

# Theory of knowledge

Theory of Knowledge (TOK) can ask an endless set of questions about knowledge, how it is created and communicated and how it is consumed by the knower.

The basic assumptions of TOK are:

- Knowledge is not fixed; it is dynamic and therefore open to influence from a variety of sources both inside the knower and out 'there' in the ether as a shared construction between humans.
- The processes that create knowledge (e.g. the assumptions or methods of the creator/s) influence knowledge itself and therefore influence what becomes known.
- The processes that communicate knowledge (e.g. the type of language used or the platform on which it is communicated) also influence its 'appearance', and therefore influence what becomes known.
- The processes that act on the knower when knowledge is consumed (e.g. emotions, perceptions, culture, values) influence what becomes known.

TOK is invaluable for exploring some of the bigger questions relevant to the teaching, learning and practice of psychology. The questions explored in this chapter are:

- Can models and theories be used to understand and predict human behaviour?
- Does a researcher's choice of methodology affect the **reliability** or **credibility** of research?
- Is what we know about human behaviour limited by our ethical considerations?
- Are emotions universal?
- Are the methods of the natural sciences applicable in the human sciences?
- Are there human qualities or behaviours that will remain beyond the scope of science?

## Can models and theories be used to understand and predict human behaviour?

Most researchers have an underlying aim to be published in a **peer-reviewed** journal. If they are working with predominantly **qualitative** data, they hope their findings will be seen as 'credible'; if they are working with **quantitative** data they hope their findings can be replicated by others and thus achieve reliability; and they hope their conclusions are seen as valid in the eyes of their peers.

Because those who propose models and theories are working with these pressures in mind, their models and theories are developed and tested as deliberate **constructs** of research methodology.

To what extent does viewing complex processes in isolation from one another help or hinder knowledge creation? For example, can the cognitive process of 'memory' be separated into its elements and studied separately from perception, schema formation, attention, emotions, forgetting, and recall.

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All models have inherent flaws because they lose the detail and nuance of the process they are trying to represent while also deliberately selecting and de-selecting key processes.



## Models

A **model** is a representation of a complex process used to aid understanding via visualization and simplification. All models have inherent flaws because they omit some of the detail and nuance of the process or object that the model represents. For example, in the dominant models of memory, the focus is on stored and recalled information, with little attention to how information is dis-remembered or forgotten.

To be considered robust, models need to be supported with empirical evidence as well as giving predictions. However, there is often a trade-off of some kind where a model might sacrifice some complexity in order to accommodate the demands of evidence and prediction.

For example, there is little explanation for how emotion influences memory in the **multi-store model of memory** (MSM) from Atkinson and Shiffrin, (1968). Emotion undoubtedly plays a role in memory formation, storage, and retrieval, but because memory is a personal, abstract concept not easily observed and described empirically, it is difficult to model the relationship between emotion and memory in a way that can be generalized to large populations. Therefore, the processes that the MSM does focus on tend to be those that can be replicated, such as word recall, which then strengthens the model's observability and predictive **validity**.

## Theories

**Theories** in the human sciences provide a framework to explain behaviour. As such, they are coherent, predictive explanations or interpretations of empirically determined facts. For example, **social learning theory** (SLT) assumes that humans learn behaviour, and even attitudes and values, through observation.

The theory is well-supported with quantitative and qualitative evidence. For example, the SLT theory has been used to explain how aggression can be acquired via the presence of models. One criticism of this theory is that it does not include key **causative** factors on behaviour, such as the biological influences of **testosterone**, brain structures, body shape or **neurotransmitters**.

In fact, few theories in the human sciences claim to offer an all-encompassing explanation for complex behaviour. Thus, as in the SLT example, the explanation may be strong on description, but limited in terms of explanation in any intentional or causative way.

A key question facing the human sciences, and psychology in particular, is: To what extent do theories and models actually add to our understanding of human behaviour? For example, does the SLT offer any genuinely new insights into the origins of human behaviour that could not be learnt from literature and films, or from authority figures such as parents, teachers, friends, or even a TV series?

While it is accepted within the discipline that a good theory provides a framework for understanding that can be shared and tested by other researchers, the question remains: How much genuinely new knowledge was generated by the process of theory construction?

In summary, it can be argued that because of their simplifications, models and theories can be used to understand and predict human behaviour as long as their limitations as research constructs are understood. Given these restraints, the **generalizations** or 'laws of large numbers' may not apply to individuals in terms of explanatory or predictive power.

## Does a researcher's choice of methodology affect the reliability or credibility of research?

Human science research methods are usually classified into two broad categories: qualitative research and quantitative research.

### Qualitative research

Qualitative researchers want to understand 'what it is like' to experience particular conditions, how people assign meaning to their experiences, and how they deal with them. People are usually studied in their own environment, preferably in naturally occurring settings, such as schools, homes, hospitals, and streets. The aim of this kind of research is to describe and explain events and experiences, but rarely will a definitive, single conclusion be reached. Qualitative research is more about gaining understandings (note the plural) and generating rich insights that represent participant experiences rather than reliable data sets that can be replicated by other researchers. However, the qualitative process can lead to suggestions about how to overcome the problems identified in qualitative studies.

Examples of qualitative methods are:

- **Case study:** a detailed analysis over time of an area of interest to produce context-dependent knowledge.
- **Naturalistic:** detailed observations of naturally occurring behaviour in a normal social setting.
- **Interviews:** unstructured, semi-structured and focus group-type approaches used to gain insights into people's thoughts, opinions and feelings.

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To what extent do theories help or hinder knowledge creation in psychology?



Qualitative researchers are concerned with meaning and experience – that is, they are interested in how people make sense of the world. The emphasis is on producing credible interpretations that represent participant(s) experiences rather than reliable data sets that can be replicated by others.

Qualitative interviews may be followed by **surveys** (a quantitative method) to collect data from a representative sample so that the findings can be generalized to a larger population.

The deeply personal nature of capturing ‘meaning and experience’ means that there is less emphasis on reliability and more emphasis on credibility. Credibility is used in qualitative research to indicate whether or not the findings of the study are congruent with the participants’ perceptions and experiences.

There is a reliance on the researchers’ decisions, such as choosing participants, deciding on questions, designing interview settings, and interpreting data, all of which are linked to the researchers’ personal circumstance. Because of these subjective elements, it is difficult for other researchers to replicate findings.

However, others can check whether the accounts and interpretations are credible by applying alternative methods of analysis in relation to the same subject matter. For instance, a form of peer review in qualitative research is the use of research diaries, to construct a ‘data decision trail’ to chart their decision-making for readers.

## Quantitative research

Quantitative methods emphasize objective measurements that allow for mathematical analysis. As such, data can be tested and possibly replicated by others through peer review. Examples of quantitative methods are:

- **Experiments:** independent variables (IV) are manipulated to measure their effect on dependent variables (DV), which are controlled as far as possible.
- **Field experiments:** the experiment takes place in a real-life environment.
- **Quasi-experiments:** the participants are grouped by characteristics such as gender, **ethnicity**, or scores on a depression scale.
- **Natural experiments:** where researchers find naturally occurring variables and study them, such as observing how children play according to gender.

Credibility in quantitative research is measured using the notion of **validity**, which refers to ‘correctness’ or ‘accuracy’. For instance: To what extent are researchers confident that an identifiable cause has had an identifiable effect? Validity is established through **cause-effect** experimental methods that are open to peer review.

Reliability in quantitative research is measured by using the notion of replicability. For instance: To what extent can other researchers produce the same results with the same methodology?

In summary, the aim of qualitative methods is more focused on producing credible accounts and interpretations of participants’ experiences (although not always open to replication). The aim of quantitative methods is to produce reliable data sets that can be tested for validity by others.

Should reliability be as important as credibility in the human sciences?

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Quantitative methods emphasize objective measurements and usually produce data that lends itself to statistical, mathematical, or numerical analysis. The emphasis is on producing reliable and valid interpretations that can be tested through peer review to achieve similar results and conclusions.



## Is what we know about human behaviour limited by our ethical considerations?

**Ethics** refers to a moral framework that differentiates 'right' from 'wrong'. All human science research carries ethical responsibilities in respect of the **autonomy** and **dignity** of the persons involved in their studies. Within a research context this means that participants should understand what is involved in the research process, and that they have the right to withdraw if emotional trauma is experienced as part of the research.

The question, 'Is what we know about human behaviour limited by our ethical considerations?' assumes a universal ethical framework ('our ethical considerations') for human science research. This assumption is supported by Research Ethics Committees (RECs) found in most respected academic institutions. RECs are usually a multidisciplinary team of professional researchers and/or experienced academics with a balance of **gender** and **cultural** backgrounds.

A REC is normally responsible for (based on the BPS Ethical guidelines 2010):

- reviewing all research involving human participants conducted by individuals employed within or by that institution
- ensuring that the ethics review is independent, competent, and timely
- protecting the dignity, rights, and welfare of research participants
- considering the safety of the researcher(s)
- considering the legitimate interests of other stakeholders
- making informed judgements on the scientific merit of proposals
- making informed recommendations to the researcher if the proposal is found to be wanting in some respect.

If there were no ethical limits on psychological experiments and other kinds of studies, then researchers would be free to violate the basic human rights of participants in their pursuit of knowledge. Such violations of ethical principals have happened throughout history under political regimes that do not recognize the dignity of the individual. Well-known examples include those conducted under the Nazi human experimentation programme during the Second World War (United States Holocaust Museum).

Among others, the Nazis conducted research on the:

- effects of mustard gas on the human body
- effects of bone, muscle, and nerve transplantation on the human body
- effects of freezing on the human body
- effects of head injuries on the human body
- effects of immunizations on the human body.

It is theoretically possible that the results of these studies found their way into Allied hands and that the findings were useful to them. It is thought that pharmaceutical knowledge in particular was used by companies after the war to develop drugs.



Ethics refers to a moral framework that differentiates 'right' from 'wrong'. All human science research carries ethical responsibilities because researchers interact with their participants on a humane level, unlike the natural sciences where the objects of study do not have consciousness or feelings (so far as we know).

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Are ethics a uniquely human construct? Do other species have ethics?

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To what extent should ethical frameworks be universal within the human sciences? What would the implications be for such a view? What are the implications for differing and culturally-specific ethical frameworks?

Research the Abu Ghraib Prison and the Dozier School for Boys in Florida and use Zimbardo's and Milgram's research to answer, 'How could rational, educated people treat other human beings in this way?'

And then answer this question: 'Should knowledge gained through research judged to be unethical later be used in research?'



Other examples of ethical importance include the obedience studies conducted by Stanley Milgram (1963) and Philip Zimbardo (1971). Milgram's interest in human obedience produced genuinely new knowledge at a time when it was assumed that people would not obey orders resulting in another's pain. However, his experiments showed that people will obey orders they know to be wrong if placed in a certain context.

Context-dependent behaviour was also investigated by Zimbardo in studies that showed that situational cues within a mock prison produced behaviour in violation of ethical norms. In both cases, Zimbardo and Milgram acknowledged the emotional trauma visited on their participants who took their roles too seriously. It is unlikely that these types of studies would get REC approval today in human science experimental settings.

## Are emotions universal?

Any approach to feelings and emotions should consider **physiology**, **cognition**, and behavioural elements. Emotions perform a number of roles in human behaviour.

- They attach meaning to basic physiological changes.
- They play an informational role in the cognitive sense. For example, emotions contribute to cognition by flagging what needs attention while devaluing what is less important (DeSousa, 1987).
- They can bring about change in the environment through facial or bodily expressions (James, 2009), such as smiling or grimacing.

Although 'emotion' is a broad term, Forgas (1992) and Fineman (1993) take the view that feelings are what humans experience, while emotions are the expression of those feelings. A working definition should be discussed and agreed upon before trying to understand their role in human behaviour. It is worth breaking the question down into the following elements.

### Physiological changes

While there are slight bodily differences across the world, the human body has universal commonalities that make it 'human'. For example, the physical and chemical structures as well as the role of the **endocrine** system is the same in every human. The endocrine system is a collection of glands that secretes hormones directly into the circulatory system. It is therefore an information signalling system that operates via a process known as endocrine signalling. The **adrenal glands** are endocrine glands that secrete **adrenaline**, among other hormones. Adrenaline is known as the 'fight or flight' hormone because it readies the individual in situations of perceived danger and produces physiological arousal. Therefore, when the human body secretes adrenaline the individual will experience a heightened physiological arousal. However, secretion will not occur in the same way in the same situations for different individuals. For example, someone who is new to skydiving will have a different physiological reaction to an instructor who has been skydiving for many years.

### Cognitive interpretations of physiological changes

While physiological arousal is a biological phenomenon, the stimulant that is context and person specific has to be interpreted. For example, Dutton and Aron (1974) aimed to

Emotions are difficult to define but usually are considered to have physiological, cognitive, and behavioural elements.



To what extent are emotions universal?

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Are underlying physiological changes universal?

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test whether physiological arousal can influence attraction by comparing attraction levels in two different environments (see bridge experiment p. 279) Their research suggested attraction occurs when physiological arousal is interpreted as sexual excitement.

However, not everyone will interpret the physiological arousal in the same way. The individual nature of emotions causes further troubles for analysis. For example, attraction is a deeply personal experience influenced both by biological determinism in the form of sexual orientation, as well as cultural **norms**. The woman in the Dutton and Aron (1974) study was uncovered, unaccompanied, and approaching men themselves. Therefore, men from cultures who are not used to seeing women act in this way may also have had mixed responses and may not have interpreted those reactions as attraction.

## Behavioural projections

Such projections of emotions are regulated by **sociocultural** norms. How humans express themselves in a social context is highly culturally specific, as well as being influenced by other factors such as gender expectations. For example, Kessler et al. (1994) reported that women in the USA are about two-thirds more likely than men to be depressed, with a similar trend in the UK. However, gender differences in depression rates may be the result of the two genders responding to sociocultural pressures in terms of how to act and feel, which would mean their underlying depression symptoms manifest themselves in gender-specific ways (Nazroo, 2001).

For example, men may have been **socialized** to express depression symptoms in the form of anger, being alone, or turning to drugs, or other forms of acting out, whereas women are more likely to talk about their feelings in social settings and peer groups.

These projected social behaviours mean they are more likely to be labelled as 'depressed' and seek help, which may account for the gender differences in **prevalence rates** of depression. Women may also feel more comfortable seeking help with personal problems from healthcare professionals as a result of sociocultural norms. Studies have shown that expected gender differences in depressive disorders were balanced out by higher male rates of alcohol abuse and drug dependency (e.g. Metzler et al., 1995), suggesting there is no underlying biological difference between men and women in experiencing feelings of depression, but there are differences in emotional expression due to sociocultural expectations for how different genders should act.

The physiological underpinnings of humans are generally universal. However, emotions are part of a complex feedback mechanism that includes the body, cognition, and sociocultural influences, as well as other physiological phenomena such as drugs or food that can all heavily impact emotion and emotional expression. Therefore, while there are general emotions that might be considered universal (e.g. sadness or happiness), the context of when, why, and how they manifest themselves is heavily influenced by specific factors.

## Are the methods of the natural sciences applicable in the human sciences?

The natural sciences use a variety of methods to generate, interpret, and present data and analysis.

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Are cognitive interpretations of physiological changes universal?

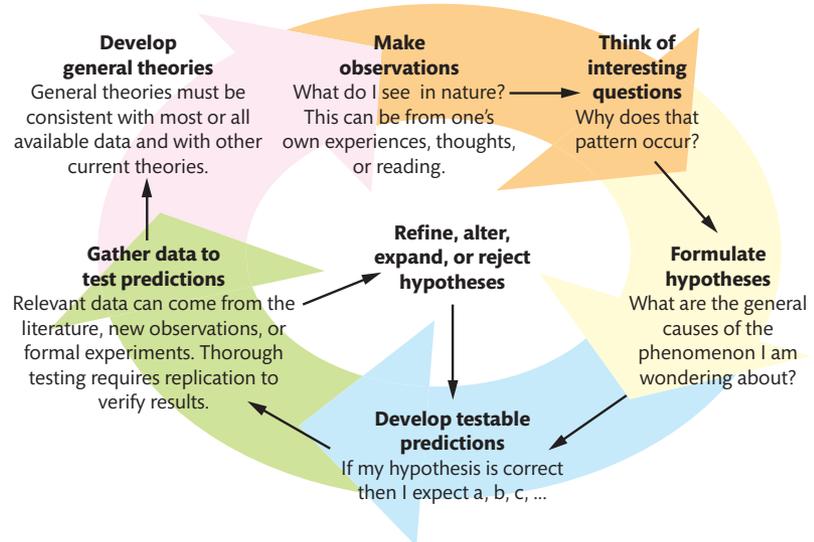
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Are the behavioural projections universal?

## Methods of the natural sciences

### The scientific method

The **scientific method** is a formal method used by scientists that consists of systematic pursuit of knowledge involving the recognition and formulation of a problem, the collection of data through observation and experiment, and the formulation and testing of **hypotheses**. It encourages the reduction of complex phenomena to the level of self-contained and isolated **variables**, which can then be manipulated and measured.



A diagram showing the cyclical process of the scientific method.

Does the scientific method help or hinder knowledge creation in the human sciences?

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The scientific method generates knowledge by providing a framework for developing and testing new ideas then allowing the results to be tested by others.

#### The use of peer review

The natural sciences are shared knowledge (the results of scientific studies are available to others working in the same field). Peer review is the process where other scholars evaluate a specific study and its conclusions in journals periodically published and read by experts in the field. For example: The *Journal of Neuroscience Methods* publishes papers that describe new methods specifically for neuroscience research conducted on invertebrates, vertebrates, or humans.

#### The use of theory

A theory is an explanation of some aspect of the natural world that has been acquired through the scientific method. Therefore, it has been repeatedly tested and confirmed through observation and experimentation, as well as peer review. Theories provide a framework for understanding and articulating knowledge and they allow new ideas to be developed (predicted) that support the basic assumptions of the original theory.

#### The use of models

Models are representations of complex processes. Characteristics of models are:

- They are a simpler version of a complex system or object.
- They focus on one feature of a system or object, descriptions of objects or processes.
- They have explanatory power.
- They generate predictions.

Models are representations of complex processes that are useful because they simplify complex phenomena, making it easier to study a concept or process or object.

#### The use of classification

Natural science seeks to find patterns and order in the natural world through classifications. Classification helps explain relationships in the natural world and helps improve prediction. For example, animal species are classified according to their body type and breeding habits.

The scientific method has a clear set of methods to generate knowledge.

## Assumptions of the natural sciences

**Scientific law:** a phenomenon that will invariably occur whenever certain conditions exist. The formal statement about such a phenomenon is called a natural law – a generalized rule to describe a body of observations. For example, Newton's First Law states that an object will remain at rest or in uniform motion in a straight line unless acted upon by an external force.

**Empiricism:** refers to the emphasis placed on physical evidence (usually quantitative) to test hypotheses, support lawful relationships, and build theories. Evidence is usually collected by carrying out experiments and observation. It is a key part of the scientific method that all hypotheses and theories must be tested under scientific conditions rather than using pure reasoning, revelation, or imagination.

**Induction:** science can never test all possible examples. For example, the natural sciences cannot observe every polar bear to test if they are all white, even though all polar bears to date have been white. Therefore, it is not possible to say with absolute certainty that all polar bears are white. The natural sciences assume that conclusions that apply to a few samples will apply to all examples. This is the process of induction linked to the assumption mentioned above that nature has laws and principles that can be applied to other individuals not included in the sample.

**Generalizability:** the natural sciences make generalizations from a smaller sample that applies to a larger population. For example, because scientists cannot study all tree roots, they study a small sample to find similarities and differences that they can generalize to all tree roots.

**Positivism:** the belief that emphasizes knowledge creation by the use of empirical evidence and scientific methods (Jakobsen, 2013).

**Falsifiability/disconfirmation:** the ability to test scientific ideas and have the opportunity to demonstrate them to be false. Karl Popper argues that science theories can be clearly separated from non-science theories through falsification: if a theory cannot be tested and falsified by scientific means, then it is not scientific (Resnik, 2000).

**Causation:** the belief that one event leads to another and that events occur in predictable ways (Shepard and Greene, 2003).

## To what extent are these methods and assumptions applicable in the human sciences?

Human scientists ask questions about human behaviour that can be tested under consistent conditions to form predictions and models/theories. The scientific method promotes the notion that variables should be isolated and studied via manipulation and measurement to test whether one variable will have a cause-effect relationship with another.

Peer review allows others to share the knowledge while evaluating the methodologies and conclusions.

Theories provide explanatory frameworks for understanding and articulating knowledge about human behaviour. They can be tested for their robustness to see how valid they are in explaining human phenomena.

Human behaviour can be classified to allow predictions and understandings to develop. It should always be remembered, humans are products of evolution and are classified on a very basic level as mammals, and therefore have many characteristics in common with other mammals.

Models can help describe and explain complex human processes and behaviours such as memory, perception, and relationship formation.

It can be assumed that humans will act in a certain way under certain conditions that allows for them to be studied and the results generalized to larger populations. Just as in science, problems can occur when the generalizations become too broad or are applied to populations that have different characteristics.

It is assumed that human behaviour can be measured and quantified using the methods of the natural sciences. For example, thought processes such as attitudes and behaviours (e.g. aggression) can be measured and observed.

Therefore, scientific methodologies and assumptions can be applied to the human sciences. The methodologies and assumptions will help and/or hinder knowledge creation depending on how they are used and applied. It is the role of the human scientist to be aware of the strengths and limitations of the various methodologies and assumptions to ensure their data and interpretations do not presume ultimate truth, while also considering how other methods may be an equally valid way for discovering the complexities of human nature.

## Are there human qualities or behaviours that will remain beyond the scope of science?

Academic psychology deals with a broad range of areas, from the action of single hormones to large scale social group behavior. The diversity among the fields of psychology means that different methods are used to gather and analyze data dependent on a number of factors, such as the purpose of the research, the characteristics of the participants, and the researchers' beliefs about the nature of knowledge and how it can be acquired.

Despite the ability to apply the methods of the natural sciences to the human sciences, questions remain about the extent to which these methods should be applied and whether there are human qualities or behaviours that remain beyond the scope of psychology and science. Noam Chomsky suggested that the methods of psychology and the natural sciences are far from the only avenue that humans have available to them:

*'There is, incidentally, no reason to suppose that all the problems we face are best approached in these terms. It is quite possible – overwhelmingly probable, one might guess – that we will always learn more about human life and personality from novels than from scientific psychology. The science forming capacity is only one facet of our mental endowment. We use it where we can but are not restricted to it, fortunately' (Chomsky, 2008: 249).*

Chomsky's remarks suggest that while psychology has a role to play, it is far from the only approach to learning about human behaviour. Psychology has been heavily influenced by the natural sciences, which encourage the reduction of complex phenomena to the level of generally self-contained and isolated variables that can then be manipulated and measured.

For example, love is a deeply personal phenomenon but it can be explained using the methods and assumptions of science. It can be seen as an **adaptive** function that has evolved as a way to keep couples who have procreated together. Therefore, researchers assume the evolutionary consequences of love are so important that there must be some long-established biological mechanisms that regulate and promote it.

Through this lens, love can be reduced to a series of chemical reactions that increase the chances of the resulting offspring surviving and thriving. For example, Marazziti et al. (1999) measured the density of the platelet 5-HT transporter in 20 subjects who had recently fallen in love within the previous six months and were compared with 20 non-medicated **obsessive compulsive disorder** (OCD) patients and 20 **controls** (see p. 16 for details). They found subjects who were in the early romantic phase of a love relationship were no different from OCD patients in terms of the low density level of the platelet 5-HT, and both groups had significantly lower levels than in the controls. They concluded that **serotonin** could act as a biological mechanism to explain 'falling in love' and pair bonding behaviour.

However, the problem with the scientific approach to understanding 'love' is that it tells us very little about the personal experiences of people who are 'in love'. It does not address the sociocultural nature of love and how different people from different cultures may have different views and experiences of the phenomena. It fails to explain why some people can 'love' inanimate objects such as cars, or have close emotional bonds with pets. If love is reduced to the level of biochemical reactions, then we may learn about the physiological basis of love but learn little about the experience of it.

Chomsky's view suggests literature is an equally valid way to access and learn about human experiences. For example, the following poem by the Bengali poet Rabindranath Tagore tells us a great deal about the emotions and sentiment of love:

### **Unending Love (edited)**

*'I seem to have loved you in numberless forms, numberless times...  
In life after life, in age after age, forever.  
My spellbound heart has made and remade the necklace of songs,  
That you take as a gift, wear round your neck in your many forms,  
In life after life, in age after age, forever.'*

Poems are products of the human capacity to imagine. Poems cause us to think and feel in ways that we might otherwise not. They cause us to ask questions about human nature, about the world around us, and about ourselves. They do this in a way that perhaps psychology and science are not able to do.

The existence of other approaches to understanding the human condition does not automatically make psychology and science less or more valid. It simply posits them as one of the many avenues that humans can come to know their world while trying to make sense of what it is to be human.