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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://kmbpsychology.jottit.com>.

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1. SOME EXAMPLES OF CROSS-CULTURAL RESEARCH

- 1.1. Introduction
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1.1. INTRODUCTION

Much psychological research does and has taken place in the West, particularly in the USA. The problem is when the results of such research is assumed to be universal (Heinrich et al 2010a).

Heinrich et al (2010a) pointed that US undergraduates were 4000 times more likely to be participants than individuals from outside the West. Such participants, the authors described as WEIRD (Western, educated, industrialised, rich, and democratic), and believed that they were different to other humans at certain levels:

- Industrialised vs non-industrialised societies.
- Western (north-west Europe and "British-descent" societies like the USA, Canada, Australia, and New Zealand) vs non-Western societies.
- Contemporary USA vs rest of the world.
- Differences within contemporary USA (eg: more educated and "middle class" participants).
- Ethnic differences in contemporary USA.
- Contemporary USA vs previous generations in the USA ¹.

Cross-cultural psychology which compares different cultures and societies attempts to confirm the universality of behaviour and to show differences around the world.

This article considers two examples of cross-cultural research which show differences around the world, and two examples that show similarities.

¹ "For the vast majority of its evolutionary history, humans have lived in small-scale societies without formal schools, governments, hospitals, police, complex divisions of labour, markets, militaries, formal laws, or mechanised transportation. Every household provisioned much or all of its own food; made its own clothes, tools, and shelters; and - aside from sexual divisions of labour - most everyone had to master the same skills and domains of knowledge. Children typically did not grow up in small, monogamous nuclear families with few kin around, nor were they away from their families at school for much of the day" (Heinrich et al 2010a pp79-80).

1.2. DIFFERENCES

1. Visual perception

This "basic" ability is tested with visual illusions, like the Muller-Lyer Illusion (figure 1.1). The observer is asked to adjust the length of horizontal lines to make them appear equal length. This is known as the "point of subjective equality" (PSE). Undergraduates in the USA tend to have a PSE of over 20% (ie: one line is longer by one-fifth but is perceived as the same length) (Heinrich et al 2010a).

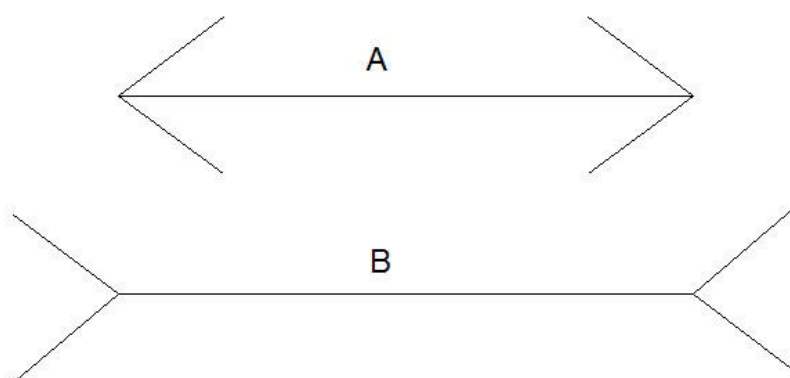


Figure 1.1 - The Muller-Lyer Illusion.

This is the extreme in susceptibility to the illusion when compared to other groups around the world. Segall et al (1966) compared sixteen societies using the illusion. All of them (both children and adults) had a PSE lower than the US undergraduates including the San of the Kalahari (southern Africa) who saw the horizontal lines as equal length (ie: PSE = 0) (Heinrich et al 2010a).

2. Fairness and co-operation

This is studied in experiments using the Ultimatum Game (UG). Two strangers are brought together for one interaction where one player is the proposer and the other is the responder. The proposer is given a sum of money, and asked to share it with the responder. The proposer can divide it up as they wish, but if the responder refuses the offer, neither party gets anything. According to pure self-interest and logic, the proposer should offer very little and the responder should accept anything.

In practice, undergraduates in the USA, Europe, and industrialised Asia offer an average of 40-50%, and offers below 30% are commonly rejected. But this behaviour is not universal, and the Western behaviour is the extreme (Heinrich et al 2010a).

Heinrich et al (2010b) reported the use of the UG among 23 different societies around the world. All but one society offered less than US undergraduates on average with offers as low as 25% by the Hadza (Tanzania, east Africa) and Tsimane (Bolivia, Amazon) peoples. In most societies responders accepted offers lower than US undergraduates, even at 10%.

A variation of the UG is the dictator game (DG) where player 1 is given the money and makes the decision on how to share it with player 2 (who has no say). This is used as a measure of behavioural fairness. The offers of US undergraduates were higher than the other societies studied.

This behaviour, Heinrich et al (2010b) argued, is a product of being a fully "monetary-integrated society" (ie: all household calories purchased from others rather than grown self).

1.3. SIMILARITIES

1. Cheater detection

Cheater detection is spotting individuals who violate a social contract (ie: try to take a benefit without incurring a cost; eg: saying that task is completed when not done and receiving payment). Sugiyama et al (2002) argued that humans have evolved the enhanced ability to spot cheaters (adaptive specialisation hypothesis).

Cheater detection has been studied with a variation of the Wason selection task (Wason and Laird-Johnson 1972). This is a measure of conditional reasoning ("if P then Q") involving four cards containing information on both sides. Participants look at the cards as presented, and must turn over two to confirm the rule given (figure 1.2).

Typically, participants in the West are poor at this task (up to one-third correct), but better at a version based on social behaviour (figure 1.3) (65-80% answer correctly) (Sugiyama et al 2002).

Each card has a letter on one side and a number on the other side. Which two cards would you turn over to confirm the rule: "If a card has a vowel on one side (P), it has an even number on the other side (Q)"?

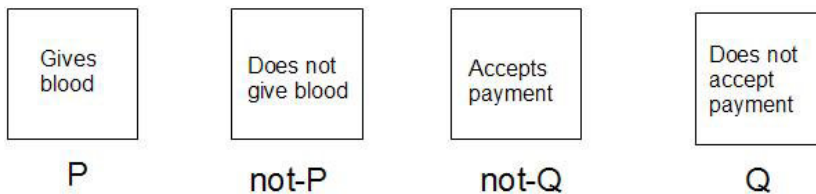


Answer (P and not-Q)
- "A" to confirm rule
- "3" to check that rule not violated

Usually participants choose "A" and "6" (Sugiyama et al 2002).

Figure 1.2 - Example of Wason task.

Each card contains information about a person's behaviour in relation to a social contract, and thus their trustworthiness. Which two cards would you turn over to confirm the rule: "If an individual gives blood (P), then they accept no payment (Q)"?



Answer (P and not-Q)
- "Gives blood" (P)
- "Does not accept payment" (not-Q)

(Based on Brown and Moore 2000)

Figure 1.3 - Example of cheater detection version of Wason task.

Sugiyama et al (2002) adapted the two types of Wason task to use with the relatively isolated Shiwiar people of Ecuadorian Amazonia in South America (figure 1.4). The logical version was: "If there is green butterfly in the picture on the top part of the card (P), then there is a red flower in the picture on the bottom part of the card (Q)", and the social version: "If you give me a basket of fish when you return from fishing (P), then you may use my motorboat (Q)".

The 21 adult Shiwiar participants were better at the social version than the logical version of the task, and

their correct responses were similar to the level of undergraduates in the USA (over 80% correct for social version).



(Drawn with MapCreator2)

Figure 1.4 - Area where Shiwiar people live.

2. Facial expressions of emotions

Charles Darwin (1872) proposed that facial expressions of emotions were universal because of the evolutionary basis to them. Ekman et al (1969), for example, provided experimental support for this proposal showing that college-educated participants in Brazil, the USA, Argentina, Chile, and Japan paired the same emotion words to the same facial expressions.

Critics pointed out that all these cultures shared mass media images of faces.

This led Ekman and Friesen (1971) to test relatively isolated members of the Fore population in the highlands of New Guinea. Contact with this group were made in the late 1950s, and consequently they had not seen Western films.

Participants listened to a story in their language, and at the appropriate point were asked to choose a photograph of a facial expression that went with the story from a choice of three. The emotions tested were happiness, sadness, anger, surprise, disgust, and fear (table 1.1). The photographs were of Western faces of men, women and children.

He (she) is sitting in his (her) house all alone, and there is no one else in the village. There is no knife, axe, or bow and arrow in the house. A wild pig is standing in the door of the house, and the man (woman) is looking at the pig and is very afraid of it. The pig has been standing in the doorway for a few minutes, and the person is looking at it very afraid, and the pig won't move away from the door, and he (she) is afraid the pig will bite him (her) (Ekman and Friesen 1971 p126).

Table 1.1 - Story used for fear.

Adult and child participants chose the correct facial expression to fit the story almost all times significantly more than chance (table 1.2). For example, 36 adults all picked happiness correctly when offered with disgust and anger, and 90% of 62 adults distinguished it from surprise and disgust. Only fear was not significant all the time among adults when surprise offered as one of the alternatives.

EMOTION	ADULTS	CHILDREN
Happiness	92	93
Anger	85	99
Sadness	79	82
Disgust	83	87
Surprise	68	98
Fear	64	93

(My calculations from Ekman and Friesen 1971 tables 1 and 2 p127)

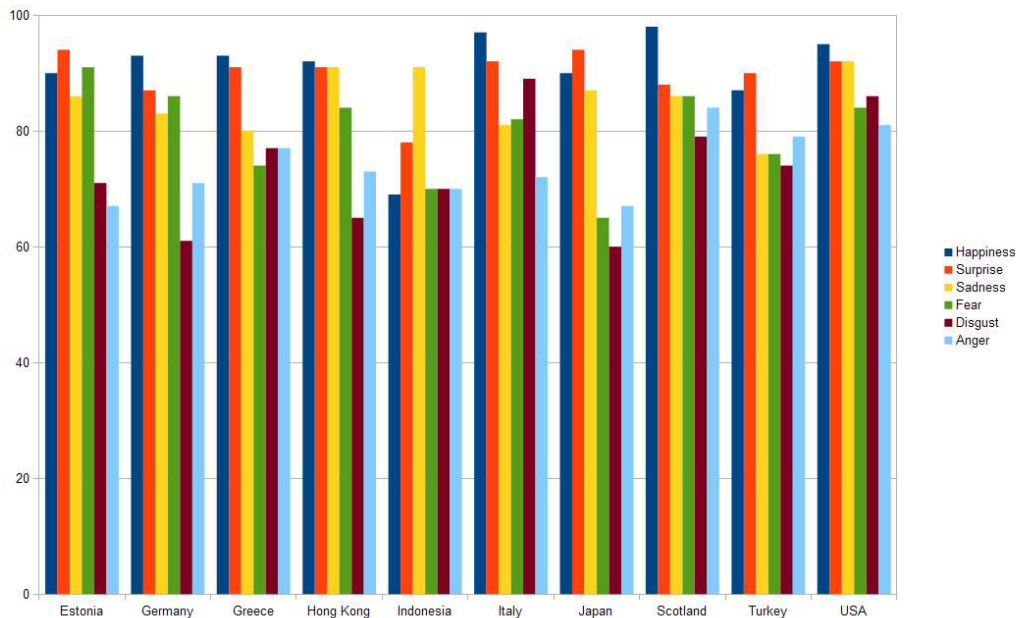
Table 1.2 - Mean correct choices (%).

Ekman et al (1987) used a more complex task with college students from ten countries (Estonia ², Germany,

² At this time Estonia was part of the USSR.

Greece, Hong Kong, Indonesia (Minangkabau people in Sumatra) Italy, Japan, Scotland, Turkey, and the USA). A face was presented on a slide for ten seconds, and the participants had to name the emotion shown from a choice of seven each time (anger, contempt, disgust, fear, happiness, sadness, and surprise), and to rate the intensity of the emotion on a scale of 1-8 when shown the face a second time for thirty seconds.

The six emotions (not contempt) were shown three times each in the ten cultures giving 180 conditions. Overall, the majority of participants agreed in 172 of these conditions. Thus the choice of correct emotion was high in all countries with medians of 93% (happiness), 91% (surprise), 86% (sadness), 83% (fear), 72.5% (disgust), and 72.5% (anger) (figure 1.5). Agreement over the intensity of the emotion shown occurred in 119 of 130 conditions.



(Data from Ekman et al 1987 table 1 p714)

Figure 1.5 - Percentage of correct emotions in each country.

Ekman et al (1987) admitted about such experiments: "It is possible... the research design itself is not a sensible one for revealing cultural differences. Taking a facial expression out of social context; eliminating the simultaneous speech, vocal clues, and body movements; freezing the expression in a still photograph; forcing attention to it; and asking for judgments by a detached uninvolved observer may remove many of the sources of

cultural differences in the interpretation of facial expression" (p717).

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2. SUICIDE AND SELF-HARM AROUND THE WORLD

- 2.1. Analysing the data
- 2.2. Indigenous populations
- 2.3. Self-burning
- 2.4. Sri Lanka
- 2.5. Deliberate self harm
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2.1. ANALYSING THE DATA

The World Health Organisation calculated that about a million people commit suicide worldwide each year, and this is often more than the number that die from terrorism, wars and homicide combined in a year (Leenaars 2006) ³.

Analysis of data about suicides reveals variations in the times of this behaviour (Erazo et al 2004):

a) Seasonal variations - a greater number in spring/early summer generally, but a spring peak for men and spring and autumn peaks for women. Among railway-related suicides, specifically, the peak is late summer/autumn.

b) Daily (diurnal) variations - generally more likely in the morning and early afternoon, but women later in the day than men. The peak is later afternoon and evening for railway-related suicides.

c) Weekly variations - three studies of railway-related suicides in Europe reported peaks on Monday and Tuesday.

Erazo et al (2004) analysed data on railway-related suicides and attempted suicides in Germany between 1997 and 2002. They confirmed 4003 cases (2922 men/1081 women) from the central registry of accidents of the German railway company. The time of suicide was recorded as well as the division of the day into three-hour blocks (beginning at midnight). The month of the act was recorded as well as a summer half year (April-September) and a winter half year (October-March).

i) Seasonal pattern - April and September were peaks with low in December (particularly for men). There was a summer half year peak in the first half of the study

³ This translates as a rate of 16 per 100 000 population (with the highest among men in Belarus at 64) (Othman 2011).

period (1997-1999), but not in the second half (2000-2002).

ii) Daily pattern - there was a morning peak (0900-1200 hours) and an evening peak (1800-2100 hours).

iii) Weekly pattern - Monday and Tuesday were peaks and Sunday the low.

If suicide behaviour was randomly distributed, then the numbers should show an expected pattern (eg: 1/12 or 8.33% per month). The statistical test, X^2 , allows the researcher to see if the actual number of cases is significantly different to the expected number. Table 2.1 shows an example with the daily variation.

	EXPECTED (any 3-hour block)	OBSERVED (0900-1200 hours)	OBSERVED (1800-2100 hours)
Cases (%)	12.5	14.5	16.5
Cases (N)	500	580	660

Table 2.1 - Expected and actual number of suicides during three-hour blocks in the day.

Suicidality and alcoholism go together. Individuals with alcoholism (and co-morbid mental disorder) are 60-120 times more likely to attempt suicide than the general population. While alcoholism has been diagnosed post-mortem in a quarter of suicide victims (Nielsen et al 1998).

These two behaviours may share physiological vulnerabilities like low serotonin levels, and underlying genetic variations. One particular variation of a gene related to serotonin metabolism (TPH - tryptophan hydroxylase) was found in Finnish offenders with alcoholism who showed suicidality more than in controls (Nielsen et al 1998).

2.2. INDIGENOUS POPULATIONS

Suicide rates among Indigenous populations are often higher than non-Indigenous populations in countries around the world (Leenaars 2006).

For example, in Canada, the rate among the general population is 13.5 per 100 000 population compared to between 59.5 to 74.3 among Canadian Arctic Indigenous populations (and 295 among their young) (Leenaars 2006).

General factors involved in suicide among the Canadian Inuit include poverty, childhood separation and

loss, alcohol abuse and dependence, and access to firearms (Leenaars 2006). However, Leenaars (2006) argued for narrative accounts to give voice to the experiences of such people and the individual reasons/factors in suicide.

The suicide rate among young (15-24 years old) Greenland Inuit men is as high as 450-500 per 100 000, and it declines with age (while rates increase with age in Denmark) (Bjerregaard and Lynge 2006).

Suicidal thoughts are higher among women than men (33% vs 19% of 18-24 year olds). Such thoughts were more frequent by individuals raised in homes with alcohol problems and victims of sexual violence as a child (table 2.2). Suicidal thoughts were significantly higher among Inuit living in Nuuk (largest city) (figure 2.1) than in a town or village in Greenland (Bjerregaard and Lynge 2006).



(Based on derivative: Abhijitsathe)

Figure 2.1 - Position of Nuuk in Greenland.

	NO SEXUAL VIOLENCE	EXPERIENCED SEXUAL VIOLENCE AS CHILD
NO ALCOHOL PROBLEMS	10.3 (neither risk factor)	21.7 (one risk factor)
PARENTAL ALCOHOL PROBLEMS	39.8 (one risk factor)	82.4 (both risk factors)

(Based on Bjerregaard and Lynge 2006 table 2 p215)

Table 2.2 - Percentage of Greenland Inuit reporting serious suicidal thoughts.

In the case of Australia, Indigenous suicides are increasing ⁴. For example, from 10.1 per 100 000 population in 1981 to 105.3 in 1998 in South Australia (figure 2.2) (Clayer and Czechowicz 1991) ⁵.

There is always an issue generally with the accuracy of official data on suicides as well as specifics to Indigenous populations ⁶. These include (De Leo et al 2011):

a) Classification of deaths where it is not entirely clear that it was suicide as another non-suicide category like accidental death (equivocal deaths).

b) Classification of deaths as non-suicide to avoid distress for the family (compassionate misclassification).

c) Variations in practice between different areas and different authorities including recording of "ethnicity".

De Leo et al (2011) used data from the Queensland Suicide Registry (QSR) ⁷ in Australia for the period 1994 to 2007 ⁸. During this period, there were 7672 cases of

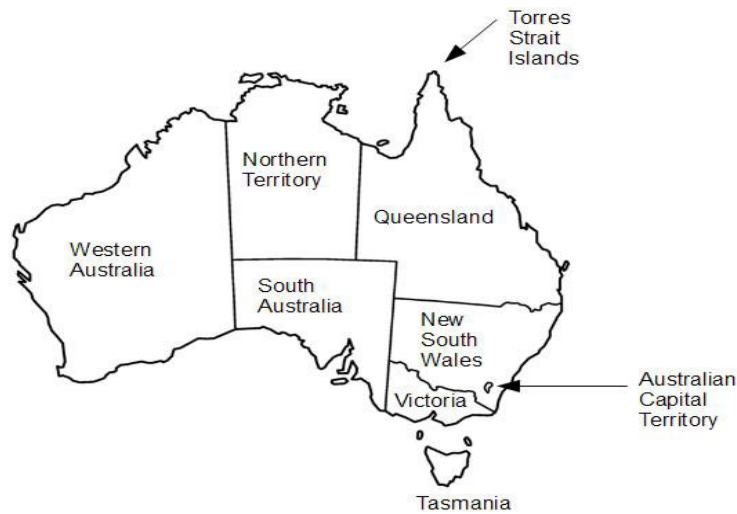
⁴ 2.4% of all Australians are Indigenous (according to ABS 2001 figures), of which 90% are Aboriginal, 6% Torres Strait Islander, and the remainder both (Hunter and Milroy 2006).

⁵ For the period 1988-98, for Western Australia, Northern Territory, and South Australia the rate was 17.0 per 100 000 for Indigenous populations versus 13.3 for the general population of those states (Hunter and Milroy 2006).

⁶ Official data from the Australian Bureau of Statistics (ABS) depends on information from the National Coronial Information System (which can be incomplete or inaccurate from coroners' offices with few staff and backlogs of cases). The ABS figures have underestimated the number of suicides by up to 25% compared to recounts by researchers (Williams et al 2010).

⁷ This is an independent database managed by the Australian Institute for Suicide Research and Prevention (AISRAP) at Griffiths University, Brisbane, and is based on police reports to coroners, post-mortem information, and toxicology reports (Williams et al 2010). It has three levels of certainty about suicide as cause of death based on information collected - beyond reasonable doubt, probable, and possible (Williams et al 2010).

⁸ The QSR numbers were higher than ABS for Queensland figures for this period (Williams et al 2010).

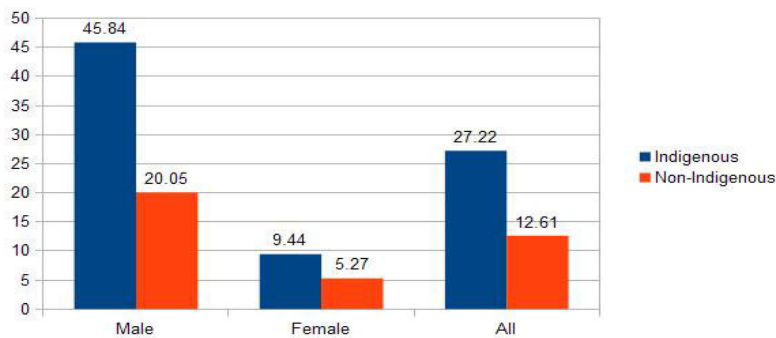


(Based on blank map by User:Golbez)

Figure 2.2 - States of Australia and Torres Strait Islands.

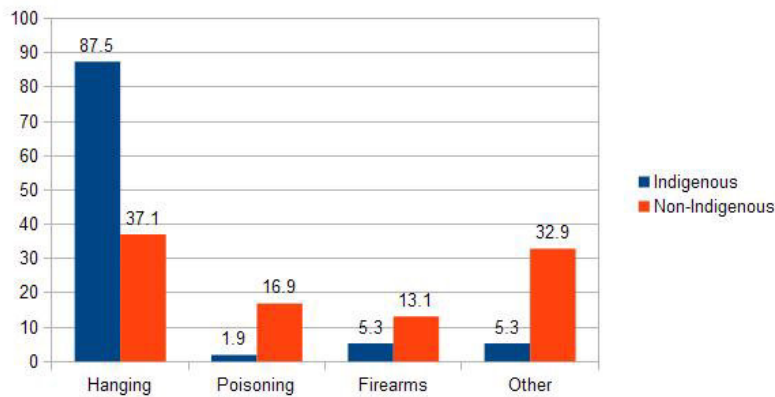
suicide, of which 6.1% (471) were Indigenous (Aboriginal and Torres Strait Island), 7.1% (546) ethnicity unknown, and the remainder (86.7%/6655) were Caucasian, Asian or other ethnicity. These figures were age-standardised and adjusted in relation to the size of the group's general population.

The suicide rate for Indigenous populations was 27.2 per 100 000 population as compared to 12.6 for non-Indigenous populations (figure 2.3). This is 2.2 times higher. The highest rate was among 15-34 year-old males in the Indigenous populations at over 90 per 100 000. Hanging was, by far, the most popular method of suicide for Indigenous cases (figure 2.4).



(Data from De Leo et al 2011 table 1 p535)

Figure 2.3 - Suicide rates of per 100 000 population.



(Data from De Leo et al 2011 table 2 p535)

Figure 2.4 - Main methods of suicide (%).

Hunter and Milroy (2006) presented a description of the "typical" Indigenous suicide victim:

For Far Northern Queensland region, it is a young Aboriginal male who has had a relative who has recently died by means of suicide. He is unemployed, or if employed, works part time on a CDEP project mainly involving manual labour. He has a history of heavy binge drinking and is intoxicated at the time of his death. He has either threatened or attempted to harm himself in the past. In the days or hours before the suicide some sort of interpersonal conflict occurred, either with members of his family or with his partner, either of apparent significance or what, to an outsider, might seem "trifling". The hanging, using material at hand such as rope or an electrical cord, takes place either in or close to his home, in a place visible to members of his family and possibly also to passers by (Hunter et al 2001 p70; quoted in Hunter and Milroy 2006 p141)).

In New Zealand, the Indigenous Maori have a higher rate of youth suicide and hospitalisation for suicide attempts than the non-Maori population, but a significantly lower rate for older Maori (Beautrais and Fergusson 2006).

Beautrais and Fergusson (2006) used data for 1996-2002 from the New Zealand Health Information Services which defined ethnicity based on self-report. Among 15-24 year-olds, the suicide rate was 43.7 per 100 000 for Maori males and 18.8 for females (versus 18.0 and 9.1 respectively for non-Maori).

Two explanations have been proposed for these

differences. One explains the behaviour as a product of the disadvantaged position of Maori in New Zealand society, while the other explanation is based in the experience of colonisation and history. Both explanations may occur together (Beautrais and Fergusson 2006).

In 1997, the overall suicide rate in Siberia, Russia was calculated as 47.2 per 100 000 per year (Lester 2006b). Modern Siberia is inhabited by Indigenous populations and immigrants (including mass deportations) from other parts of the Soviet Union in the past and now the Russian Federation.

Historical data about Indigenous populations is not easy to ascertain, and the Human Relations Area Files (HRAF) project ⁹ collates historical information from anthropologists, bureaucrats, missionaries, and travellers about such populations. Lester (2006b) used these data for four Indigenous populations in Siberia.

i) Chukchee - rated as having a high suicide rate for the period 1890-1901, and the behaviour being quite common in the past, even to the point of family tradition (sons copying fathers) ¹⁰.

ii) Koryak - little information.

iii) Kamchadal - an observer in the 18th century reported that the desire to lead a pleasurable life led to suicide if that was not possible. Mass suicide after defeat in battle was also reported.

iv) Gilyak - suicide in response to shame was reported in the late 19th century.

In all the groups, suicide due to depression did not seem to be the main motivation, and the suicidal behaviour was closer to "voluntary death" (Lester 2006b).

In another country with multiple Indigenous populations, the USA, Lester (1997) collected data on Native American tribal suicide rates among twenty groups in the 20th century. The highest was 149 per 100 000 among the Kwakiutl in the 1970s, while the lowest in the same period was seven among the Pima.

Using HRAF data, Masumura (1977) rated the frequency of suicide among 35 Indigenous populations. The Kwakiutl had the highest score along with five other groups.

The HRAF data come from very different time periods which makes comparison between groups difficult. Furthermore, cultural attitudes will influence what is

⁹ <http://www.yale.edu/hraf/>.

¹⁰ Masumura (1977) rated 8 out of 8 on scale of amount of suicide.

defined as suicide. For example, among the Mohave in North America, a stillborn baby is seen as trying to commit suicide and to murder the mother in order to unite them in the spirit world. While the Gisu of East Africa view suicide as contagious (ie: physical contact with a suicide victim or their surroundings may cause suicide) (Lester 2006a).

2.3. SELF-BURNING

One method of suicide (and self-harm) is deliberate self-burning, which is popular in the Middle East. In Iran, for example, 17% of suicides involve this, while 8% of burn admissions to the Italian Red Cross in Baghdad, Iraq, over a 45-day period were suicidal (Othman 2011).

Othman (2011) found that self-burning was over thirteen times more common among Iraqi Kurdish women than men using data from the Sulaymaniyah Burns and Plastic Surgery Centre between November 2007 and 2008. Deliberate self-burning was categorised if the patient (where surviving) or a companion clearly stated so. There were 197 cases of which 83% died.

The annual incidence rate translated as 8.4 per 100 000 per year overall in the province of Sulaymaniyah (figure 2.5), but 15.5 for women and only 1.2 for men. The other risk factors were age (11-18 years old), lower education, Spring ¹¹, and a smaller household (including possibly childless couples and single parents). Furthermore, kerosene is available in the house and women deal with it on a daily basis (Othman 2011).

¹¹ "Nawroz" (New Year) happens in Spring around 21st March. "On the eve of Nawroz people celebrate the day, traditionally by lighting bonfires, and then picnics continue in holidays throughout spring. Therefore, the image of spring in people's minds is one of pleasure and enjoyment, which means that people's expectations for spring will be higher than usual. When expectation is higher, disappointment is likely to be more painful too. Among people who are more sensitive and who possess certain personality attributes that in some way could be related to suicide; disappointments in spring may be more likely to lead to committing acts of self-burning than in other seasons" (Othman 2011 p247).



(Source: Maximillan Dorrbecker (Chumwa) and ilyacadiz)

Figure 2.5 - Sulaymaniyah (Sulaimaniyya) in Iraqi Kurdistan.

2.4. SRI LANKA

The suicide rate in Sri Lanka was the seventh highest in the world in 2003, according to the World Health Organisation, at 40 per 100 000 ¹² (compared to 7.4 in the UK and 12 in the USA) (Jayasinghe and Foster 2011). The main method is poisoning (with pesticides, for example).

Jayasinghe and Foster (2011) reported a link between

¹² Jayasinghe and Foster (2011) calculated the rate as 20 from their analysis using data from the police service and the Sri Lankan version of "Samaritans" ("Sumitrayo") (a charity that offers a listening ear to those considering suicide). This is actually a fall over recent years from a peak of 47 in 1995.

alcohol consumption and suicide, poisoning, and deliberate self-harm (DSH), via being male. Men in Sri Lanka are more likely to drink alcohol (legally purchased or privately distilled) and are more likely to commit suicide or DSH. Generally, individuals with alcohol dependence are 60-120 times more likely to attempt suicide than the general population (Sher 2006).

2.5. DELIBERATE SELF-HARM

DSH (or non-suicidal self-injury; NSSI) is the "deliberate destruction of one's body tissue (eg: cutting, burning) for non-lethal reasons" (Lewis and Baker 2011).

However, DSH can represent an attempted suicide that is not completed or behaviour with no intention to die. Thus DSH and suicide overlap.

It is defined as parasuicide by the WHO (2000): "an act with non-fatal outcome in which an individual deliberately initiates a non-habitual behaviour, that without intervention from others will cause self-harm, or deliberately ingests a substance in excess of the prescribed or generally recognised dosage, and which is aimed at realising changes that the person desires via the actual or expected physical consequences" (quoted in Abidi et al 2010).

The most common method of DSH is self poisoning in Pakistan, based on studies between 1996 and 2008, and benzodiazepines (tranquillisers) are the most common substance used. There is variation across the country with wheat pills and bleach/bathroom cleaner most common in Lahore, as opposed to the previous case in Karachi (Abidi et al 2010).

Women are more likely than men to present at hospitals with DSH, and married women in particular. Stressful life events, like family conflict and marital problems are common prior to DSH. Major depressive illness is also common (Abidi et al 2010)

Via the Internet it is possible to find websites where individuals who perform NSSI share their experiences. There is concern that such websites may reinforce the behaviour and normalise it for those who enact it (Lewis and Baker 2011). For example, cultivation theory (Gerbner et al 2002) argued that repeated and regular messages lead to the normalisation of that message. It is a principle of mass advertising.

Lewis and Baker (2011) performed a content analysis of 71 such sites. Many of them were personally constructed and detailed the experiences of the individual who self-injured. Where authorship was given, the majority of authors (over three-quarters) were

female, and cutting was the most requested method used. Over 90% of authors reported that DSH helped them cope with negative emotions.

Most of the websites had ambivalent information about NSSI with positive comments (eg: advice about concealing injuries from others) as well as negative ones (eg: details of the pain experienced)¹³. About one-third of websites had first-aid information (eg: cleaning a wound afterwards). "Although websites frequently provide supportive messages to those who self-injure, many have defensive messages directed at people who do not self-injure. As these websites are likely more frequently visited by individuals who self-injure, these messages may not be reaching the author's target audience. Those who self-injure may interpret these messages as a way to justify their own NSSI (eg: NSSI is acceptable and others cannot understand it)" (Lewis and Baker 2011 p394).

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¹³ Forty-four websites were rated as ambivalent, four as exclusively pro-NSSI, and 23 as anti-NSSI.

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3. STRESS IN EARLY LIFE

Adverse and stressful early life experiences are associated with adult mental health problems. This statement is usually studied by asking adults with such problems (or close relatives) about their childhood and comparing the amount of stress with that of adults who do not have mental health problems. This is a retrospective design.

An experimental design that manipulates the childhood experiences in order to see the long-term outcome (ie: prospective design) is not ethically acceptable with humans. But it is done with non-human primates.

For example, Coplan et al (1998) used bonnet macaques (*Macaca radiata*) reared in the laboratory. Mothers and infants were placed in one of three environments to manipulate the level of stress for twelve weeks - low foraging demand (LFD) (food readily available on cage floor - little stress), high foraging demand (HFD) (food not available easily as mother had to dig for it - high stress), and variable foraging demand (VFD) (alternating between LFD and HFD in two week blocks - high stress).

The level of stress was measured by the presence of stress-related biochemicals (eg: corticotropin-releasing factor; CRF) in the blood of the infants. The macaques showed as much stress in the HFD and VFD conditions at 17 weeks old (ie: at time of stress), and subsequently at four years old. This study showed the long-term effects of early life stress, particularly the uncertainty of the VFD condition.

Stress produces changes in the brain that can lead to anxiety disorders. The exact physiology of this relationship is being sought. For example, Mucha et al (2011) found that stress¹⁴ led to an increase of a protein, lipocalin-2 (*Lcn2*) in the hippocampus of a mouse, and this inhibited neuron dendrite development. These changes "significantly contribute to the development of behavioural manifestation of anxiety" (Mucha et al 2011 p18440).

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¹⁴ The stress was produced by placing the mice in a head restraint for six hours per day for three days.