Cardiff Study of All Wales & North West of England Twins (CaStANET)

Who is on the register?

All twins who were born in Wales or the Greater Manchester area between 1980 and 1991. Unless a contra-indication has been indicated by the twin’s GP (such as illness or death) the twins have not moved abroad, asked to be removed and their address is traceable, they are listed on the register.

How was the register set up?

The twin register was initially established in Cardiff in 1992 and was extended to include twins across Wales in 1997 and Greater Manchester in 1996. The combined register is now held in the Section of Child & Adolescent Psychiatry, Department of Psychological Medicine and includes approximately 6,000 twin pairs who were born in Wales and the Greater Manchester area.

How do twin studies work?

The logic of the twin study is quite simple. There are two types of twins, monozygotic or identical twins (who are from the same egg and therefore have 100% of their genes in common) and dizygotic or non-identical twins (who are from 2 separate eggs and therefore, like any sibling, share on average 50% of the same genes). Assuming that a trait is genetically influenced then it follows that identical twins will be more similar for that trait than non-identical twins. Conversely if a trait is heavily influenced by shared environmental factors it follows that identical and non-identical twins should be equally similar. Finally the difference between identical twins is a measure of non-shared environment, i.e. environmental influences that make the twins more different. Using this naturally occurring experimental design it is possible, with model fitting statistical techniques, to estimate the relative contribution of genes (heritability) and environment to variation for a given trait.

Why study twins?

Twins are very important for research into the underlying causes of behaviour. This is because of special features that they possess. Identical twins come from the same egg and share all of their genes in common. Non-identical or fraternal twins come from two separate eggs and are no more genetically alike than non-twin brothers or sisters. That is, on average, non-identical twins share half of their genes in common (just as ordinary brothers and sisters do). These natural characteristics are very important for researchers because comparing the similarity of identical and fraternal twins allows us to separate similarity that is due to genes from similarity that is due to environmental influences.

Why is separating similarity into genetic and environment important?

Separating similarity into that due to genes and that due to environment is useful because it increases understanding of the causes of behaviour. It is also useful because it helps us to identify specific environmental influences such as smoking, family support, life events and how these affect behaviour. It is also important to realise that genes and environment are not always entirely distinct - genes and environment interact together. A good example is life events. Things that happen to us (such as being picked for a school team, having a new boyfriend or girlfriend) might at first seem to be obviously environmental. However, life events that are to some degree dependent upon our
behaviour, such as being picked for a school team, are partly influenced by our genes. This seems
strange at first, but when we think about it, it makes sense. Being chosen by your school swimming
team says something about you - not only that you’re good at swimming but also something about
your personality - for example, that you are organised and keen enough to attend practice sessions.
Our personality is partly influenced by our genes; this could be a reason that behaviour-dependent
life events are also partly influenced by genes. So, because genes and environment act together,
being able to tell how much is due to genes and how much is due to environment can be helpful.

Another important point to realise is that just because a behaviour is genetically influenced, that
does not mean that it cannot be changed by the environment. This is particularly important to note
with regard to diseases. A good example is PKU (phenylketonuria) this is an illness that all babies are
tested for when they are born - it is caused by a recessive genetic variation that means that people
who have PKU are intolerant to phenylalanine. However, the treatment for PKU is provided by the
environment - it is simply to avoid phenylalanine in the diet. This illness provides a good example
that the fact that something has a genetic cause does not render the environment unimportant.

Over the years, research involving the twins on the CASTANET Register has focused on variability in
normal behaviours. We have done this by asking twins and parents to complete questionnaires or
interviews about symptoms of behaviours such as overactive behaviours, feeling tired and feeling
upset. This is because we are interested in variability of scores in the normal population. However,
this method also allows us to compare those who score high on questionnaires to those who score in
the normal range and to see whether the causes of these behaviours differ from each other.

Twin Register- Research
2008-Family life, gene-environment interplay and adolescent adjustment
2008-Adult health and adjustment
2004-Substance use and health
2000-Child and adolescent mood and experiences
1998 - Sustained attention and concentration on computer-based tasks
1998 - Finding genes that influence concentration and activity
1996 - Childhood attention/ activity, mood and behaviour
1997 - Behaviour and inter-personal awareness
1992 - Childhood mood and behaviour

It is also possible to look at twin publications that have arisen from previous work with the twin
registry.

Funding:
Selected Publications

List of twin studies using the CaStANET database:


