documented relating to labial and clitoral size, colour and rugosity, vaginal length and urethral position" (p645).

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10. UNDERSTANDING RESPONSIBLE ENVIRONMENTAL BEHAVIOURS: THREE DIFFERENT STUDIES

10.1. PERSONALITY

Personality plays a part in how individuals respond now and in the future to climate change, and their attitudes and behaviours towards the environment.

Hines et al (1987), in their meta-analysis, found that pro-environmental behaviours (PEBs) (eg: recycling; energy reduction) were associated with locus of control, for example. Bamberg and Moser's (2007) meta-analysis confirmed the importance of perceived control for PEBs. These two early meta-analyses "focused only on selected specific personality traits such as locus of control, personal responsibility, feelings of guilt, and economic orientation. They did not address traits commonly used in current personality research such as the domains of the Big Five and HEXACO" (Soutter et al 2020 p914).

Soutter et al's (2020) meta-analysis rectified this weakness. The "Big Five" or Five-Factor Model of personality (eg: McCrae and John 1992) describes five broad domains of emotional stability (or neuroticism), extraversion, openness, agreeableness, and conscientiousness. The HEXACO personality-trait model (eg: Ashton and Lee 2007) has six factors, which are similar to the "Big Five", plus "honesty-humility" (Soutter et al 2020).

A literature search was performed by Soutter et al (2020) for all relevant articles up to mid-2019, and 38 sources were found (36 published articles and two dissertations).

Overall, the openness, and honesty-humility domains had the strongest associations with pro-environmental attitudes and behaviours. A high openness score suggests an individual who is generally informed about the world, and is willing to accept and adopt new ideas, for example. Such individuals could perform PEBs because of a greater awareness of the human impact on the environment, and a willingness to change environmentally destructive behaviours.

High honesty-humility describes a tendency to co-operate and not to exploit others. "Therefore, as environmentalism suggests that it is human's exploitation of the environment that has led to the anthropogenic climate change we are currently facing..., high honesty-humility may lead to an alignment with environmentalism"

(Soutter et al 2020 p922).

There was heterogeneity in the studies included in the meta-analysis, and the nature of the samples used explained much of the difference - ie: the proportion of female participants, age, and country of origin. There was also a difference between studies using the "Big Five" or HEXACO models of personality.

Studies varied in their control of factors like political ideology, which influenced pro-environmental attitudes and behaviours, so Soutter et al (2020) only included data about personality traits and attitudes towards the environment (so-called "zero-order correlations").

In terms of the implications of the findings for persuading individuals to perform more PEBs, Soutter et al (2020) suggested that "environmental policy intervention should likely not be framed in terms that resonate with those who already support the policy; instead, framing in terms that resonate with those who least support it can be more effective" (p923). In this case, low openness, and low honesty-humility scorers need specific messages to persuade them. The former are less likely to try new things, so "it may not be helpful to frame environmentally friendly practices as novel but rather demonstrate the extent to which they are already established" (Soutter et al 2020 p924). While low honesty-humility scorers may be persuaded by the personal benefits of PEBs. "For example, instead of highlighting that the use of electric vehicles is important in reducing carbon emissions that damage the environment, campaigns could highlight the financial savings of using electricity as a fuel source over petrol" (Soutter et al 2020 p924).

10.2. NARCO LAND USE

Deforestation in Central and South America by drug trafficking organisations (DTOs) has been called "narco-deforestation" (Devine et al 2020). "DTOs finance deforestation, plant pasture, and illegally ranch cattle [33] in protected areas in order to launder money, build airstrips, and claim territory along drug smuggling routes" (Devine et al 2020 p1).

Devine et al (2020) described the situation in Guatemala's Maya Biosphere Reserve with data covering 2000 to 2015 (eg: aerial photographs; interviews with local people). Deforestation varied between 59 to 87% in

[33] "Narco-cattle ranching" (Paullier 2016 quoted in Devine et al 2020).

sampled areas over the study period. Illegal cattle ranching by DTOs was responsible.

Narco-cattle ranches are bigger than a peasant family's cattle holdings, and a "telltale sign that a cattle ranch is narco-capitalised is the absence of cattle. Narco-ranches are not governed by the same profit seeking motives of non-narco capitalised ranches... The purpose of narco-ranching is not to make money, but to clean and layer narco-capital... DTOs can risk losing tens, if not hundreds, of thousands of dollars of investment to build cattle ranches in protected areas to land cocaine-laden planes even just a few times" (Devine et al 2020 p6).

10.3. BANKERS AND HONESTY

Cohn et al (2014) found that around 200 individuals who worked in the banking industry were more dishonest when told to think about their professional identity (treatment condition) rather than about leisure activities (control condition) [34], and than other non-banking professionals [35]. Not surprisingly, these findings gained a lot of publicity (Rahwan et al 2019).

But the methodology of the study can be criticised. Honesty was measured by the self-report of ten coin tosses with a monetary reward for each correct outcome (eg: heads). There was no checking of the coin outcome. So, the participants could say that they were correct when not. The experimenters assumed that five out of ten was average, and claiming more wins than this was dishonesty. Furthermore, how applicable is honesty/dishonesty in this task to real-world situations (Rahwan et al 2019)?

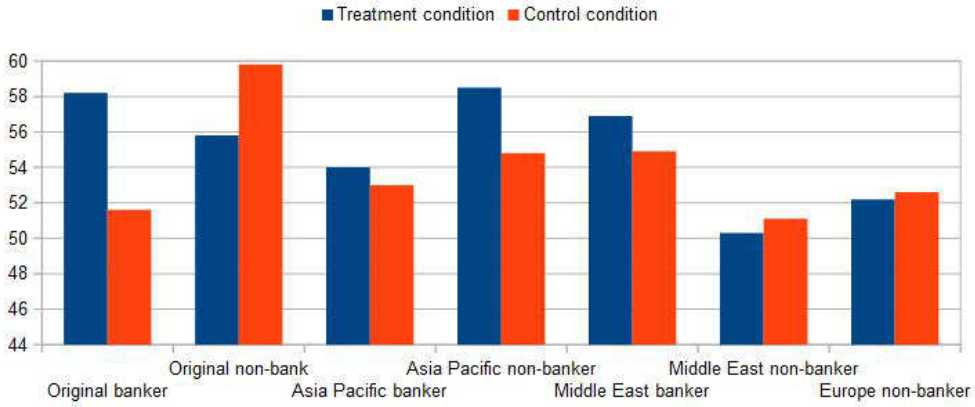
Rahwan et al (2019) performed an extended replication of Cohn et al's (2014) work. The first group of participants were employees of a large commercial bank in the Asia Pacific region (n = 620), and there was no significant difference between the treatment and control groups. Non-bankers (n = 242) from the same region showed no differences also (which confirmed what Cohn et al 2014

[34] Identity was made salient by seven questions - eg: "What is your function at this bank?" or "How many hours per week do you watch television on average?".

[35] Behind Cohn et al's (2014) work was the "economic theory of identity" (Akerlof and Kranton 2010). This proposed that "individuals have multiple social identities based on, for example, gender, ethnicity or profession. Identities are associated with specific social norms prescribing permissible behaviours. Which identity and associated norms are behaviourally relevant depends on the relative weight an individual attributes to an identity. In a given situation, behaviour is shifted towards those norms that are associated with the more salient identity. Thus, if the banking culture favours dishonest behaviours, it should be possible to trigger dishonesty in bank employees by rendering their professional identity salient" (Cohn et al 2014 p86).

had found).

Another sample was taken from a medium-sized commercial bank in the Middle East (n = 148), and there was no significant difference found. The non-banking sample (n = 67) were regulators of financial services in the region, as well as 205 individuals performing the same task in Europe. No significant difference was found in either group (figure 10.1).



(Source of data: Rahwan et al 2019)

Figure 10.1 - Percentage of participants showing likelihood of cheating in the original and replication study.

Rahwan et al (2019) stated that Cohn et al's (2014) findings are "not generalisable beyond the original population sampled" (p346).

Rahwan et al (2019) considered the possible reasons for the difference in findings between their study (the replication) and the original one (by Cohn et al 2014).

a) The original study did not disclose the location of their sample, but the "banking culture" may have been different to that of the replication study. Cohn et al (2014) initially used 128 bank employees from a "large, international bank", who were randomly assigned to the treatment or control condition.

b) Differences in cultural expectations - Cohn et al (2014) reported that bankers were perceived as less honest than the general population, which was not the case with the cultures of the replication study.

c) The original study used investment bankers, while the replication study sampled employees at commercial banks, though Rahwan et al (2019) did not see this as an

important difference.

d) Self-selection bias of which banks participated in the replication study. Rahwan et al (2019) approached 27 financial institutions and only two commercial banks agreed to participate. There was no control over how the banks "chose" the employees to participate.

e) Publicity surrounding the original study - Around one-third of Rahwan et al's (2019) Asia Pacific region sample had heard something about it.

f) Information given to participants beforehand - Cohn et al (2014) used deception (ie: providing false information), whereas the replication study used "incomplete disclosure" (ie: provided some information).

g) Size of the reward for the correct coin toss outcome - Cohn et al (2014) offered US$20 per win, but, after adjustment to local currencies, Rahwan et al (2019) had approximately equivalent to US$14 per win.

h) Other issues included the self-selection of honest or dishonest people to work in banking, differences in consent forms, the timing of the research and banking industry regulations, and the statistical methods used to analyse the data.

Rahwan et al (2019) concluded that the original findings "may only have held in a very specific setting and point in time" (p349). The differences in findings between the original study and the replication was probably most influenced by "banking culture" and general cultural differences and norms, and the self-selection of "only 'ethical' banks who agreed to participate" (pp348-349) in the replication (Rahwan et al 2019).

Rahwan et al's (2019) study showed the problems with replication and generalisability generally. They stated: "our work highlights the complexity of undertaking a high-fidelity replication of sensitive, highly publicised field work with largely inaccessible populations due to institutional and geographic barriers" (Rahwan et al 2019 p345).

10.4. REFERENCES

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