

MORE APPLICATIONS AND EXAMPLES OF RESEARCH METHODS IN PSYCHOLOGY

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NEUROSCIENCE, PSYCHOLOGY AND PSYCHIATRY: **NEW VERSIONS OF OLD ISSUES IN RESEARCH** **ETHICS**

Neuroscience focuses upon the brain (in the biological sense) for understanding psychology and psychiatry. It includes the use of neuroimaging (brain scans), "brain enhancement" drugs, and neurotechnology (eg: neurosurgery). Each of these areas will be considered in more detail, particularly in terms of the ethical issues raised by them.

NEUROIMAGING

Neuroscience makes use of modern technology, like neuroimaging (1), to understand the physiology of the brain. This technology allows researchers to "see" the brain working in a way that previous technologies, like X-rays, did not. This could be seen as the age of the "technology of consciousness" (Fuchs 2006).

"There exists no doubt about the fact that neuroimaging, despite its relative youth, is a potent and exciting tool to explore the working of the brain" (Fusar-Poli and Broome 2006 p609).

Recent developments in neuroimaging include diffusion tensor imaging (DTI) (examining the white matter in the brain), magnetoencephalography (MEG), and the combination of other methods (eg: EEG/MEG and Functional Magnetic Resonance Imaging/Positron Emission Tomography). There can be technical difficulties with the combination of methods; eg: magnetic field interfering with EEG signals (Fusar-Poli and Broome 2006).

Most neuroimaging studies use small samples. But attempts to pool data and apply meta-analysis (eg: coordinate-based voxel-wise mega-analysis; CMV) are being developed (Fusar-Poli and Broome 2006).

The technology of neuroimaging has implications related to free will, agency, and personality among other things, and it requires an ethical awareness for their use by researchers. This ethical awareness has been called "neuroethics" (Marcus 2002).

Fuchs (2006) distinguished two main areas of ethical concerns with neuroimaging:

i) The "new methods and technologies, by laying bare neural correlates of personal identity, cause problems of individual rights on privacy, non-interference and inviolability" (p600);

ii) The findings are reductionist in that everything is reduced to neurons firing and electrochemical processes.

For example, Libet (1985) showed that electrical activity in the brain ("readiness potential") occurs 500ms before an individual consciously chooses to do an action. Individuals, wired to EEG sensors, were told to pick up items when they wanted. If free will is nothing more than this, than is an individual ever truly responsible for their behaviour?

Responsibility

So many of the findings using neuroimaging questions the responsibility of the individual for their behaviour. The assumption of biological determinism is implicit (and explicit) in the research.

Adrian Raine (eg: Raine et al 1998), for example, using PET scans with convicted murderers, has found poor prefrontal cortex functioning compared to the general population. Relevant abilities in the prefrontal cortex include controlling impulses, awareness of future consequences, and empathy which all discourage murderous behaviour. The first thing is the distinguishing in terms of physiology between offenders and non-offenders.

The prefrontal cortex can be damaged in subtle ways by childhood physical abuse and maltreatment (Teicher 2002). So the abuse leads to brain damage which leads to violence (directly or indirectly), can the perpetrator be held responsible for their actions? If an individual has no impulse control through damage to the prefrontal cortex, what is to stop them committing impulsive behaviour? Who is to blame when a car without brakes crashes?

Knowing More Than the Individual Themselves

Another issue is that the sophistication of the technology has led to inferences about mental states outside of conscious awareness. In other words, neuroimaging is telling us something that the individual does not consciously know themselves. The idea of the "transparent brain" (Fuchs 2006).

One example of this is unconscious attitudes. The idea that there is a conscious attitude (what the individual reports on attitude questionnaires) and an unconscious attitude (what they really believe). The two may, of course, be in agreement. But more interesting when they are not, as in the case of racial attitudes.

For example, white participants who did not report

racist attitudes, showed greater activity in the amygdala in response to black people's faces than whites (Phelps et al 2000). This would suggest fear of these faces, and the inference of unconscious racist attitudes.

More than this, inferences are made about future behaviour. For example, Arnow et al (2002) showed a link between particular sexual preferences and physiological correlates in "healthy heterosexual men". In other words, if a non-offender shows the physiological correlates associated with sexual violence in an experiment, the prediction could be made that such an individual will perpetrate sexual violence in the future. But should it be made in terms of labelling individuals before they offend?

If it is possible to know more from brain scans than the individual knows themselves, it could be inferred if they are lying. "Brain fingerprinting" is based on this assumption. Developed by Lawrence Farwell (Farwell and Smith 2001), it measures P300 waves by EEG in response to knowledge of facts about a crime.

The P300 wave response to crime-related words flashed on a screen are classed as "guilty knowledge" which the offender cannot hide. The key is that there will be information that is only known to the offender and the "guilty knowledge test" will find it among hundreds of questions asked. The technology is being used in the US legal system (eg: murder conviction reversal in Iowa; Fuchs 2006).

One major problem stands out with "brain fingerprinting". It measures recognition, and this recognition may be from elsewhere than the "guilty knowledge" of the offender (Innovation 2004).

Neuroimaging has also been used to detect deception by showing the physiological correlates of intentional deception (eg: in anterior cingulate cortex in functional magnetic resonance imaging; Langleben et al 2002).

Wider Ethical Issues with Neuroimaging

There are a number of critical issues in using neuroimaging, particularly when it goes beyond the simple description of physiology.

1. The gap between subjective experience and electromagnetic signals.

"Imaging studies are based on probabilistic covariances and not on causal connections. Their interpretation depends on the design and theory behind

the study.." (Fuchs 2006 p601).

It is one thing to see the brain activated during certain behaviour, and another to say what is actually going on, particularly in terms of subjective experience. This is even more so with complex social issues - eg: showing a reaction in the amygdala to a photograph flashed on a screen briefly is a very poor way of measuring racial attitudes. Attitudes, at least, involve different components - cognitive, affective, and behavioural (Secord and Backman 1964).

If neuroscience comes to dominate in psychiatry, as in cognitive neuropsychiatry (CNP) (Halligan and David 2001), then diagnosis of mental disorders will depend on neuroimaging techniques. Such an approach would lead to changes in the clustering of symptoms, and the elimination of classifications like "schizophrenia", "bipolar disorder" etc.

They will be replaced by "neurological explanations and to the entities that make up such explanations instead" (Fuser-Poli and Broome 2006 p610).

So at the moment, depression would be diagnosed based on the presence of behavioural symptoms like low mood and suicidal thoughts, diagnosis in CNP would revolve around brain abnormalities. Depression would equal the specified abnormalities in the particular areas of the brain. Behavioural symptoms would simply be a product of these brain abnormalities. The mind, as in subjective experience, is removed from the process. This has been called "eliminative mindless psychiatry" (Jablensky and Kendell 2002).

2. From potential to actual.

It is one thing to say that the individual has the physiology for potential violence and another for them to show it. There are many factors between the potential and actual.

Brewer (2003) distinguished three groups of factors (individual, group and social) that lead to a general level of aggression, but then disinhibitions and environmental triggers that explain the specific aggression shown. This move from general to specific is similar to the move from potential to actual.

There are a lot of concerns if individuals are punished for having the potential to be dangerous. Though we live in a society that is trying to pursue such ideas. The ability to predict future behaviour is the holy grail of psychology and psychiatry. Sometimes it is done well, many other times done badly.

"The wide-spread misunderstanding of brain scans as

direct measures of psychological states or even traits, however, carries the risk that courts, parole boards, immigration services, insurance companies and others will use these technologies prematurely" (Fuchs 2006 p601).

3. Acting on the knowledge.

In the area of mental illness, studies have looked for pre-onset factors to predict the mental disorders. For example, functional magnetic resonance scans of adolescents with a high family risk of schizophrenia show brain differences (eg: Pantelis et al 2003).

To act upon this knowledge could mean giving these adolescents anti-psychotic drugs before any behavioural symptoms have appeared. Such drugs have effects on the brain as well as producing side-effects. How long to remain on the medication? Not to mention the potential for discrimination from others, and the effects of the knowledge on the individual's self-esteem (Fuchs 2006).

4. Technology as threatening.

"Our sense of privacy may be threatened by technologies that can reveal the neural correlates of our innermost thoughts and unconscious attitudes" (Fuchs 2006 pp601-602).

At the moment, such technology is relatively limited in this, but what if it becomes more reliable and accurate in the future. This is a threat to "cognitive liberty" - an individual's right over their own brain and its contents (Sententia 2004).

BRAIN ENHANCEMENT

"Brain enhancement" is the term used for new psychotropic drugs designed to combat mental disorders being used to improve the psychological and cognitive functioning of healthy individual (Fuchs 2006). In the past, such drugs were prescribed for the unhealthy (mentally ill), but there is now the option of cognitive improvements through legal drug use for healthy individuals.

Amphetamine-based drugs (eg: methylphenidate) are used to treat attention deficit hyperactivity disorder (ADHD), but such stimulants can also improve attention and alertness in healthy individuals. For example, Turner et al (2003) described the use of modafinil to improve cognitive abilities among shiftworkers.

Another area that is prone to "cosmetic neurology"

(Chatterjee 2004) is memory improvement. The focus of drug research here is initially for memory loss in dementia, but the market for the products can be widened to include individuals with small memory declines due to ageing.

While there may be a market for drugs to remove undesirable memories based on drugs to prevent traumatic memories in post-traumatic stress disorder (eg: Pitman et al 2002 propranolol (2)).

The desire to increase legal drug use by pharmaceutical companies began in full in the 1990s with "Prozac". The expansion of this selective serotonin reuptake inhibitor (SSRI) anti-depressant to include "mood brightening" and personality alteration for non-depressed individuals was aided by the evangelistic "Listening to Prozac" (Kramer 1993).

This book is full of positive stories about the benefits of "Prozac" for everyone: "It is one thing for a doctor to be able to transform a patient with medication, quite another for the doctor to be able to sculpt the patients' personality trait by trait" (Kramer 1993 p97).

Fuchs (2006) noted relatively few studies (eg: Tse and Bond 2002) on the effects of SSRIs on non-depressed individuals. Any positive benefits (like confidence) can be outweighed by attenuated negative feelings, like disappointment and guilt. Brewer (1999) questioned the motives of the makers of "Prozac", Eli Lilly, when there is so much money involved in sales (ie: billions of dollars).

Ethical Issues with Brain Enhancement

The use of drugs, aimed at specific mental disorders, by healthy individuals have far-reaching implications.

1. Side-effects

Taking the drugs either as a healthy or unhealthy individual, they have side-effects, and particularly long-term consequences. For example, methylphenidate can increase short-term memory, but lead to long-term memory organisation problems (Fuchs 2006).

To some degree, it could be argued that when drugs are taken as brain enhancement, the individuals choose to accept the side-effects. For example, Fieve (1994) recorded nausea and headaches in one-fifth of "Prozac" takers in clinical trials.

2. Future societies.

Western societies are highly competitive, especially the USA, where brain enhancers are growing in use. If some adults/children are taking them, it creates the pressure on others to take them in order to compete. Will the future include drug tests for brain enhancers before school examinations as in sports for performance enhancing drugs today?

Furthermore, those who cannot afford the drugs become disadvantaged, and, in the case, of low income groups more disadvantaged (Fuchs 2006).

3. Threats from brain enhancers

If a society develops where taking brain enhancers was a normal way of life, it would raise the question of what being human means. Like many areas of biotechnology, normal human imperfection is presented as failure: "It nurtures an illusionary outlook of constant happiness and productivity while pathologizing negative moods, a normal attention span or natural forgetfulness" (Fuchs 2006 p603).

But in the world of "consumer capitalism" (Brewer 2001a), where almost anything can be purchased, there is a (disturbing) logic to purchasing a permanent happiness, unbroken, endless concentration, or unforgetful memory. For Fuchs (2006), "Medicalising human efforts may weaken our sense of responsibility for ourselves and undermine our readiness to solve the problems of life" (p603).

NEUROTECHNOLOGY

This is the use of modern technology to physically change the brain. For example, the surgical implanting of electrodes in specific areas of the brain (deep brain stimulation - "brain pace-maker"; Fuchs 2006) to restore co-ordination of movement in Parkinson's disease or with Obsessive-Compulsive Disorder sufferers (eg: Kopell et al 2004). If this technology does produce personality change (as observed by eg: Berney et al 2002), on the positive side, it is reversible.

Neuroengineering is a developing area connecting the brain to electronic devices from cochlear implants to EEG-controlled computers. The fact that the latter is largely funded by the US military, "conjures up sinister scenarios involving mind control, hybrid brains and cyborgs" (Fuchs 2006 p603).

REDUCTIONIST CONCEPTION OF HUMANS

Neuroscience holds the reductionist view that all subjective experience and mental states are brain states. But such a view has implications for the understanding of being human. This can be seen in three areas of debate.

1. Free will versus determinism.

Neuroscience presents all behaviour as determined by brain functions. The traditional view of free will behind our actions, as characterised by explainable motives, experiencing oneself as the originator of the behaviour, and the choice of different behaviours, are all illusions (Fuch 2006).

Libet's research mentioned earlier, suggested that unconscious physiological processes cause conscious free will. While the use of transcranial magnetic stimulation (TMS) determines behaviour and takes away the originator of the action.

Boyce (1999) reported research by Grafton et al that asked volunteers to point to a light in a dark room, which moved as they pointed, and compensation took place (ie: moving the finger to the new position). With TMS to a particular area of the brain, pointing was made to the original position with no compensation. These studies and others have led Wegner (2003) to suggest that choice control and free will were illusions added by the brain after the event.

The alternative to such a reductionist and deterministic view is that "free will is not something attributable to a single mental state but rather to the person as a whole" (Fuchs 2006 p604) - a holistic view.

If all behaviour is determined, many things related to conscious change, like therapy, are meaningless.

2. What is mental illness?

Any abnormal behaviour becomes seen as mental illness, and specifically as caused by brain abnormalities with neuroscience. More than that, the origin of the mental disorder can be localised to specific areas of the brain.

The individual with all their behaviour and complexity is reduced to an illness or disease, which is reduced to a small area of the brain that functions incorrectly or is structurally damaged. The abnormal brain causes the abnormal behaviour. But what is a normal brain exactly? All brains are different in minute areas because we are individuals.

And, by the way, what is normal behaviour? This is very difficult to define (Brewer 2001a). "Normal and abnormal themselves are normatively defined and are not properties of the brain" (Fusar-Poli and Broome 2006 p611).

If the physiology of the brain is the cause of the mental illness, then the solution is a physical one. Fuchs (2006) mentioned, worryingly, the renewed use of neurosurgery for anxiety disorders.

Also it is important to emphasise that individuals suffering from a mental disorder are more than their disorder. Despite the disorder, they are, like everybody else, trying to make sense of the world.

3. What is the self?

Neuroscience sees the self as the "electrochemical and computational processes inside the brain" (Fuchs 2006) as characterised by the, for example, "synaptic self" (LeDoux 2002). In the main, an illusion.

Bennett and Hacker (2003) warned of the "mereological fallacy". This is the taking of part of the person as the whole; in this case, the brain.

The self does not exist in isolation in the brain, but in relation to the world and others. This is the social constructionist view of the self (Brewer 2001b).

In conclusion:

Mental states depend upon the patient's relations to numerous other entities and to the world as a meaningful whole. These relations are certainly not contained in neuroimaging data. Neither the mind nor the self is to be found inside the skull (Fuchs 2006 p605).

FOOTNOTES

1. The main areas of neuroimaging are:

- computerised axial technology (CAT)
- positron emission tomography (PET)
- nuclear magnetic resonance imaging (NMRI)
- functional magnetic resonance imaging (fMRI)

2. Propanolol is a type of beta-blocker, and it produces a tranquillising effect on the body.

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HARD TO FIND THE TRUTH: ASKING QUESTIONS ABOUT THE FREQUENCY OF SEXUAL INTERCOURSE WITH STRUCTURED QUESTIONNAIRES AND INTERVIEWS

INTRODUCTION

"How often do people have sex" is the kind of question that is asked by the media a lot. Various answers are received. The problem is that this is such a difficult area to measure accurately for many reasons. Academic research wants to know the truth rather than answers that are entertaining (as in the case of the media).

For example, one third of respondents to a "Playboy" magazine survey in 1982 said they had engaged in group sex (King 1996). That is entertaining for the readers of that magazine, but it is not representative of the population as a whole simply by the biased sample of who reads "Playboy".

There are many problems in asking questions about sexual behaviour, some of them are specific to the topic area, and others are general problems of research with structured questionnaires or interviews.

Structured questionnaires and interviews use the same questions with all respondents, and there is usually a limited number of response choices. In the main, the focus is upon collecting quantitative data.

This method is able to gain a large amount of comparable data in a shorter time than other methods. But the opportunity to explore respondent's answers, particularly unusual ones, are limited (table 1). This can be overcome in part by the use of semi-structured questionnaires and interviews that use some open-ended questions as well as the closed ones.

ADVANTAGES

- larger sample than most other methods
- gain information hard to observe
- allows comparison of answers between respondents and studies

DISADVANTAGES

- no opportunity to explore respondent's answers in detail
- limited nature of questions
- biases: sampling; respondent; interviewer

Table 1 - Main advantages and disadvantages of structured questionnaires and interviews.

The problems with structured questionnaire and interview research for sexual behaviour will be reviewed under the following headings: sampling; nature of the questions asked; question wording and responses; reliability and validity; and wider issues.

SAMPLING

The generalisability of a survey depends upon the representativeness of the sample questioned. There are a number of main sampling techniques used (table 2).

SAMPLING TECHNIQUE	ADVANTAGE	DISADVANTAGE
- random sample (every member of research population has equal chance of being chosen)	easy to sample	no guarantee of representativeness
- opportunity sample (random sample of those available)	convenient	generalisation not possible
- volunteer sample	overcomes ethical problems	volunteers not typical of general population
- purposive sample eg: quota sample from different groups (like age, gender)	cross-section of population	difficult to achieve

Table 2 - Main types of sampling for survey research.

The Kinsey et al (1948; 1953) surveys interviewed 5300 men and 5940 women, but the samples were not representative. There was a bias towards Midwestern, white, college-educated Americans, and also a disproportionate number of prison inmates (King 1996).

1. Non-respondents

Refusal to participate in the survey can bias a representative sample as it is not clear whether the non-respondents are a particular type of individual (eg: more conservative, or something to hide).

Hunt (1975), attempting to update Kinsey et al's data, received only a 20% response rate, while Hite (1976, 1981, 1987) had only a 3-6% rate (1).

A study may set out to gain a representative sample,

but obviously, it is dependent on who agrees to take part. Wellings et al (1994), in a British survey, broke down the number of respondents and non-respondents to give a response rate of 36% of the original sample (table 3).

	Numbers	% of total sample	Numbers	% of eligibles
Total number of questionnaires issues	50 010			
Potentially eligible	29 802	59.6		100
Out of scope addresses eg: empty	5980	12.0		
Non-eligible eg: age	14 228	28.5		
Completed interview		36	18 876	63.3
No contact at address			1027	3.4
Complete refusal of information			1761	5.9
Refusal of part of information			7517	25.2
Selected person ill/away/non-English speaker			562	1.9
Other eg: lost in post			59	0.2

(After Wellings et al 1994)

Table 3 - Reasons for non-response in British study of sexual behaviour.

This study did find far lower figures for homosexuality than other studies. It may be that the homosexual population is not evenly geographically distributed across Britain, but focused in certain locations (eg: Brighton) (O'Connell et al 1994).

2. Volunteers

In terms of the ethics of research having individuals who volunteer for the study is good practice, but such individuals are not necessarily typical of the general population.

Brewer (2005) summarised the main differences of volunteers as high need for social approval and insecurity in some studies, and more self-confident and unconventional than the norm in other studies. If they

have a high need for social approval, then they are more susceptible to giving socially desirable answers. While if they are unconventional, then their sexual behaviour may not be typical. In both cases, it does not help in finding the truth about sexual behaviour.

3. Specialist populations

To avoid the concern over the representativeness of the sample for the population as a whole, some research has focused upon specific groups. The aim is to study that group only.

For example, Blumstein and Schwartz (1983) concentrated on US couples of different types. They sent questionnaires to 4314 heterosexual couples, 969 male homosexual and 788 lesbian couples. Detailed interviews were performed on sub-groups (129, 98 and 93 couples respectively). Then eighteen months later, there was a follow-up questionnaire which had a 40% response rate.

NATURE OF QUESTION ASKING

The context of asking the questions will influence the answers given: face-to-face or group interviews, anonymous or over the telephone (table 4).

ADVANTAGES		DISADVANTAGES
	Group	
- more people quicker		- not all group members speak equal amount
- some individuals find one-to-one threatening		- give personal information in front of group of strangers
	Telephone	
- cheaper than face-to-face		- limited to short interviews
- great willingness to give personal information		- interviewer cannot see body language of respondent
	Face-to-Face	
- best for long interviews		- interviewer-interviewee bias at greatest
- can check understanding of questions		- embarrassment at greatest
	Postal/Email	
- respondents can remain anonymous		- low response rate
- cheaper than training interviewers		- cannot tell if respondents misunderstand questions

Table 4 - Comparison of the different types of questionnaire or interview.

1. Couples together

One way to check the accuracy of information is to interview both members of a couple, either alone or together. But what happens if there are different answers given to the same question by each member of the couple? Who does the interviewer believe?

Men, as a generalisation, tend to exaggerate the number of female sexual partners and women the opposite (King 1996). The same could be true with frequency of sexual intercourse.

2. Anonymity

When respondents believe in the anonymity of their answers, not necessarily that others will not see the answers, this does produce greater willingness to admit to personal information.

It is hoped that questionnaires by post and email, or by telephone involving anonymity will reduce bias answers. The first two are best for complete anonymity.

On the other hand, if people know that they cannot be identified, it may lead to exaggeration of answers. Anonymity in other situations can produce anti-social behaviour (eg: deindividuation).

3. Presence of family members or peers

This situation reduces the likelihood of honest answers to difficult questions, and produces more guarded responses or confessions.

This was shown indirectly in an experiment by Baldwin and Holmes (1987). Female US college students had to rate sexual stories they heard either while visualising the faces of two student acquaintances or two members of their family. In the latter case, the stories were rated more negatively.

4. Magazine surveys

These are a popular way of gaining a lot of information, but of limited use to academic research. The sampling process has problems (table 5), though a large number of replies may be received. With magazine surveys, analysis of findings is often simplistic (Bullough 1994).

There is no way of telling the truth of replies, for example: "In some cases, magazine readers who are annoyed or upset by seeing a sex survey in their favourite publication may vent their wrath by sending in intentionally false answers so as to interfere with the

1. volunteers
2. more affluent/educated than non-readers (depends on magazine)
3. why some readers not reply (eg: sexual hang-ups)
4. specific readership groups (eg: "Playboy" versus "Cosmopolitan")

Table 5 - Problems with sample in magazine surveys of sexual behaviour.

results of the study" (Masters et al 1995 p30). This has been called the "screw you effect" (Masling 1966).

5. Length of the questionnaire or interview

Very simply, if the questionnaire or interview is too long, participants may become bored or fatigued.

6. Who is the questioner

Respondents do not just answer the question, they try to make sense of who is asking the question; ie: the researcher's affiliation.

Norenzayan and Schwarz (Schwarz 1999) varied the letter heading on their questionnaire between the "Institute for Personality Research" and the "Institute for Social Research", and this produced different answers to questions about the reasons for mass murder.

7. Face-to-face interviews

Building on the last point, face-to-face interviews produce interviewer-interviewee bias. The interviewee is aware of how their responses will be interpreted by the interviewer and will look for signs, like facial expressions. Also differences between the interviewer and interviewee in terms of gender and ethnicity produce different responses.

On the positive side, interviewers can look for body language signs of distress or dishonesty.

QUESTION WORDING AND RESPONSES

How the question is asked can influence the responses, particularly for personal issues like sexual behaviour.

At the end of the day, self-reports of sexual behaviour cannot be verified despite self-reports being a primary source of data in psychology and the social

sciences (Schwarz 1999).

Self-reports may be retrospective or concurrent, and global or specific (Brehm et al 2002).

The answers given to questions like "how often do you have sexual intercourse" can be untrue for a number of reasons.

1. Deliberate lying

Individuals may give information that they know is false because of embarrassment or a desire to look good (impression management).

It is difficult, for example, for men in Western society to admit to infrequent sexual intercourse. On the other hand, older women may wish to play down their frequency for fear of social sanctions. There are clear social norms about sexual behaviour that influence the context of the questions and answers.

The frequency of sexual intercourse is very much cultural. In Western societies, with the "consumerisation of sex":

(A) great deal of energy (is spent) trying either to express, or in some cases, suppress sexuality. Sexuality in a direct or veiled form pervades our literature, painting and music. Sexuality is also an important part of our everyday conversation, ranging from sexual jokes to serious discussions of sex and morality (Maier 1984).

While Heider (1976) reported that the Dani (in south-east Asia) rarely have intercourse (nor masturbate), and show few signs of concern or frustration.

Distorting answers to fit the social norms is called the "social desirability bias". Thus, with a question like "have you ever forced someone to have sex against their will", it is difficult to believe the answers given.

2. Unintentional lying

Individuals can give false information because of memory lapses, particularly when time periods like the previous twelve months are used. It is easier if a time span is linked to a meaningful event (eg: since being married).

The longer the time period being asked, the more accurate will be the recall of those whose behaviour is infrequent. Thus to ask "how many times have you had vaginal intercourse during your life" will produce the most accurate answers from those respondents who say none or a very small number. This is a bias in the response accuracy as those who have frequent intercourse will be guessing at how many times (unless they keep a detailed record which is probably unlikely).

This is also a problem if the rate of frequency of intercourse varies over a long period. For example, a lot of activity with one person, then abstinence when the relationship ended or multiple partners and frequency difficult to remember.

Where individuals cannot remember or count the frequency of their behaviour, there is a tendency to guess (Wiederman 1997).

3. Misunderstanding the questions

"The key issue is whether the respondent's understanding of the question matches what the researcher had in mind.." (Schwarz 1999 p94). This occurs in two ways: the literal meaning of the sentence, and the pragmatic meaning (inferences about the questioner's intentions). The latter has four maxims - of relation, quantity, manner, and quality (Schwarz 1999) (table 6).

MAXIMS	MEANING	APPLIED TO QUESTION ABOUT HOW OFTEN HAVE SEX
relation	give relevant information	information about number of times in set period
quantity	not more information than required	not to give long details of what actually happened
manner	clear response	not to give obscure or ambiguous information
quality	truth	true number of occasions

Table 6 - Maxims of pragmatic meaning.

Words chosen can mean different things to different people. For instance, asking about sexual intercourse will elicit different responses to asking about vaginal intercourse.

The word "sex" itself means different things to different groups: for heterosexual respondents, usually it is taken as vaginal penetration. But it could mean

oral sex or mutual masturbation to others (Sanders and Reinisch 1999).

Sanders and Reinisch (1999) asked 599 undergraduates in a US Mid-West university whether certain behaviours would be described as "had sex". Oral-genital intercourse was seen so by 59%, but only 19% for penile-anal intercourse.

The male member of a heterosexual couple may count their number of orgasms, and not include whether it is the same as the female member's. For gay women, the calculation of how often will be done differently to heterosexual men (Rothblum 1994).

Misunderstanding of terms can be overcome by face-to-face interviews, but this loses anonymity. Questions should also not be ambiguous or complex and using technical terms, nor emotive or leading.

4. How behaviour measured

Behaviour can be measured by a single item or question, or by multiple items that combine to give a score for the behaviour. The former is vulnerable to carelessness or misunderstanding by the respondent, and the whole behaviour measure fails. Multiple items can overcome these problems (Wiederman 2002).

But multiple items are not always homogeneous (measure the same behaviour) and can be interrelated (answers that appear together but are not measuring the same behaviour) (Wiederman 2002).

For example, questions about actual sexual intercourse and masturbatory fantasies are interrelated in terms of the same sexual preference usually. Having sex with women and fantasising about having sex with women are similar, but not the same behaviour.

5. The nature of behaviour

Accuracy of answers to certain questions will depend upon the normality of certain behaviours. For example, asking about the frequency of anal intercourse depends upon the normality of that behaviour.

An individual who is always engaging in it may not remember how frequently because there are too many occasions. So individuals may guess using a process like this: have anal intercourse three times last week, and there are fifty-two weeks in the year; thus 150 occasions in the last year is the answer given. But this ignores the fact that every week is not necessarily like the last week.

For individuals, where the behaviour is rare or unacceptable, they may recall exactly how often in the first case or lie in the second one.

6. Degree of insight

Questions involving why, like why did your relationship end, require respondents to reflect upon their motives and emotions. A degree of insight is not inevitable, and people may give stereotypical answers (eg: we grew apart) which do not capture all of the complexity of the event (Wiederman 2002).

7. Response choices and sets

Three types of response formats are used for frequency of behaviour: open-ended questions asking for a number; close-ended numerical categories (eg: 0-1, 2-3); or frequency-labelled categories (eg: never, often) (Cecil and Zimet 1998).

Frequency-labelled categories have a problem because each label means different things to different people.

Closed questions limit the information given whereas open-ended questions produce data that is difficult to compare and/or code (Belson and Duncan 1962).

Offering alternative answers gets different results to open-ended questions. For example, to the question about "the most important thing for children to prepare them for life", 4.6% of respondents volunteered the answer: "to think for themselves". But when this was a response option, 61.5% chose it (Schuman and Presser 1981).

Offering alternatives overcomes the problems that information may be forgotten with an open-ended questionnaire, but it limits the choices to only those that the researcher thought important.

The answers given to questions will depend upon the scale options available in closed questions. A ten point scale is different to a five point scale, and some individuals gravitate towards the middle of the scale, while others use the extreme ends (Wiederman 2002).

The numbering of the rating scale produces different results; eg: -5 to +5 versus 0 to 10. Individuals are more likely to choose +3 or +4 on the former scale than to choose 8 or 9 on the latter (Schwarz 1999).

The length of the reference period (eg: last week or last year) can influence the answer. A shorter period encourages the respondent to think of every possible

case. For example, to a question about sexual encounters in the last week, the respondent may include minor occurrences (eg: a kiss), which would not be included (remembered) for a question about the last year.

Frequency alternatives can also use word scales (like "less than once a week"). In table 7, the same behaviour of sexual intercourse on two occasions in the last week will be viewed differently depending on the scale used by the researcher. With scale A, the behaviour appears infrequent, but the opposite for scale B.

How often have you had sex recently?

Scale A (low frequency)

less than once a month	once a month	once in two weeks	once a week	twice a week	more often
				X	

Scale B (high frequency)

less than twice a week	twice a week	four times a week	six times a week	once every day	more often
	X				

Table 7 - Word frequency response alternatives.

Response choices like "daily", "once a week", "twice a week" are used by respondents to determine what is normal before they answer as in table 7 (Schwartz 1999).

Where a number of frequency alternatives are offered, "respondents assume that the researcher constructs a meaningful scale, based on his or her knowledge of, or expectation about, the distribution of behaviour in the 'real world'" (Schwarz 1999 pp97-98). Add to this the tendency to choose the middle values, and different reports will be given. Choosing the middle value in table 8 gives different responses in situation A (3-4) and situation B (6-10).

Only the answer of zero times is consistent between both scales.

How often have you had sex in the last month?

Scale A:	0	1-2	3-4	5-6	7+ times
Scale B:	0	1-5	6-10	11-15	16+ times

Table 8 - Different frequency alternatives produce different responses.

The frequency alternatives will also influence the individual's perception of their behaviour as "normal". For example, an individual who reports two occasions in table 8 will view themselves differently in situation A (where 3-4 appears normal) to situation B (where 6-10 assumed normal).

How the individual perceives themselves is important, particularly if individuals believe their behaviour is untypical (or abnormal), then they will choose the extreme options.

Response choices using words like "rarely" "occasionally", "frequently" are also open to individual interpretation. Cecil and Zimet (1998) gave 192 US undergraduates a series of scenarios involving a couple having sexual intercourse twenty times during the past three months. Participants were given varying figures out of twenty as to how often a condom was used. For example, using a condom on one or two occasions was rated as "never" by 31% and 23% of participants respectively, while 23% and 40% rated 18 and 19 out of twenty respectively as "always" (table 9).

The most disturbing is the category of "sometimes" which varied between participants: it meant 0 of 20 uses of a condom for 2% of respondents to 19 out of 20 for 1% of respondents. So "most of the time" can mean use of a condom five out of twenty occasions for some people (table 10).

CONDOM USE: OCCASIONS (out of 20)	NEVER	RARELY	SOMETIMES	MOST OF THE TIME	ALWAYS
0	94	4	2	0	0
1	31	67	2	0	0
2	23	73	4	0	0
10	0	12	77	11	0
11	0	5	72	23	0
18	0	0	2	76	23
19	0	0	1	59	40
20	0	0	0	4	96

(After Cecil and Zimet 1998)

Table 9 - Percentage of respondents to different categories of condom use.

Answers are also affected by response sets (or tendencies) as shown with the "acquiescence response bias" (the tendency to agree with questions). This can be overcome by phrasing some questions negatively. Rather than "do you have intercourse each month", for example,

NEVER	RARELY	SOMETIMES	MOST OF THE TIME	ALWAYS
0-9	0-13	0-19	5-20	15-20

Table 10 - Range of terms and of occasions out of 20 for different respondents.

to "are there months where you do not have intercourse" asked to a couple.

8. Order of questions

The current question is answered in relation to the adjacent ones; ie: individual questions are perceived in their context. So, regular use of a term, like masturbation, influences the answer to a specific question about it later in the questionnaire or interview (Raghubir and Menon 1996).

RELIABILITY AND VALIDITY

Any method of measurement needs to be reliable and valid in order to be scientific. This is the case for questionnaires used to study sexual behaviour.

1. Reliability

Reliability refers to the consistency of the questionnaire. Thus if the same questions are asked to the same person at different times, similar answers will be given with a reliable questionnaire. This is the theory.

In reality, there are differences in the answers given (known as random error in measurement) (Wiederman 2002). These include inconsistent interpretation of questions by respondent or carelessness in filling out the questionnaire. The more reliable the questionnaire, the less random error will occur.

There are three main ways of establishing reliability:

i) Test-retest reliability

The correlation of the scores on the same questionnaire by the same respondent from two points of time. This can be done by asking the same questions within a single interview or at two separate times (eg:

three months apart) (table 11). The longer the time between retests, the lower the reliability. Anastasi and Urbina (1997) recommended never to exceed six months.

SINGLE INTERVIEW	TWO SEPARATE INTERVIEWS
- asking the same questions in different forms allows cross-referencing on answers. But if the questions are too similar, respondents may get bored or simply recall first time	- short period between interviews (eg: two weeks) improves reliability, but may increase possibility that respondents recall their first answer rather than actual information if too soon
- only need to interview respondents once. No problems in trying to find them again	- asking "how many partners in last 12 months" at two interviews, three months apart, is not asking for the same information. Saying "how many partners in last 12 months from previous interview" is confusing and likely to produce inaccurate information

Table 11 - Test-retest reliability with single or separate interviews.

ii) Internal reliability

With multiple item measures of the same behaviour, internal reliability can be measured by correlating between scores on two halves of the questionnaire. This makes use of techniques like "Cronbach's alpha".

But research has shown that personal relevance of questions can increase the internal reliability (Britt and Sheppard 1999). What this means is that internal reliability can be a product of the sample rather than the questionnaire (Wiederman 2002). This can also be seen in the finding that questions are more reliable if later in the questionnaire than earlier (Knowles 1988).

iii) Inter-rater reliability

This is the degree of agreement between two sources for the same information, like both members of a couple.

2. Validity

Some behaviour cannot be directly observed (eg sex drive), and is, thus, a hypothetical construct. A valid questionnaire will measure what it claims to measure. Valid measures of sex drive, for example, could include

the frequency of intercourse or masturbation. Questionnaires can be reliable but not valid and vice versa.

There are two main types of validity for a questionnaire (table 12).

TYPE OF VALIDITY	MEASURED	EXAMPLE: SEX DRIVE
Convergent	relationship with predictable variables	high sex drive and talking about sex a lot (positive correlation)
Divergent	no or negative relationship with opposite variables	high sex drive and never talks or thinks about sex (negative correlation)

Table 12 - Types of validity and application to sex drive.

WIDER ISSUES

The study of sexual behaviour is not like research into other areas of psychology and behaviour because of wider issues around it.

1. Funding of research

Large scale US surveys of sexual behaviour have been refused government funding because of the perceived inappropriateness of such research. In the late 1980s, Senator Jesse Helms of South Carolina introduced an amendment against funding such surveys on the grounds that they "legitimise homosexual lifestyles" (King 1996).

The lead researcher, Edward Laumann, was intending to interview 20 000 Americans with full government funding of 15 million dollars, but this was reduced to 3432 in a privately funded version (costing 1.7 million dollars) (Laumann et al 1994).

2. Gender issues

Feminists have argued that any understanding of sexual behaviour has to be within the context of gender relations. It is not a simple question of having sex or not and the frequency, there are definite rules that socially construct sexuality:

Within dominant cultural discourses, men are cast as the active initiators of sexual activity and women as passive recipients of male advances; men's desires are seen as uncontrollable urges which women are paradoxically expected to both satisfy and to restrain (Jackson and Scott 1996 pp17-18).

The discourse of "uncontrollable urges" is key in our society.

Gavey (1992) highlighted the cultural supports for the manifestation of this in terms of coercion:

- a) The inevitability of penetration;
- b) The absence of female discourses in heterosexual acts;
- c) No meaning in consent or restraint by women as "no" means "yes", what does "yes" mean?;
- d) The fear of abnormality for women (eg: being seen as frigid);
- e) Female socialisation of self-sacrifice.

The question of how often heterosexual individuals have sexual intercourse is more than a simple number, for feminists, it is a major thing. The private act of intercourse is completely public in terms of the discourses, norms and values related to it. Thus it may never be possible to know how often heterosexual individuals have sex.

3. Challenges from qualitative methods

Quantitative methods are interested in collecting numbers, whereas qualitative methods want to find out about the meaning of the behaviour. With qualitative research, it is not about how often individuals have sexual intercourse, but the meaning of the experience to the participants.

A coerced sexual encounter, for example, will count as one occasion of intercourse in a numerical study, but the meaning will be very different for the perpetrator and the victim.

Gavey (1992) interviewed women about their sex lives, and in particular coerced experiences of intercourse. One interviewee reported being accused of not caring if she did not have when sex when her male partner wanted, and a consequent argument developed. While another interviewee admitted giving in to his

demands for sex, just for "a few hours rest and peace and quiet".

Gavey (1996) noted that:

(S)everal women reported experiences which seemed to me like clear cases of rape or sexual aggression, but which they were reluctant to label as such - thus implicitly accepting them to be within the realm of ordinary heterosexual practice.

4. Normality and social control

The general assumption is that today individuals are freer in terms of their choice of sexual behaviour than other times in history, and that research is following after the behaviour. But what if the research constructed the behaviour. The presence of research findings create the clear ideas of what is normal or abnormal.

Foucault (1979) took a different view to the traditional one. For many, the Victorian period was one of silence about sexuality, but, for Foucault, it was the opposite. It was a period of cataloguing and categorising of individual acts, and the establishment of sexualities as part of the person rather than as specific acts.

For example, a person is a homosexual rather than performing homosexual acts, but heterosexual activity is seen as "having no particular implications for identity" (Kitzinger 1994).

Most importantly, normal and abnormal sexuality were clearly laid out. Jeffreys (1985) quoted the example of passionate middle class female friendships which were accepted in the 18th and 19th centuries, then became constructed as "lesbian", and viewed as unacceptable.

These processes have continued up to today. Knowing about the average sexual behaviour is not liberating but controlling because it establishes what is normal and abnormal.

EXAMPLES OF KEY US RESEARCH STUDIES

Most large-scale research on sexual behaviour has been historically carried out in the USA, beginning, in terms of fame, with the Kinsey et al Reports after World War Two.

1. Kinsey et al (1948; 1953)

The Kinsey et al reports are massive: 800 pages and men and 842 for women. They are packed with statistical information about sexual behaviour. Detailed calculations

are made of the frequency of sexual intercourse (tables 13 and 14).

	MARRIED	SINGLE PRE-MARRIED
16-20 yrs	2.56	0.45
21-25	2.28	0.43
31-35	1.76	0.43
41-45	1.28	0.44
51-55	0.68	-

(After Kinsey et al 1948)

Table 13 - Median frequency of sexual intercourse per week for men in selected age groups.

	FEMALE	MALE
MARRIED		
20 yrs	2.8	2.6
40	1.5	1.6
60	0.6	0.6
PRE-MARITAL		
less 20 yrs	0.1-0.2	0.6
20 yrs+	0.3	0.4

(After Kinsey et al 1953)

Table 14 - Median frequency of sexual intercourse per week.

The studies have been strengths and weaknesses as well as critics (table 15). "Those seeking titillation will be disappointed by these books however, for they make intensely dull reading. Each volume consists of around seven hundred pages of dreary figures and tables of statistics and dry commentary upon them" (O'Connell Davidson and Layder 1994 p87).

STRENGTHS	WEAKNESSES
- gained confidence of interviewees during interview	- face-to-face interviews only
- avoided leading questions	- volunteers; not random sample
- interviewing technique "stands out as model of excellence for other researchers to follow" (Masters et al 1995)	- basic interviews involved 300 questions
- clear statistical method and presentation of data	- interviewer alone had to code answers and detect inconsistencies
	- interview designed originally for use with students and not changed for others
	- each interview was time-consuming and expensive
	- data on African-Americans not published in original reports
	- sample over-representation of prisoners (25% of male sample including some sex offenders; Muir 1994), college-educated, Protestants, male prostitutes (approx 200; Muir 1994); female sample had more divorced women than average
	- sample under-representation: elderly, people living in rural communities, poorly- educated

Table 15 - Main strengths and weaknesses of Kinsey et al reports.

2. Hunt (1975)

The "Hunt Report" was commissioned by the Playboy Foundation, and performed by an independent research organisation with the aim of updating Kinsey et al's data. The random sample were obtained from telephone books in 24 US cities. The response rate was 20%, though it did mirror the national population (table 16).

The research involved small group discussions followed by individual self-administered questionnaires. The final sample was 982 men and 1044 women aged 18 years and over.

The median frequency of married sex in the USA was three times per week, and the range from more than once per day to less than once per year.

STRENGTH	WEAKNESSES
<ul style="list-style-type: none"> - sample mirrored national population eg: 10% Black, 71% married 	<ul style="list-style-type: none"> - volunteers - under-representation of those without telephone (eg: students, institutionalised people) or unlisted numbers (eg: rich) - who are non-respondents?

Table 16 - Strength and weaknesses of the Hunt Report.

3. Other large US studies

The National Survey of Young Adult Men (Billy et al 1993; Tanfer et al 1993) was carried out by the Battelle Human Affairs Research Centers with a representative sample of 3321 20-39 year-old men (drawn from the National Survey of Men). The response rate was 70% to requests for face-to-face interviews. The researchers over-sampled minority populations (eg: Blacks) to overcome drop-out.

The National Health and Social Life Survey (NHSLs) (Laumann et al 1994; Laumann and Michael 2000) was undertaken in the USA in 1992 with 3432 interviewees aged between 18-59 years. The ninety minute interviews were carried out by staff from the National Opinion Research Center at the University of Chicago.

It was found that the responses of women to "had sex more than two times a week" varied with the nature of the relationship: 40% of those long-term dating (more than three months together), 45% of cohabitees, and 25% of married women.

Lewontin (1995) criticised this study for getting underestimates on "socially unacceptable" behaviour questions. LeVay and Valente (2006) saw failings in not including under 18s and over 60s in the sample as well as the sample itself being too few, especially in relation to sexual minorities.

Masters et al (1995) listed the following problems with this study:

- i) Interviews restricted to ninety minutes even if interested issues emerged from the questions;
- ii) Around a fifth (21%) of interviews took place in front of spouses and/or children;
- iii) Carried out by researchers who were not specialist sex researchers, and only given three days

training with the questionnaire;

iv) Did not include institution-living individuals (eg: students)

v) "Average" frequencies of behaviour of limited use because of broad range of scores.

CONCLUSIONS

King (1996) summarised the feelings of many academic researchers of sexual behaviour:

Although we may never know exactly how many people engage in a particular behaviour, or the exact frequency with which people engage in various behaviours, there has often been enough agreement among the many different surveys to allow us to feel confident in making generalisations (p19).

But Wideman (2002) said that "researchers should be cautious of the absolute accuracy of answers respondents provide about events that occurred several years ago or when the individuals were very young" (p38).

So, in conclusion to the question of how often do individuals have sexual intercourse, the answer is that it depends. It depends on a number of factors:

i) Gender - Kinsey et al found men having sex more often than women. Leridon (1996) (2) reported a mean number of 8.0 and 7.1 for women in the previous four weeks;

ii) Age - frequency of intercourse tends to decline with age. Leridon (1996) showed a halving between the mid-20s (peak) and retirement age for both men and women.

Data from the National Opinion Research Center (1998), in the US, confirmed that the mean frequency of marital sexual intercourse declined with age: varying from over twice per week in the 18-29 years age group, to one and half times in the 30s, and less than 0.5 for retirees;

iii) Partnered or not - Individuals living with other individuals have intercourse more than non-cohabitantes (Leridon 1996). Length of relationship is also relevant (as shown by the NHSLs);

iv) Availability of partners - The simple practicality of people available to have sex with. Not

surprisingly, those who have a number of partners available have more sex, especially for men (Leridon 1996);

v) Heterosexual/homosexual - Blumstein and Schwartz's (1993) extensive study found differences in frequency of intercourse between heterosexual and gay and lesbian couples (table 17);

YEARS TOGETHER	0-2	2-10	10+
HETEROSEXUAL MARRIED	45	27	18
HETEROSEXUAL COHABIT	61	38	-
GAY MALE	67	32	11
LESBIAN	33	7	1

(After Blumstein and Schwartz 1993)

Table 17 - Percentage of couples in four groups having sex three or more times a week based on length of relationship.

vi) Life events/opportunities - Stressful life events will reduce the frequency of intercourse, for example, and opportunities like the presence of young children will also play a role;

vii) Time periods - Table 18 confirms the relationship between age and frequency with by a comparison of data between 1938-49 and 1972 in the US. Intercourse is reported as more frequent in 1972 in all age groups;

AGE	MEDIAN: 1938-49	AGE	MEDIAN: 1972
16-25	2.45	18-24	3.25
26-35	1.95	25-34	2.55
36-45	1.40	35-44	2.00
46-55	0.85	45-54	1.00
56-60	0.50	55+	1.00

(After Worchel and Shebilske 1986)

Table 18 - Weekly frequency of marital intercourse in the USA.

viii) Culture - As mentioned earlier the Dani appear to have sex a handful of times in their lives;

ix) Individual preferences - This can be summarised as "sex drive", and some individuals have a higher drive than others;

x) Other factors - Janus and Janus (1993) (3) reported differences in intercourse frequency based on income (table 19). The lowest income group reported the highest frequency. The authors asked whether this was due to a lack of other entertainment for low income groups.

	MEN	WOMEN
LOW INCOME	65	51
MIDDLE	48	43
HIGH	60	49

(After Janus and Janus 1993)

Table 19 - Percentage of respondents reporting "daily" and "few times weekly" sexual intercourse based on income group.

Leridon (1996) reported other variables related to higher frequency of intercourse: feeling very loving towards partner; earlier age of first intercourse; higher enjoyment of intercourse; and less interest in religion. None of these variables are that surprising.

FOOTNOTES

1. Hite Reports

- 1976: essay-type questionnaire with 3019 women; 3% response rate; 35% married women (half national average).
- 1981: essay-type questionnaire with 7239 men; 6% response rate; not representative sample and increased sample by adding elderly male volunteers.
- 1987: 4500 women; 4.5% response rate.

Also criticised for having leading questions; eg: "Do you feel there is something wrong with your 'performance', technique, or sensitivity if the woman does not orgasm from intercourse itself that you're 'not man enough', or at least that you did not do it right?" (question 132 in 1981) (Masters et al 1995).

2. In France, the Analyse des comportements sexuels en France (ASCF) (Leridon and Bozon 1996) has produced data from detailed questionnaires with 4820 individuals (2642 male and 2178 female).

3. Janus and Janus (1993) used questionnaires with 2765 US individuals (1347 male and 1418 female).

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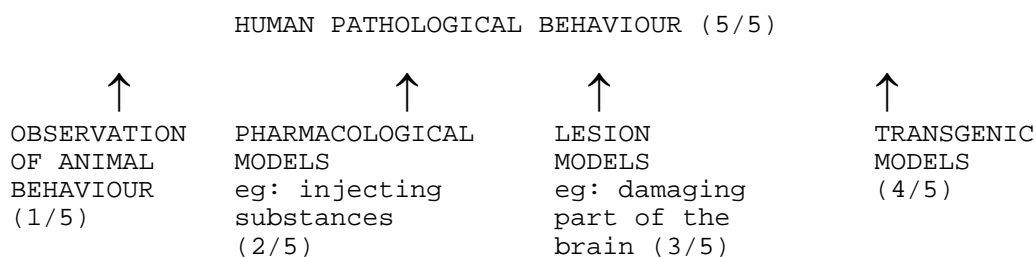
TRANSGENIC STUDIES IN PSYCHOLOGY: A NEW ISSUE FOR ANIMAL RESEARCH ETHICS

INTRODUCTION

Non-human animals have been studied throughout the history of psychology in order to understand human behaviour. In recent years, animals have been used in a different way in psychology (and science generally). This is by genetic modification of the animals including using human genes (as in transgenic studies).

These types of studies, which change specific genes in the embryo, are most useful for understanding pathology. Genes can be manipulated to create the pathology, and thus isolate the genes involved, in a way that is not possible with humans. In other words, to go from healthy to unhealthy. Any use of genetic manipulation in humans would be the other way around.

For researchers using these types of studies, genetic manipulation is the best of the methods available to understand a pathology. In figure 1, each method of studying non-human animals gives varying degrees of detail for understanding human pathological behaviour. Transgenic models are the closest yet (scoring four out of five), but they are not necessarily perfect.



(After Codita et al 2006)

Figure 1 - Nearness of different animals models to human pathological behaviour.

There are concerns about transgenic studies including the patenting of new genetic versions as if the animals were products. The correct reference number allows ordering of particular types of genetically manipulated animals from a mail-order catalogue. Debate about the right and wrongs of using non-human animals in psychology experiments can be outdated compared to the new areas like this where human genes are placed into mice, for example.

Table 1 summarises the main arguments for and against transgenic studies.

ARGUMENTS FOR

- Able to manipulate genes in way that unacceptable with humans
- Change genes and isolate those that cause problems
- Help find a cure for human conditions caused by genes
- Better method than other types of animal studies

ARGUMENTS AGAINST

- Moral argument of treating animals in such a way; eg: adding human genes; patenting as if products. These animals live just to show the pathology
- Transgenic studies found different results depending on the process of genetic engineering or the breeding strain of animal
- Applicability of findings to humans. Do human genes behaviour the same way when placed in other species?
- Ignores the role of the environment: eg dementia in humans affected by nutrition and physical exercise

Table 1 - Main arguments for and against transgenic studies.

MICE AND DEMENTIA

Cordita et al (2006) saw transgenic models "allowing ethically approved manipulations that cannot be performed on humans" as "a natural approach for Alzheimers disease researchers". Mice are easier to handle and less expensive than primates to study in this way.

The goal is "of modelling an animal so that it could resemble, as much as possible, the features of humans suffering from Alzheimers disease" (Cordita et al 2006 p560).

The mouse model of dementia has been developed by changing certain genes:

i) Changing a single gene

Amyloid precursor protein (APP) is linked to the build up of plaque in the brain as a cause of dementia Alzheimers type (DAT). Ultimately this plaque leads to nerve cells dying.

Games et al (1995) produced a mouse with a specific mutation to the APP gene which had amyloid deposits by eight months old. These mice, known as PDAPP, had

problems learning.

Studies involving this mouse and other transgenic ones related to APP sometimes find differing results. The breeding strain of mouse and the promoter are important (Cordita et al 2006). The promoter is the means by which a gene is "driven" (ie: how the human gene part into the mouse).

ii) Changing two genes

For example, a mutant known as Tg CRND8 combined two different APP mutations (eg: Janus et al 2000). This mouse showed accelerated amyloid deposits. Other combinations include two genes that are involved in different processes (eg: APP and presenilin genes). Presenilin genes code for certain cell proteins (Brindle and St.George-Hyslop 1998).

iii) Changing three genes

Oddo et al (2003) co-microinjected two independent genes into the single cell of a mouse embryo, which already had a mutation. This 3xTg-AD mouse, thus, had three genetic changes.

Researchers are happy that transgenic mice show aspects of DAT in terms of the physiology of the brain. This type of research, say the advocates, could help in finding a cure for DAT: these studies "can take us further towards completing the circle of knowledge in the human pathology of Alzheimers disease" (Codita et al 2006).

But findings from mice do not necessarily apply to humans. For example, clinical trials of a vaccine to combat amyloid deposits showed severe side effects in humans, which had not been found with mice (Orgogozo et al 2003).

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TEMPERATURE AND AGGRESSION: THREE DIFFERENT WAYS OF STUDYING THE RELATIONSHIP USING SECONDARY DATA

It is believed that as the temperature increases, so does the amount of aggression. In other words, people fight more on hot summer days than cold winter ones.

Finding the nature of the relationship between temperature and aggression depends upon the design of the study. Three different studies using secondary data are considered here.

1. Baron and Ransberger (1978) Newspaper reports

Seen as a classic study in this area, the researchers hunted through the US newspapers for reports of civil disorder between 1967-71, and then checked the temperature on that day where the event occurred. They found a curvilinear relationship (inverted U shape) between temperature and civil disorder. As the temperature increased so did the amount of civil disorder until it peaked at 80-85°F (28-30°C), and then the civil disorder declined at the higher temperatures.

There are some problems with this study (table 1).

- Relies on newspaper reports of civil disorder.
- Civil disorder can be caused by a number of factors other than just the temperature.
- Civil disorder (and group aggression) is different to individual aggression.

Table 1 - Some problems with the Baron and Ransberger study.

2. Rotton and Cohn (2000) Police records

This study confirmed the inverted U shape relationship between temperature and aggression by using telephone calls to Dallas police in 1994-5 as their measure of aggression.

Table 2 lists some problems with this study.

- Does not include aggression not reported. Some types of aggression (eg: domestic) are often under-reported to the police.
- Reports to police depend upon a number of factors - eg: individuals involved in criminal activities themselves tend not to report to the police when they are victims of aggression. It is fair to assume that such individuals are more likely to be involved in aggression than the general population.
- Reporting to the police depends upon the ability to do that; eg: availability of telephone, mobile phones.

Table 2 - Some problems with the Rotton and Crohn study.

3. Sivarajasingam and Shepherd (2001) Hospital records

This study found a peak in violence in the community in late summer (July-September) and troughs for February to April based on a random sample of Accident and Emergency (A&E) departments in hospitals in England and Wales between May 1995 and April 1998.

Of 121 475 assaults presented, young males were the most common. These figures showed ten times more violence than reported to the police.

The use of A&E department figures are better than police figures because individuals (especially young men) may be more likely to go to hospital for treatment than to go to the police. But the study still has some weaknesses (table 3).

- Does not include aggression where the individual did not seek medical help because only minor injury sustained.
- In some cases, like domestic violence, the victim may not be allowed to seek medical help. This type of aggression is not included.

Table 3 - Some problems with the Sivarajasingam and Shepherd study.

Overall these studies have some common weaknesses from using secondary data (table 4).

- Studies only find a correlation not causation.
- A third variable may explain the relationship; eg: in hot weather more alcohol is consumed and it is this that causes the aggression.
- Use of secondary data is dependent on somebody else collecting it and not making errors.

Table 4 - Some common problems of using secondary data.

Secondary data are used because, despite the

problems mentioned above, there are advantages to their use (table 5).

- Unobtrusive method.
- Collect data that would be hard to obtain in other ways.
- Possible to examine trends over long periods of time.
- Allows a large amount of data to be analysed statistically.
- Saves time and effort as data collected by others, particularly with official statistics collected by whole government departments.
- Works well where data normally collected in detail; eg: police records.

Table 5 - Advantages of using secondary data.

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