Philology and Linguistics

Michael Garrison

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Chapter 1

Philosophy of Language

Ordinary language philosophy is a philosophical methodology that sees traditional philosophical problems as rooted in misunderstandings philosophers develop by distorting or forgetting what words actually mean in everyday use. "Such 'philosophical' uses of language, on this view, create the very philosophical problems they are employed to solve." Ordinary language philosophy is a branch of linguistic philosophy closely related to logical positivism.

This approach typically involves eschewing philosophical "theories" in favor of close attention to the details of the use of everyday "ordinary" language. Its earliest forms are associated with the work of G.E. Moore and the later work of Ludwig Wittgenstein, in addition to a number of mid-20th century philosophers who can be split into two main groups, neither of which could be described as an organized "school". In its earlier stages, contemporaries of Wittgenstein at Cambridge University such as Norman Malcolm, Alice Ambrose,

Friedrich Waismann, OetsKolkBouwsma and Morris Lazerowitz started to develop ideas recognisable as ordinary language philosophy. These ideas were further elaborated from 1945 onwards through the work of some Oxford University philosophers led initially by Gilbert Ryle, then followed by J. L. Austin. This Oxford group also included H. L. A. Hart, Geoffrey Warnock, J. O. Urmson and P. F. Strawson. The close association between ordinary language philosophy and these later thinkers has led to it sometimes being called "Oxford

philosophy". More recent philosophers with at least some commitment to the method of ordinary language philosophy include Stanley Cavell, John Searle and Oswald Hanfling.

Central ideas

The later Wittgenstein held that the meanings of words reside in their ordinary uses and that this is why philosophers trip over words taken in abstraction. From this came the idea that philosophy had gotten into trouble by trying to use words outside of the context of their use in ordinary language. For example, "understanding" is what you mean when you say "I understand". "Knowledge" is what you mean when you say "I know". The point is that you *already know* what "understanding" or "knowledge" are, at least implicitly. Philosophers are ill-advised to construct new definitions of these terms, because this is necessarily a *re*definition, and the argument may unravel into self-referential nonsense. Rather, philosophers must explore the definitions these terms already have, without forcing convenient redefinitions onto them.

The controversy really begins when ordinary language philosophers apply the same leveling tendency to questions such as *What is Truth?*or*What is Consciousness?* Philosophers in this school would insist that we cannot assume that (for example) truth 'is' a 'thing' (in the same sense that tables and chairs are 'things') that the word 'truth' represents. Instead, we must look at the differing ways in which the words 'truth' and 'conscious' actually function in ordinary language. We may well discover, after investigation, that there is no single entity to which the word 'truth' corresponds, something Wittgenstein attempts to get across via his concept of a 'family resemblance'

(cf. *Philosophical Investigations*). Therefore, ordinary language philosophers tend to be anti-essentialist.

Anti-essentialism and the linguistic philosophy associated with it are often important to contemporary accounts of feminism, Marxism, and other social philosophies that are critical of the injustice of the status quo.

The essentialist 'Truth' as 'thing' is argued to be closely related to projects of domination, where the denial of alternate truths is understood to be a denial of alternate forms of living. Similar arguments sometimes involve ordinary language philosophy with other anti-essentialist movements like post-structuralism. But strictly speaking, this is not a position derived from Wittgenstein, as it still involves 'misuse' (ungrammatical use) of the term "truth" in reference to "alternate truths".

History

Early analytic philosophy had a less positive view of ordinary language. Bertrand Russell tended to dismiss language as being of little philosophical significance, and ordinary language as just too confused to help solve metaphysical and epistemological problems. Frege, the Vienna Circle (especially Rudolf Carnap), the young Wittgenstein, and W.V. Quine all attempted to improve upon it, in particular using the resources of modern logic. In his *TractatusLogico-Philosophicus* Wittgenstein more or less agreed with Russell that language ought to be reformulated so as to be unambiguous, so as to accurately represent the world, so that we can better deal with philosophical questions.

By contrast, Wittgenstein later described his task as bringing "words back from their metaphysical to their everyday use". The sea change can be traced originally back to the early essays of Moore (e.g. *A Defense of Common Sense*, 1925, and *Proof of the External World*, 1939), though its most recognizable form is found in the unpublished work of Wittgenstein from the mid-1930s, which centered largely on the idea that there is nothing *wrong* with ordinary language as it stands, and that many traditional philosophical problems are only illusions brought on by misunderstandings about language and related subjects. The former idea led to rejecting the approaches of earlier analytic philosophy—arguably, of any earlier philosophy—and the latter led to replacing them with careful attention to language in its normal use, in order to "dissolve" the appearance of philosophical problems, rather than attempt to solve them. At its inception, ordinary language philosophy (also called linguistic philosophy) was taken as either an extension of or as an alternative to analytic philosophy. Now that the term "analytic philosophy" has a more standardized meaning, ordinary language philosophy is viewed as a stage of the analytic tradition that followed logical positivism and that preceded the yet-to-be-named stage analytic philosophy continues in today. According to Preston, analytic philosophy is now in a fifth, eclectic or pluralistic, phase he calls 'post-linguistic analytic philosophy', which tends to 'emphasize precision and thoroughness about a narrow topic, and to deemphasize the imprecise or cavalier discussion of broad topics'.

Ordinary language analysis largely flourished and developed at Oxford in the 1940s, under Austin and Ryle, and was quite widespread for a time before declining rapidly in popularity in

the late 1960s and early 1970s. It is now not uncommon to hear that ordinary language philosophy is no longer an active force. Wittgenstein is perhaps the only one of the major figures of linguistic philosophy to retain anything like the reputation he had at that time. On the other hand, attention to language remains one of the most important techniques in contemporary analytic thought, and many of the effects of ordinary language philosophy can still be felt across many academic disciplines.

Criticism

One of the most ardent critics of ordinary language philosophy was a student at Oxford, Ernest Gellner who said:

"[A]t that time the orthodoxy best described as linguistic philosophy, inspired by Wittgenstein, was crystallizing and seemed to me totally and utterly misguided. Wittgenstein's basic idea was that there is no general solution to issues other than the custom of the community. Communities are ultimate. He didn't put it this way, but that was what it amounted to. And this doesn't make sense in a world in which communities are not stable and are not clearly isolated from each other. Nevertheless,

Wittgenstein managed to sell this idea, and it was enthusiastically adopted as an unquestionable revelation. It is very hard nowadays for people to understand what the atmosphere was like then. This was *the* Revelation. It wasn't doubted. But it was quite obvious to me it was wrong. It was obvious to me the moment I came across it, although initially, if your entire environment, and all the bright people in it, hold something to be true, you assume *you* must be wrong, not

understanding it properly, and they must be right. And so I explored it further and finally came to the conclusion that I did understand it right, and it *was* rubbish, which indeed it is."

— *Ernest Gellner, Interview with John Davis, 1991*

Gellner criticized ordinary language philosophy in his book *Words and Things* published in 1959.

Phenomenology (philosophy)

Phenomenology (from Greekφαινόμενον, *phainómenon* "that which appears" and λόγος, *lógos* "study") is the philosophical study of the structures of experience and consciousness. As a philosophical movement it was founded in the early years of the 20th century by Edmund Husserl and was later expanded upon by a circle of his followers at the universities of Göttingen and Munich in Germany. It then spread to France, the United States, and elsewhere, often in contexts far removed from Husserl's early work.

Phenomenology is not a unified movement; rather, different authors share a common family resemblance but also with many significant differences. Gabriella Farina states:

A unique and final definition of phenomenology is dangerous and perhaps even paradoxical as it lacks a thematic focus. In fact, it is not a doctrine, nor a philosophical school, but rather a style of thought, a method, an open and ever-renewed experience having different results, and this may disorient anyone wishing to define the meaning of phenomenology.

Phenomenology, in Husserl's conception, is primarily concerned with the systematic reflection on and study of the structures of consciousness and the phenomena that appear in acts of consciousness. Phenomenology can be clearly differentiated from the Cartesian method of analysis which sees the world as objects, sets of objects, and objects acting and reacting upon one another.

Husserl's conception of phenomenology has been criticized and developed not only by him but also by students and colleagues such as Edith Stein, Max Scheler, Roman Ingarden, and Dietrich von Hildebrand, by existentialists such as Nicolai Hartmann, Gabriel Marcel, Maurice Merleau-Ponty, and Jean-Paul Sartre, by hermeneutic philosophers such as Martin Heidegger, Hans-Georg Gadamer, and Paul Ricoeur, by later French philosophers such as Jean-Luc Marion, Michel Henry, Emmanuel Levinas, and Jacques Derrida, by sociologists such as Alfred Schütz and Eric Voegelin, and by Christian philosophers, such as Dallas Willard.

Overview

In its most basic form, phenomenology attempts to create conditions for the objective study of topics usually regarded as subjective: consciousness and the content of conscious experiences such as judgements, perceptions, and emotions. Although phenomenology seeks to be scientific, it does not attempt to study consciousness from the perspective of clinical psychology or neurology. Instead, it seeks through systematic reflection to determine the essential properties and structures of experience.

There are several assumptions behind phenomenology that help explain its foundations:

- Phenomenologists reject the concept of objective research. They prefer grouping assumptions through a process called phenomenological epoché.
- They believe that analyzing daily human behavior can provide one with a greater understanding of nature.
- They assert that persons should be explored. This is because persons can be understood through the unique ways they reflect the society they live in.
- Phenomenologists prefer to gather "capta", or conscious experience, rather than traditional data.
- They consider phenomenology to be oriented toward discovery, and therefore they research using methods that are far less restrictive than in other sciences.

Husserl derived many important concepts central to phenomenology from the works and lectures of his teachers, the philosophers and psychologists Franz Brentano and Carl Stumpf. An important element of phenomenology that Husserl borrowed from Brentano is intentionality (often described as "aboutness"), the notion that consciousness is always consciousness *of* something. The object of consciousness is called the *intentional object*, and this object is constituted for consciousness in many different ways, through, for instance, perception, memory, retention and protention, signification, etc. Throughout these different intentionalities, though they have different structures and different ways of being "about" the object, an object is still constituted as the identical object;

consciousness is directed at the same intentional object in direct perception as it is in the immediately following retention of this object and the eventual remembering of it.

Though many of the phenomenological methods involve various reductions, phenomenology is, in essence, anti-reductionistic; the reductions are mere tools to better understand and describe the workings of consciousness, not to reduce any phenomenon to these descriptions. In other words, when a reference is made to a thing's *essence* or *idea*, or when the constitution of an identical coherent thing is specified by describing what one "really" sees as being only these sides and aspects, these surfaces, it does not mean that the thing is only and exclusively what is described here: the ultimate goal of these reductions is to understand *how* these different aspects are constituted into the actual thing as experienced by the person experiencing it. Phenomenology is a direct reaction to the psychologism and physicalism of Husserl's time.

Although previously employed by Georg Wilhelm Friedrich Hegel in his *Phenomenology of Spirit*, it was Husserl's adoption of this term (c. 1900) that propelled it into becoming the designation of a philosophical school. As a philosophical perspective, phenomenology is its method, though the specific meaning of the term varies according to how it is conceived by a given philosopher. As envisioned by Husserl, phenomenology is a method of philosophical inquiry that rejects the rationalist bias that has dominated Western thought since Plato in favor of a method of reflective attentiveness that discloses the individual's "lived experience." Loosely rooted in an epistemological device, with Sceptic roots, called epoché, Husserl's method entails the suspension of judgment while

relying on the intuitive grasp of knowledge, free of presuppositions and intellectualizing. Sometimes depicted as the "science of experience," the phenomenological method is rooted in intentionality, i.e. Husserl's theory of consciousness (developed from Brentano).

Intentionality represents an alternative to the representational theory of consciousness, which holds that reality cannot be grasped directly because it is available only through perceptions of reality that are representations of it in the mind. Husserl countered that consciousness is not "in" the mind; rather, consciousness is conscious of something other than itself (the intentional object), whether the object is a substance or a figment of imagination (i.e., the real processes associated with and underlying the figment). Hence the phenomenological method relies on the description of phenomena as they are given to consciousness, in their immediacy.

According to Maurice Natanson (1973, p. 63), "The radicality of the phenomenological method is both continuous and discontinuous with philosophy's general effort to subject experience to fundamental, critical scrutiny: to take nothing for granted and to show the warranty for what we claim to know." In practice, it entails an unusual combination of discipline and detachment to *bracket* theoretical explanations and second-hand information while determining one's "naïve" experience of the matter. (To "bracket" in this sense means to provisionally suspend or set aside some idea as a way to facilitate the inquiry by focusing only on its most significant components.) The phenomenological method serves to momentarily erase the world of speculation by returning the

subject to his or her primordial experience of the matter, whether the object of inquiry is a feeling, an idea, or a perception. According to Husserl the suspension of belief in what we ordinarily take for granted or infer by conjecture diminishes the power of what we customarily embrace as objective reality. According to RüdigerSafranski (1998, 72), "[Husserl's and his followers'] great ambition was to disregard anything that had until then been thought or said about consciousness or the world [while] on the lookout for a new way of letting the things [they investigated] approach them, without covering them up with what they already knew."

Martin Heidegger modified Husserl's conception of phenomenology because of what Heidegger perceived as Husserl's subjectivist tendencies. Whereas Husserl conceived humans as having been constituted by states of consciousness, Heidegger countered that consciousness is peripheral to the primacy of one's existence (i.e., the mode of being of Dasein), which cannot be reduced to one's consciousness of it. From this angle, one's state of mind is an "effect" rather than a determinant of existence, including those aspects of existence of which one is not conscious. By shifting the center of gravity from consciousness (psychology) to existence (ontology), Heidegger altered the subsequent direction of phenomenology. As one consequence of Heidegger's modification of Husserl's conception, phenomenology became increasingly relevant to psychoanalysis. Whereas Husserl gave priority to a depiction of consciousness that was fundamentally alien to the psychoanalytic conception of the unconscious, Heidegger offered a way to conceptualize experience that could accommodate those aspects of one's existence that lie on the periphery of sentient awareness.

Etymology

Phenomenology has at least three main meanings in philosophical history: one in the writings of G. W. F. Hegel, another in the writings of Edmund Husserl in 1920, and thirdly, succeeding Husserl's work, in the writings of his former research assistant Martin Heidegger in 1927.

- For G. W. F. Hegel, phenomenology is a philosophical (*philosophischen*) and scientific (*wissenschaftliche*) study of phenomena (what presents itself to us in conscious experience) as a means to finally grasp the absolute, logical, ontological and metaphysical Spirit (Absolute Spirit) that is essential to phenomena. This has been called**dialectical phenomenology** (see *Hegelian dialectic*).
- For Edmund Husserl, phenomenology is "the reflective study of the essence of consciousness as experienced from the first-person point of view." Phenomenology takes the intuitive experience of phenomena (whatever presents itself in phenomenological reflexion) as its starting point and tries to extract from it the essential features of experiences and the essence of what we experience. When generalized to the essential features of any possible experience, this has been called**transcendental phenomenology** (see *Varieties*). Husserl's view was based on aspects of the work of Franz Brentano and was developed further by philosophers such as Maurice Merleau-

Ponty, Max Scheler, Edith Stein, Dietrich von Hildebrand and Emmanuel Levinas.

Although the term "phenomenology" was used occasionally in the history of philosophy before Husserl, modern use ties it more explicitly to his particular method.

Following is a list of important thinkers, in rough chronological order, who used the term "phenomenology" in a variety of ways, with brief comments on their contributions:

- Friedrich Christoph Oetinger (1702–1782), Germanpietist, for the study of the "divine system of relations"
- Johann Heinrich Lambert (1728–1777), mathematician, physicist and philosopher, known for the theory of appearances underlying empirical knowledge.
- Immanuel Kant (1724–1804), in the *Critique of Pure Reason*, distinguished between objects as phenomena, which are objects as shaped and grasped by human sensibility and understanding, and objects as *things-in-themselves* or noumena, which do not appear to us in space and time and about which we can make no legitimate judgments.
- G. W. F. Hegel (1770–1831) challenged Kant's doctrine of the unknowable thing-in-itself, and declared that by knowing phenomena more fully we can gradually arrive at a consciousness of the absolute and spiritual truth of Divinity, most notably in his *Phenomenology of Spirit*, published in 1807.

- Carl Stumpf (1848–1936), student of Brentano and mentor to Husserl, used "phenomenology" to refer to an ontology of sensory contents.
- Edmund Husserl (1859–1938) established phenomenology at first as a kind of "descriptive psychology" and later as a transcendental and eidetic science of consciousness. He is considered to be the founder of contemporary phenomenology.
- Max Scheler (1874–1928) developed further the phenomenological method of Edmund Husserl and extended it to include also a reduction of the scientific method. He influenced the thinking of Pope John Paul II, Dietrich von Hildebrand, and Edith Stein.
- Martin Heidegger (1889–1976) criticized Husserl's theory of phenomenology and attempted to develop a theory of ontology that led him to his original theory of Dasein, the non-dualistic human being.
- Alfred Schütz (1899–1959) developed a phenomenology of the social world on the basis of everyday experience that has influenced major sociologists such as Harold Garfinkel, Peter Berger, and Thomas Luckmann.
- Francisco Varela (1946–2001), Chilean philosopher and biologist. Developed the basis for experimental phenomenology and neurophenomenology.

Later usage is mostly based on or (critically) related to Husserl's introduction and use of the term. This branch of philosophy differs from others in that it tends to be more "descriptive" than "prescriptive".

Varieties

The *Encyclopedia of Phenomenology* (Kluwer Academic Publishers, 1997) features separate articles on the following seven types of phenomenology:

- **Transcendental constitutive phenomenology** studies how objects are constituted in transcendental consciousness, setting aside questions of any relation to the natural world.
- **Naturalistic constitutive phenomenology** (see naturalism) studies how consciousness constitutes things in the world of nature, assuming with the natural attitude that consciousness is part of nature.
- Existential phenomenology studies concrete human existence, including our experience of free choice and/or action in concrete situations.
- **Generative historicist phenomenology** (see historicism) studies how meaning—as found in our experience—is generated in historical processes of collective experience over time.
- **Genetic phenomenology** studies the emergence/genesis of meanings of things within one's own stream of experience.
- **Hermeneutical phenomenology** (also **hermeneutic phenomenology** or **post-phenomenology/postphenomenology** elsewhere; see hermeneutics) studies interpretive structures of experience. This approach was introduced in Martin Heidegger's early work.

- Realistic phenomenology (also realist phenomenology elsewhere) studies the structure of consciousness and intentionality as "it occurs in a real world that is largely external to consciousness and not somehow brought into being by consciousness."

The contrast between "constitutive phenomenology" (German: *konstitutive Phänomenologie*; also static phenomenology (*statische Phänomenologie*) or descriptive phenomenology (*beschreibende Phänomenologie*)) and "genetic phenomenology" (*genetische Phänomenologie*; also phenomenology of genesis (*Phänomenologie der Genesis*)) is due to Husserl.

Modern scholarship also recognizes the existence of the following varieties: late Heidegger's transcendental hermeneutic phenomenology (see transcendental philosophy and *a priori*), Maurice Merleau-Ponty'sembodied phenomenology (see embodied cognition), Michel Henry's material phenomenology (also based on embodied cognition), Alva Noë'sanalytic phenomenology (see analytic philosophy), J. L. Austin's linguistic phenomenology (see ordinary language philosophy), and Paul Crowther's post-analytic phenomenology (see postanalytic philosophy).

Concepts

Intentionality

Intentionality refers to the notion that consciousness is always the consciousness *of* something. The word itself should not be confused with the "ordinary" use of the word intentional, but should rather be taken as playing on the etymological roots of

the word. Originally, intention referred to a "stretching out" ("in tension," from Latin *intendere*), and in this context it refers to consciousness "stretching out" towards its object. However, one should be careful with this image: there is not some consciousness first that, subsequently, stretches out to its object; rather, consciousness *occurs as* the simultaneity of a conscious act and its object.

Intentionality is often summed up as "aboutness." Whether this *something* that consciousness is about is in direct perception or in fantasy is inconsequential to the concept of intentionality itself; whatever consciousness is directed at, *that* is what consciousness is conscious of. This means that the object of consciousness doesn't*have* to be a *physical* object apprehended in perception: it can just as well be a fantasy or a memory. Consequently, these "structures" of consciousness, i.e., perception, memory, fantasy, etc., are called*intentionalities*.

The term "intentionality" originated with the Scholastics in the medieval period and was resurrected by Brentano who in turn influenced Husserl's conception of phenomenology, who refined the term and made it the cornerstone of his theory of consciousness. The meaning of the term is complex and depends entirely on how it is conceived by a given philosopher. The term should not be confused with "intention" or the psychoanalytic conception of unconscious "motive" or "gain".

Intuition

Intuition in phenomenology refers to cases where the intentional object is directly present to the intentionality at play; if the intention is "filled" by the direct apprehension of

the object, you have an intuited object. Having a cup of coffee in front of you, for instance, seeing it, feeling it, or even imagining it – these are all filled intentions, and the object is then *intuited*. The same goes for the apprehension of mathematical formulae or a number. If you do not have the object as referred to directly, the object is not intuited, but still intended, but then *emptily*. Examples of empty intentions can be signitive intentions – intentions that only *imply* or *refer to* their objects.

Evidence

In everyday language, we use the word evidence to signify a special sort of relation between a state of affairs and a proposition: State A is evidence for the proposition "A is true." In phenomenology, however, the concept of evidence is meant to signify the "subjective achievement of truth." This is not an attempt to reduce the objective sort of evidence to subjective "opinion," but rather an attempt to describe the structure of having something present in intuition with the addition of having it present as *intelligible*: "Evidence is the successful presentation of an intelligible object, the successful presentation of something whose truth becomes manifest in the evidencing itself."

Noesis and noema

In Husserl's phenomenology, which is quite common, this pair of terms, derived from the Greek *nous* (mind), designate respectively the real content, **noesis**, and the ideal content, noema, of an intentional act (an act of consciousness). The noesis is the part of the act that gives it a particular sense or

character (as in judging or perceiving something, loving or hating it, accepting or rejecting it, and so on). This is real in the sense that it is actually part of what takes place in the consciousness (or psyche) of the subject of the act. The noesisis always correlated with a noema; for Husserl, the full noema is a complex ideal structure comprising at least a noematic sense and a noematic core.

The correct interpretation of what Husserl meant by the noema has long been controversial, but the noematic sense is generally understood as the ideal meaning of the act and the noematic core as the act's referent or object *as it is meant in the act*. One element of controversy is whether this noematic object is the same as the actual object of the act (assuming it exists) or is some kind of ideal object.

Empathy and intersubjectivity

In phenomenology, empathy refers to the experience of one's own body *as* another. While we often identify others with their physical bodies, this type of phenomenology requires that we focus on the subjectivity of the other, as well as our intersubjective engagement with them. In Husserl's original account, this was done by a sort of apperception built on the experiences of your own lived-body.

The lived body is your own body as experienced by yourself, *as* yourself. Your own body manifests itself to you mainly as your possibilities of acting in the world. It is what lets you reach out and grab something, for instance, but it also, and more importantly, allows for the possibility of changing your point of view. This helps you differentiate one thing from another by

the experience of moving around it, seeing new aspects of it (often referred to as making the absent present and the present absent), and still retaining the notion that this is the same thing that you saw other aspects of just a moment ago (it is identical).

Your body is also experienced as a duality, both as object (you can touch your own hand) and as your own subjectivity (you experience being touched).

The experience of your own body as your own subjectivity is then applied to the experience of another's body, which, through apperception, is constituted as another subjectivity. You can thus recognise the Other's intentions, emotions, etc.

This experience of empathy is important in the phenomenological account of intersubjectivity. In phenomenology, intersubjectivity constitutes objectivity (i.e., what you experience as objective is experienced as being intersubjectively available – available to all other subjects. This does not imply that objectivity is reduced to subjectivity nor does it imply a relativist position, cf. for instance intersubjective verifiability).

In the experience of intersubjectivity, one also experiences oneself as being a subject among other subjects, and one experiences oneself as existing objectively *for* these Others; one experiences oneself as the noema of Others' noeses, or as a subject in another's empathic experience. As such, one experiences oneself as objectively existing subjectivity. Intersubjectivity is also a part in the constitution of one's lifeworld, especially as "homeworld."

Lifeworld

The lifeworld (German: *Lebenswelt*) is the "world" each one of us *lives* in. One could call it the "background" or "horizon" of all experience, and it is that on which each object stands out as itself (as different) and with the meaning it can only hold for us. The lifeworld is both personal and intersubjective (it is then called a "homeworld"), and, as such, it does not enclose each one of us in a solus ipse.

Husserl's *Logical Investigations* (1900/1901)

In the first edition of the *Logical Investigations*, still under the influence of Brentano, Husserl describes his position as "descriptive psychology." Husserl analyzes the intentional structures of **mental acts** and how they are directed at both real and ideal objects. The first volume of the *Logical Investigations*, the *Prolegomena to Pure Logic*, begins with a devastating critique of psychologism, i.e., the attempt to subsume the *a priori* validity of the laws of logic under psychology. Husserl establishes a separate field for research in logic, philosophy, and phenomenology, independently from the empirical sciences.

"**Pre-reflective self-consciousness**" is Shaun Gallagher and Dan Zahavi's term for Husserl's (1900/1901) idea that self-consciousness always involves a self-appearance or self-manifestation (German: *Für-sich-selbst-erscheinens*) prior to self-reflection, and his idea that the fact that "an appropriate train of sensations or images is experienced, and is in this

sense conscious, does not and cannot mean that this is the object of an act of consciousness, in the sense that a perception, a presentation or a judgment is directed upon it" (see also Fichte's original insight).

Husserl's *Ideas* (1913)

In 1913, some years after the publication of the *Logical Investigations*, Husserl published *Ideas: General Introduction to Pure Phenomenology*, a work which introduced some key elaborations that led him to the distinction between the act of consciousness (*noesis*) and the phenomena at which it is directed (the *noemata*).

- "noetic" refers to the intentional act of consciousness (believing, willing, etc.)
- "noematic" refers to the object or content (noema), which appears in the noetic acts (the believed, wanted, hated, and loved, etc.).

What we observe is not the object as it is in itself, but how and inasmuch it is given in the intentional acts. Knowledge of essences would only be possible by "bracketing" all assumptions about the existence of an external world and the inessential (subjective) aspects of how the object is concretely given to us. This procedure Husserl called epoché.

Husserl concentrated more on the ideal, essential structures of consciousness. As he wanted to exclude any hypothesis on the existence of external objects, he introduced the method of phenomenological reduction to eliminate them. What was left over was the pure transcendental ego, as opposed to the

concrete empirical ego. Transcendental phenomenology is the study of the essential structures that are left in pure consciousness: this amounts in practice to the study of the noemata and the relations among them.

Transcendental phenomenologists include Oskar Becker, Aron Gurwitsch, and Alfred Schütz.

The philosopher Theodor Adornocriticised Husserl's concept of phenomenological epistemology in his metacritique *Against Epistemology*, which is anti-foundationalist in its stance

Realism

After Husserl's publication of the *Ideas* in 1913, many phenomenologists took a critical stance towards his new theories. Especially the members of the Munich group distanced themselves from his new transcendental phenomenology and preferred the earlier realist phenomenology of the first edition of the *Logical Investigations*.

Realist phenomenologists include Edith Stein, Adolf Reinach, Alexander Pfänder, Johannes Daubert [de], Max Scheler, Roman Ingarden, Nicolai Hartmann, and Dietrich von Hildebrand.

Existentialism

Existential phenomenology differs from transcendental phenomenology by its rejection of the transcendental ego. Merleau-Ponty objects to the ego's transcendence of the world, which for Husserl leaves the world spread out and completely

transparent before the conscious. Heidegger thinks of a conscious being as always already in the world. Transcendence is maintained in existential phenomenology to the extent that the method of phenomenology must take a presuppositionless starting point – transcending claims about the world arising from, for example, natural or scientific attitudes or theories of the ontological nature of the world.

While Husserl thought of philosophy as a scientific discipline that had to be founded on a phenomenology understood as epistemology, Martin Heidegger held a radically different view. Heidegger himself states their differences this way:

For Husserl, the phenomenological reduction is the method of leading phenomenological vision from the natural attitude of the human being whose life is involved in the world of things and persons back to the transcendental life of consciousness and its noetic-noematic experiences, in which objects are constituted as correlates of consciousness. For us, phenomenological reduction means leading phenomenological vision back from the apprehension of a being, whatever may be the character of that apprehension, to the understanding of the Being of this being (projecting upon the way it is unconcealed).

According to Heidegger, philosophy was not at all a scientific discipline, but more fundamental than science itself. According to him science is only one way of knowing the world with no special access to truth. Furthermore, the scientific mindset itself is built on a much more "primordial" foundation of practical, everyday knowledge. Husserl was skeptical of this approach, which he regarded as quasi-mystical, and it contributed to the divergence in their thinking.

Instead of taking phenomenology as *prima philosophia* or a foundational discipline, Heidegger took it as a metaphysical ontology: "*being is the proper and sole theme of philosophy*... this means that philosophy is not a science of beings but of being." Yet to confuse phenomenology and ontology is an obvious error. Phenomena are not the foundation or Ground of Being. Neither are they appearances, for, as Heidegger argues in *Being and Time*, an appearance is "that which shows itself in something else," while a phenomenon is "that which shows itself in itself."

While for Husserl, in the epoché, being appeared only as a correlate of consciousness, for Heidegger being is the starting point. While for Husserl we would have to abstract from all concrete determinations of our empirical ego, to be able to turn to the field of pure consciousness, Heidegger claims that "the possibilities and destinies of philosophy are bound up with man's existence, and thus with temporality and with historicality."

However, ontological being and existential being are different categories, so Heidegger's conflation of these categories is, according to Husserl's view, the root of Heidegger's error. Husserl charged Heidegger with raising the question of ontology but failing to answer it, instead switching the topic to the Dasein, the only being for whom Being is an issue. That is neither ontology nor phenomenology, according to Husserl, but merely abstract anthropology. To clarify, perhaps, by abstract anthropology, as a non-existentialist searching for essences, Husserl rejected the existentialism implicit in Heidegger's distinction between beings qua existents as things in reality and their Being as it unfolds in Dasein's own reflections on its

being-in-the-world, wherein being becomes present to us, that is, is unconcealed. Existential phenomenologists include:Martin Heidegger (1889–1976), Hannah Arendt (1906–1975), Karl Jaspers (1883–1969), Emmanuel Levinas (1906–1995), Gabriel Marcel (1889–1973), Jean-Paul Sartre (1905–1980), Paul Ricoeur (1913–2005) and Maurice Merleau-Ponty (1908–1961).

Eastern thought

Some researchers in phenomenology (in particular in reference to Heidegger's legacy) see possibilities of establishing dialogues with traditions of thought outside of the so-called Western philosophy, particularly with respect to East-Asian thinking, and despite perceived differences between "Eastern" and "Western". Furthermore, it has been claimed that a number of elements within phenomenology (mainly Heidegger's thought) have some resonance with Eastern philosophical ideas, particularly with Zen Buddhism and Taoism. According to TomonobuImamichi, the concept of *Dasein* was inspired – although Heidegger remained silent on this – by OkakuraKakuzo's concept of *das-in-der-Welt-sein* (being in the world) expressed in *The Book of Tea* to describe Zhuangzi's philosophy, which Imamichi's teacher had offered to Heidegger in 1919, after having studied with him the year before.

There are also recent signs of the reception of phenomenology (and Heidegger's thought in particular) within scholarly circles focused on studying the impetus of metaphysics in the history of ideas in Islam and Early Islamic philosophy such as in the works of the Lebanese philosopher Nader El-Bizri; perhaps this is tangentially due to the indirect influence of the tradition of

the French Orientalist and phenomenologist Henri Corbin, and later accentuated through El-Bizri's dialogues with the Polish phenomenologist Anna-Teresa Tymieniecka.

In addition, the work of Jim Ruddy in the field of comparative philosophy, combined the concept of "transcendental ego" in Husserl's phenomenology with the concept of the primacy of self-consciousness in the work of Sankaracharya. In the course of this work, Ruddy uncovered a wholly new eidetic phenomenological science, which he called "convergent phenomenology." This new phenomenology takes over where Husserl left off, and deals with the constitution of relation-like, rather than merely thing-like, or "intentional" objectivity.

Approaches to technology

James Moor has argued that computers show up policy vacuums that require new thinking and the establishment of new policies. Others have argued that the resources provided by classical ethical theory such as utilitarianism, consequentialism and deontological ethics is more than enough to deal with all the ethical issues emerging from our design and use of information technology.

For the phenomenologist the 'impact view' of technology as well as the constructivist view of the technology/society relationships is valid but not adequate (Heidegger 1977, Borgmann 1985, Winograd and Flores 1987, Ihde 1990, Dreyfus 1992, 2001). They argue that these accounts of technology, and the technology/society relationship, posit technology and society as if speaking about the one does not immediately and already draw upon the other for its ongoing

sense or meaning. For the phenomenologist, society and technology co-constitute each other; they are each other's ongoing condition, or possibility for being what they are. For them technology is not just the artifact. Rather, the artifact already emerges from a prior 'technological' attitude towards the world (Heidegger 1977).

Heidegger's

For Heidegger the essence of technology is the way of being of modern humans—a way of conducting themselves towards the world—that sees the world as something to be ordered and shaped in line with projects, intentions and desires—a 'will to power' that manifests itself as a 'will to technology'.

Heidegger claims that there were other times in human history, a pre-modern time, where humans did not orient themselves towards the world in a technological way—simply as resources for our purposes.

However, according to Heidegger this 'pre-technological' age (or mood) is one where humans' relation with the world and artifacts, their way of being disposed, was poetic and aesthetic rather than technological (enframing).

There are many who disagree with Heidegger's account of the modern technological attitude as the 'enframing' of the world. For example, Andrew Feenberg argues that Heidegger's account of modern technology is not borne out in contemporary everyday encounters with technology. Christian Fuchs has written on the anti-Semitism rooted in Heidegger's view of technology.

Dreyfus'

In critiquing the artificial intelligence (AI) programme, Hubert Dreyfus (1992) argues that the way skill development has become understood in the past has been wrong. He argues, this is the model that the early artificial intelligence community uncritically adopted. In opposition to this view, he argues, with Heidegger, that what we observe when we learn a new skill in everyday practice is in fact the opposite. We most often start with explicit rules or preformulated approaches and then move to a multiplicity of particular cases, as we become an expert. His argument draws directly on Heidegger's account in "Being and Time" of humans as beings that are always already situated in-the-world. As humans 'in-the-world', we are already experts at going about everyday life, at dealing with the subtleties of every particular situation; that is why everyday life seems so obvious. Thus, the intricate expertise of everyday activity is forgotten and taken for granted by AI as an assumed starting point. What Dreyfus highlighted in his critique of AI was the fact that technology (AI algorithms) does not make sense by itself. It is the assumed, and forgotten, horizon of everyday practice that makes technological devices and solutions show up as meaningful. If we are to understand technology we need to 'return' to the horizon of meaning that made it show up as the artifacts we need, want and desire. We need to consider how these technologies reveal (or disclose) us.

Ideal language philosophy

Ideal language philosophy is contrasted with ordinary language philosophy. From about 1910 to 1930, analytic philosophers

like Bertrand Russell and Ludwig Wittgenstein emphasized creating an ideal language for philosophical analysis, which would be free from the ambiguities of ordinary language that, in their opinion, often made philosophy invalid. During this phase, Russell and Wittgenstein sought to understand language (and hence philosophical problems) by using formal logic to formalize the way in which philosophical statementsare made. Wittgenstein developed a comprehensive system of logical atomism in his *TractatusLogico-Philosophicus* (German: *Logisch-Philosophische Abhandlung*, 1921). He thereby argued that the universe is the totality of actual states of affairs and that these states of affairs can be expressed by the language of first-order predicate logic. Thus a *picture* of the universe can be construed by means of expressing atomic facts in the form of atomic propositions, and linking them using logical operators.

Chapter 2

Theory of Language

Theory of language is a topic from philosophy of language and theoretical linguistics. It has the goal of answering the questions “What is language?”; "Why do languages have the properties they have?"; or "What is the origin of language?".

Even though much of the research in linguistics is descriptive or prescriptive, there exists an underlying assumption that terminological and methodological choices reflect the researcher's opinion of language. Linguists are divided into different schools of thinking, with the nature–nurture debate as the main divide. Some linguistics conferences and journalsare focussed on a specific theory of language, while others disseminate a variety of views.

Like in other human and social sciences, theories in linguistics can be divided into humanistic and sociobiological approaches. Same terms, for example 'rationalism', 'functionalism', 'formalism' and 'constructionism', are used with different meanings in different contexts.

Humanistic Theories

Humanistic theories consider people as having an agentive role in the social construction of language. Language is primarily seen as a sociocultural phenomenon. This tradition emphasises culture, nurture, creativity and diversity. A classical rationalist approach to language stems from the philosophy Age of Enlightenment. Francisco Sánchez de las Brozas and

Antoine Arnauld believed that people had created language in a step-by-step process to serve their psychological need to communicate with each other. Thus, language is thought of as a rational human invention.

Cultural–historical approaches

During the 19th century, when sociological questions remained under psychology, languages and language changewere thought of as arising from human psychology and the collective unconscious mind of the community, shaped by its history, as argued by Moritz Lazarus, HeymannSteinthal and Wilhelm Wundt. Advocates of Völkerpsychologie ('folk psychology') regarded language as Volksgeist; a social phenomenon conceived as the 'spirit of the nation'.

Wundt claimed that the human mind becomes organised according to the principles of syllogistic reasoning with social progress and education. He argued for a binary-branching model for the description of the mind, and syntax. Folk psychology was imported to North American linguistics by Franz Boas and Leonard Bloomfield who were the founders of a school of thought which was later nicknamed 'American structuralism'.

Folk psychology became associated with German nationalism, and after World War I Bloomfield apparently replaced Wundt's structural psychology with Albert Paul Weiss's behavioral psychology; although Wundtian notions remained elementary for his linguistic analysis. The Bloomfieldian school of linguistics was eventually reformed as a sociobiological approach by Noam Chomsky (see 'generative grammar' below).

Since generative grammar's popularity began to wane towards the end of the 20th century, there has been a new wave of cultural anthropological approaches to the language question sparking a modern debate on the relationship of language and culture. Participants include Daniel Everett, Jesse Prinz, Nicholas Evans and Stephen Levinson.

Structuralism: a sociological–semiotic theory

The study of culture and language developed in a different direction in Europe where Émile Durkheim successfully separated sociology from psychology, thus establishing it as an autonomous science. Ferdinand de Saussure likewise argued for the autonomy of linguistics from psychology. He created a semiotictheory which would eventually give rise to the movement in human sciences known as structuralism, followed by functionalism or functional structuralism, post-structuralism and other similar tendencies. The names structuralism and functionalism are derived from Durkheim's modification of Herbert Spencer'sorganicism which draws an analogy between social structures and the organs of an organism, each necessitated by its function.

Saussure approaches the essence of language from two sides. For the one, he borrows ideas from Steinthal and Durkheim, concluding that language is a 'social fact'. For the other, he creates a theory of language as a system in and for itself which arises from the association of concepts and words or expressions. Thus, language is a dual system of interactive sub-systems: a conceptual system and a system of linguistic forms. Neither of these can exist without the other because, in Saussure's notion, there are no (proper) expressions without

meaning, but also no (organised) meaning without words or expressions. Language as a system does not arise from the physical world, but from the contrast between the concepts, and the contrast between the linguistic forms.

Functionalism: language as a tool for communication

There was a shift of focus in sociology in the 1920s, from structural to functional explanation, or the adaptation of the social 'organism' to its environment. Post-Saussurean linguists, led by the Prague linguistic circle, began to study the functional value of the linguistic structure, with communication taken as the primary function of language in the meaning 'task' or 'purpose'. These notions translated into an increase of interest in pragmatics, with a discourse perspective (the analysis of full texts) added to the multilayered interactive model of structural linguistics. This gave rise to functional linguistics.

Formalism: language as a mathematical–semiotic system

Structural and formal linguistLouis Hjelmslev considered the systemic organisation of the bilateral linguistic system fully mathematical, rejecting the psychological and sociological aspect of linguistics altogether. He considered linguistics as the comparison of the structures of all languages using formal grammars – semantic and discourse structures included. Hjelmslev's idea is sometimes referred to as 'formalism'.

Although generally considered as a structuralist, Lucien Tesnière regarded meaning as giving rise to expression, but not vice versa, at least as regards the relationship between

semantics and syntax. He considered the semantic plane as psychological, but syntax as being based on the necessity to break the two-dimensional semantic representation into linear form.

Post-structuralism: language as a societal tool

The Saussurean idea of language as an interaction of the conceptual system and the expressive system was elaborated in philosophy, anthropology and other fields of human sciences by Claude Lévi-Strauss,

Roland Barthes, Michel Foucault, Jacques Derrida, Julia Kristeva and many others. This movement was interested in the Durkheimian concept of language as a social fact or a rule-based code of conduct; but eventually rejected the structuralist idea that the individual cannot change the norm. Post-structuralists study how language affects our understanding of reality thus serving as a tool of shaping society.

Language as an artificial construct

While the humanistic tradition stemming from 19th century Völkerpsychologieemphasises the unconscious nature of the social construction of language, some perspectives of post-structuralism and social constructionism regard human languages as man-made rather than natural. At this end of the spectrum, structural linguist Eugenio Coşeriu laid emphasis on the intentional construction of language. Daniel Everett has likewise approached the question of language construction from the point of intentionality and free will.

There were also some contacts between structural linguists and the creators of constructed languages. For example, Saussure's brother René de Saussure was an Esperanto activist, and the French functionalist André Martinet served as director of the International Auxiliary Language Association.

Sociobiological theories

In contrast to humanistic linguistics, sociobiological approaches consider language as a biological phenomena. Approaches to language as part of cultural evolution can be roughly divided into two main groups: genetic determinism which argues that languages stem from the human genome; and social Darwinism, as envisioned by August Schleicher and Max Müller, which applies principles and methods of evolutionary biology to linguistics. Because sociobiogical theories have been labelled as chauvinistic in the past, modern approaches, including Dual inheritance theory and memetics, aim to provide more sustainable solutions to the study of biology's role in language.

Language as a genetically inherited phenomenon

Strong version ('rationalism')

The role of genes in language formation has been discussed and studied extensively. Proposing generative grammar, Noam Chomsky argues that language is fully caused by a random genetic mutation, and that linguistics is the study of universal grammar, or the structure in question. Others, including Ray Jackendoff, point out that the innate language component

could be the result of a series of evolutionary adaptations; Steven Pinker argues that, because of these, people are born with a language instinct.

The random and the adaptational approach are sometimes referred to as formalism (or structuralism) and functionalism (or adaptationism), respectively, as a parallel to debates between advocates of structural and functional explanation in biology. Also known asbiolinguistics, the study of linguistic structures is parallelised with that of natural formations such as ferromagnetic droplets and botanic forms. This approach became highly controversial at the end of the 20th century due to a lack of empirical support for genetics as an explanation of linguistic structures.

More recent anthropological research aims to avoid genetic determinism. Behavioural ecology and dual inheritance theory, the study of gene–culture co-evolution, emphasise the role of culture as a human invention in shaping the genes, rather than vice versa. It is known, for example, that since early humans started developing their language, the process paved way for genetic changes that would affect the vocal tract.

Weak version ('empiricism')

Some former generative grammarians argue that genes may nonetheless have an indirect effect on abstract features of language. This makes up yet another approach referred to as 'functionalism' which makes a weaker claim with respect to genetics. Instead of arguing for a specific innate structure, it is suggested that human physiology and neurologicalorganisation may give rise to linguistic phenomena in a more abstract way.

Based on a comparison of structures from multiple languages, John A. Hawkins suggests that the brain, as a syntactic parser, may find it easier to process some word orders than others, thus explaining their prevalence. This theory remains to be confirmed by psycholinguistic studies.

Conceptual metaphor theory from George Lakoff'scognitive linguisticshypothesises that people have inherited from lower animals the ability for deductive reasoning based on visual thinking, which explains why languages make so much use of visual metaphors.

Languages as species

It was thought in early evolutionary biology that languages and speciescan be studied according to the same principles and methods. The idea of languages and cultures as fighting for living space became highly controversial as it was accused of being a pseudoscience that caused two world wars, and social Darwinism was banished from humanities by 1945. In the concepts of Schleicher and Müller, both endorsed by Charles Darwin, languages could be either organisms or populations.

A neo-Darwinian version of this idea was introduced as memetics by Richard Dawkins in 1976. In this thinking, ideas and cultural units, including words, are compared to viruses or replicators. Although meant as a softer alternative to genetic determinism, memetics has been widely discredited as pseudoscience, and it has failed to establish itself as a recognised field of scientific research. The language–species analogy nonetheless continues to enjoy popularity in linguistics and other human sciences. Since the 1990s there

have been numerous attempts to revive it in various guises. As JaminPelkey explains,

"Theorists who explore such analogies usually feel obliged to pin language to some specific sub-domain of biotic growth. William James selects “zoölogical evolution”, William Croft prefers botanical evolution, but most theorists zoom in to more microbiotic levels – some claiming that linguistic phenomena are analogous to the cellular level and others arguing for the genetic level of biotic growth. For others, language is a parasite; for others still, language is a virus ... The disagreements over grounding analogies do not stop here."

Like many other approaches to linguistics, these, too, are collectively called 'functionalism'. They include various frameworks of usage-based linguistics, language as a complex adaptive system, construction grammar, emergent linguistics, and others.

Chapter 3

Cant and Linguistic Relativity

Cant (language)

A cant is the jargon or language of a group, often employed to exclude or mislead people outside the group. It may also be called a cryptolect, argot, anti-language or secret language. Each term differs slightly in meaning; their use is inconsistent.

Terminology

In parts of Connacht in Ireland, *Cant* mainly refers to an auction typically on fair day ("Cantmen and Cantwomen, some from as far away as Dublin, would converge on Mohill on a Fair Day, ... set up their stalls ... and immediately start auctioning off their merchandise") and secondly means talk ("very entertaining conversation was often described as 'great cant'" or "crosstalk").

In Scotland, two unrelated creole languages are termed as "cant". *Scottish Cant* (a mixed language, primarily Scots and Romani with Scottish Gaelic influences) is spoken by Lowland Roma groups. *Highland Traveller's Cant* (or *BeurlaReagaird*) is a Gaelic-based cant of the Indigenous Highland Traveller population. The cants are mutually unintelligible.

The word has also been used as a suffix to coin names for modern-day jargons such as "medicant", a term used to refer to

the type of language employed by members of the medical profession that is largely unintelligible to lay people.

Etymology

There are two main schools of thought on the origin of the word *cant*:

- In linguistics, the derivation is normally seen to be from the Irish word *caint* (older spelling *cainnt*), "speech, talk", or Scottish Gaelic*cainnt*. It is seen to have derived amongst the itinerant groups of people in Ireland and Scotland, who hailed from both Irish/Scottish Gaelic and English-speaking backgrounds, ultimately developing as various creole languages. However, the various types of cant (Scottish/Irish) are mutually unintelligible. The Irish creole variant is simply termed "the Cant". Its speakers from the Irish Traveller community know it as *Gammon*, while the linguistic community identifies it as *Shelta*.
- Outside Gaelic circles, the derivation is normally seen to be from Latin*cantāre*, "to sing", via Norman French*canter*. Within this derivation, the history of the word is seen to originally have referred to the chanting of friars, used in a disparaging way some time between the 12th and 15th centuries. Gradually, the term was applied to the singsong of beggars and eventually a criminal jargon.

Argot

An **argot** (English: /ˈɑːrgoʊ/; from French*argot*[aʁgo] 'slang') is a language used by various groups to prevent outsiders from understanding their conversations. The term *argot*is also used to refer to the informal specialized vocabulary from a particular field of study, occupation, or hobby, in which sense it overlaps with jargon.

In his 1862 novel *Les Misérables*,Victor Hugo refers to that argot as both "the language of the dark" and "the language of misery."

The earliest known record of the term *argot* in this context was in a 1628 document. The word was probably derived from the contemporary name *les argotiers*, given to a group of thieves at that time.

Under the strictest definition, an *argot* is a proper language with its own grammatical system. Such complete secret languages are rare because the speakers usually have some public language in common, on which the argot is largely based. Such argots are lexically divergent forms of a particular language, with a part of its vocabulary replaced by words unknown to the larger public; *argot* used in this sense is synonymous with *cant*. For example, *argot* in this sense is used for systems such as *verlan* and *louchébem*, which retain French syntax and apply transformations only to individual words (and often only to a certain subset of words, such as nouns, or semantic content words). Such systems are examples of *argotsà clef*, or "coded argots".

Specific words can go from argot into common speech or the other way. For example, modern French*loufoque* 'crazy, goofy', now common usage, originates in the *louchébem* transformation of Fr. *fou* 'crazy'.

In the field of medicine, physicianshave been said to have their own spoken argot, cant or slang, which incorporates commonly understood abbreviations and acronyms, frequently used technical colloquialisms, and much everyday professional slang (that may or may not be institutionally or geographically localized). While many of these colloquialisms may prove impenetrable to most lay people, few seem to be specifically designed to conceal meaning from patients (perhaps because standard medical terminology would usually suffice anyway).

Anti-language

The concept of the **anti-language**was first defined and studied by the linguist Michael Halliday, who used the term to describe the lingua franca of an anti-society. He defined an **anti-language** as a language created and used by an anti-society. An anti-society is a small, separate community intentionally created within a larger society as an alternative to or resistance of it. For example, Adam Podgorecki studied one anti-society composed of Polish prisoners; BhaktiprasadMallik of Sanskrit College studied another composed of criminals in Calcutta.

Anti-languages are developed by these societies as a means to prevent outsiders from understanding their communication, and as a manner of establishing a subculture that meets the needs of their alternative social structure. Anti-languages

differ from slang and jargon in that they are used solely among ostracized social groups including prisoners, criminals, homosexuals, and teenagers. Anti-languages use the same basic vocabulary and grammar as their native language in an unorthodox fashion. For example, anti-languages borrow words from other languages, create unconventional compounds, or utilize new suffixes for existing words. Anti-languages may also change words using metathesis, back formation (e.g. apple to elppa), or by substituting their consonants. Therefore, anti-languages are distinct and unique, and are not simply dialects of existing languages.

In his essay "Anti-Language", Halliday synthesized the research of Thomas Harman, Adam Podgórecki, and BhaktiprasadMallik to explore anti-languages and the connection between verbal communication and the maintenance of social structure. For this reason, the study of anti-languages is both a study of sociology and linguistics. Halliday's findings can be compiled as a list of nine criteria that a language must meet to be considered an anti-language:

- An anti-society is a society which is set up within another society as a conscious alternative to it.
- Like the early records of the languages of exotic cultures, the information usually comes to us in the form of word lists.
- The simplest form taken by an anti-language is that of new words for old: it is a language relexicalised.
- The principle is that of same grammar, different vocabulary.
- Effective communication depends on exchanging meanings which are inaccessible to the layperson.

- The anti-language is not just an optional extra, it is the fundamental element in the existence of the “second life” phenomenon.
- The most important vehicle of reality-maintenance is conversation. All who employ this same form of communication are reality-maintaining others.
- The anti-language is a vehicle of resocialisation.
- There is continuity between language and anti-language.

Examples of anti-languages include Cockney rhyming slang, CB slang, verlan, the *grypsera* of Polish prisons, thieves' cant, Polari, and possibly Bangime.

In popular culture

Anti-languages are sometimes created by authors and used by characters in novels. These anti-languages do not have complete lexicons, cannot be observed in use for linguistic description, and therefore cannot be studied in the same way that a language that is actually spoken by an existing anti-society would. However, they are still used in the study of anti-languages. Roger Fowler's "Anti-Languages in Fiction" analyzes Anthony Burgess's *A Clockwork Orange* and William S. Burroughs' *Naked Lunch* to redefine the nature of the anti-language and to describe its ideological purpose.

A Clockwork Orange is a popular example of a novel in which the main character is a teenage boy who speaks an anti-language called Nadsat. This language is often referred to as an argot, but it has been argued that it is an anti-language

because of the social structure that it maintains through the social class of the droogs.

Examples

- Adurgari, from Afghanistan
- Agbirigba, from Nigeria
- Äynu, from China
- Back slang, from London, United Kingdom
- Banjački, from Serbia
- Barallete, from Galicia, Spain
- Bargoens, from the Netherlands
- Bron from León and Asturias, Spain
- BeurlaReagaird, a Gaelic-based cant used by Highland Traveller community in Scotland
- Boontling from California
- Caló (Chicano), from the US/Mexican border
- Cockney Rhyming Slang, from London, United Kingdom
- Engsh, from Kenya
- Fala dos arxinas, from Galicia, Spain
- Fenya from Russia
- Gacería, from Spain
- Gayle language, from South African gay culture
- Gender transposition
- Germanía, from Spain
- Grypsera, from Poland
- Gumuțeasca, from Romania
- Gyaru-moji, from Japan

- Hijra Farsi, from South Asia, used by the *hijra* and *kothi* subcultures (traditional indigenous approximate analogues to LGBT subcultures)
- IsiNgqumo, from South Africa and Zimbabwe
- Javanais, from France
- Jejemon from the Philippines
- Joual from Quebec French
- Klezmer-loshn, from Eastern Europe
- Leet (or *1337 speak*), from internet culture
- Louchébem, from France
- Lunfardo, from Argentina and Uruguay
- Martian language, to replace Chinese characters
- Meshterski, from Bulgaria
- Miguxês, from the emo, hipster subcultures of young netizens in Brazil
- Minderico, a sociolect or a secret language traditionally spoken by tailors and traders in the freguesia (civil parish) of Minde, Portugal.
- Nadsat, a fictional argot
- Nihali, from India
- Nyōbōkotoba, from Japan
- Padonkaffsky jargon (or Olbanian) from Runet, Russia
- Pig Latin
- Pitkernese
- Podaná, from Greece
- Pajubá, from Brazil a dialect of the gay subculture that uses African or African sounding words as slang, heavily borrowed from the Afro-Brazilian religions
- Polari, a general term for a diverse but unrelated groups of dialects used by actors, circus and

fairground showmen, gay subculture, criminal underworld (criminals, prostitutes).

- Rotvælsk, from Denmark
- Rotwelsch, from Germany
- Rövarspråket, from Sweden
- Šatrovački, from the former Yugoslavia
- Scottish Cant a variant of Scots and Romani used by the Lowland Romani people in Scotland, United Kingdom
- Shelta, from the Irish traveller community in Ireland
- Sheng from Kenya
- Spasell, from Italy
- Swardspeak (or Bekimon, or Bekinese), from the Philippines
- Thieves' cant (or peddler's French, or St Giles' Greek), from the United Kingdom
- Totoiana, from Romania
- Tsotsitaal, from South Africa
- Tutnese, from the United States
- Verlan, from France
- Xíriga, from Asturias, Spain
- Zargari, from Iran

Thieves' cant

The thieves' cant was a feature of popular pamphlets and plays particularly between 1590 and 1615, but continued to feature in literature through the 18th century. There are questions about how genuinely the literature reflected vernacular use in the criminal underworld. A thief in 1839 claimed that the cant he had seen in print was nothing like the cant then used by gypsies, thieves and beggars. He also said that each of these

used distinct vocabularies, which overlapped, the gypsies having a cant word for everything, and the beggars using a lower style than the thieves.

Ulti

Ulti is a language studied and documented by BhaktiprasadMallik in his book *Languages of the Underworld of West Bengal.*Ulti is an anti-language derived from Bengali and used by criminals and affiliates. The Ulti word *kodān* 'shop' is derived from rearranging the letters in the Bengali word *dokān*, which also means 'shop'.

Linguistic relativity

The hypothesis of linguistic relativity, also known as the Sapir–Whorf hypothesis/səˌpɪərˈwɔːrf/, the Whorf hypothesis, or Whorfianism, is a principle suggesting that the structure of a language affects its speakers' worldview or cognition, and thus people's perceptions are relative to their spoken language.

Linguistic relativity has been understood in many different, often contradictory ways throughout its history. The idea is often stated in two forms: the *strong hypothesis*, now referred to as linguistic determinism, was held by some of the early linguists before World War II, while the *weak hypothesis* is mostly held by some of the modern linguists.

- The *strong* version, or *linguistic determinism*, says that language *determines* thought and that linguistic categories limit and determine cognitive categories.

This version is generally agreed to be false by modern linguists.

- The *weak* version says that linguistic categories and usage only *influence* thought and decisions. Research on weaker forms has produced positive empirical evidence for a relationship.

The term "Sapir–Whorf hypothesis" is considered a misnomer by linguists for several reasons: Edward Sapir and Benjamin Lee Whorf never co-authored any works, and never stated their ideas in terms of a hypothesis. The distinction between a weak and a strong version of this hypothesis is also a later invention; Sapir and Whorf never set up such a dichotomy, although often their writings and their views of this relativity principle are phrased in stronger or weaker terms.

The principle of linguistic relativity and the relation between language and thought has also received attention in varying academic fields from philosophy to psychology and anthropology, and it has also inspired and colored works of fiction and the invention of constructed languages.

History

The idea was first clearly expressed by 19th-century thinkers, such as Wilhelm von Humboldt and Johann Gottfried Herder who saw language as the expression of the spirit of a nation. Members of the early 20th-century school of American anthropology headed by Franz Boas and Edward Sapiralso embraced forms of the idea to a certain extent, including in a 1928 meeting of the Linguistic Society of America, but Sapir in particular, wrote more often against than in favor of anything

like linguistic determinism. Sapir's student, Benjamin Lee Whorf, came to be seen as the primary proponent as a result of his published observations of how he perceived linguistic differences to have consequences in human cognition and behavior.

Harry Hoijer, another of Sapir's students, introduced the term "Sapir–Whorf hypothesis", even though the two scholars never formally advanced any such hypothesis. A strong version of relativist theory was developed from the late 1920s by the German linguist Leo Weisgerber. Whorf's principle of linguistic relativity was reformulated as a testable hypothesis by Roger Brown and Eric Lenneberg who conducted experiments designed to find out whether color perception varies between speakers of languages that classified colors differently.

As the study of the universal nature of human language and cognition came into focus in the 1960s the idea of linguistic relativity fell out of favor among linguists. From the late 1980s, a new school of linguistic relativity scholars has examined the effects of differences in linguistic categorization on cognition, finding broad support for non-deterministic versions of the hypothesis in experimental contexts. Some effects of linguistic relativity have been shown in several semantic domains, although they are generally weak. Currently, a balanced view of linguistic relativity is espoused by most linguists holding that language influences certain kinds of cognitive processes in non-trivial ways, but that other processes are better seen as arising from connectionist factors. Research is focused on exploring the ways and extent to which language influences thought.

Ancient philosophy to the Enlightenment

The idea that language and thought are intertwined is ancient. Plato argued against sophist thinkers such as Gorgias of Leontini, who held that the physical world cannot be experienced except through language; this made the question of truth dependent on aesthetic preferences or functional consequences.

Plato held instead that the world consisted of eternal ideas and that language should reflect these ideas as accurately as possible. Following Plato, St. Augustine, for example, held the view that language was merely labels applied to already existing concepts. This view remained prevalent throughout the Middle Ages. Roger Bacon held the opinion that language was but a veil covering up eternal truths, hiding them from human experience. For Immanuel Kant, language was but one of several tools used by humans to experience the world.

German Romantic philosophers

In the late 18th and early 19th centuries, the idea of the existence of different national characters, or *Volksgeister*, of different ethnic groups was the moving force behind the German romantics school and the beginning ideologies of ethnic nationalism.

Swedish philosopher Emanuel Swedenborg inspired several of the German Romantics. As early as 1749, he alludes to something along the lines of linguistic relativity in commenting on a passage in the table of nations in the book of Genesis:

"Everyone according to his language, according to their families, as to their nations." [Genesis 10:5] This signifies that these were according to the genius of each; "according to their language," according to the opinion of each.... "Language," in its inner meaning, signifies opinion, thus principles and persuasions. This is because there is a correspondence of the language with the intellectual part of man, or with his thought, like that of an effect with its cause.

In 1771 he spelled this out more explicitly:

- There is a common genius prevailing among those who are subject to one king, and who consequently are under one constitutional law. Germany is divided into more governments than the neighboring kingdoms.... However, a common genius prevails everywhere among people speaking the same language.

Johann Georg Hamannis often suggested to be the first among the actual German Romantics to speak of the concept of "the genius of a language." In his "Essay Concerning an Academic Question", Hamann suggests that a people's language affects their worldview:

- The lineaments of their language will thus correspond to the direction of their mentality.

In 1820, Wilhelm von Humboldt connected the study of language to the national romanticist program by proposing the view that language is the fabric of thought. Thoughts are produced as a kind of internal dialog using the same grammar as the thinker's native language. This view was part of a larger

picture in which the world view of an ethnic nation, their "Weltanschauung", was seen as being faithfully reflected in the grammar of their language. Von Humboldt argued that languages with an inflectionalmorphological type, such as German, English and the other Indo-European languages, were the most perfect languages and that accordingly this explained the dominance of their speakers over the speakers of less perfect languages. Wilhelm von Humboldt declared in 1820:

The diversity of languages is not a diversity of signs and sounds but a diversity of views of the world.

In Humboldt's humanistic understanding of linguistics, each language creates the individual's worldview in its particular way through its lexical and grammatical categories, conceptual organization, and syntactic models.

Herder worked alongside Hamann to establish the idea of whether or not language had a human/rational or a divine origin. Herder added the emotional component of the hypothesis and Humboldt then took this information and applied to various languages to expand on the hypothesis.

Boas and Sapir

The idea that some languages are superior to others and that lesser languages maintained their speakers in intellectual poverty was widespread in the early 20th century. American linguist William Dwight Whitney, for example, actively strove to eradicate Native American languages, arguing that their speakers were savages and would be better off learning English and adopting a "civilized" way of life. The first anthropologist and linguist to challenge this view was Franz Boas. While

undertaking geographical research in northern Canada he became fascinated with the Inuit people and decided to become an ethnographer.

Boas stressed the equal worth of all cultures and languages, that there was no such thing as a primitive language and that all languages were capable of expressing the same content, albeit by widely differing means. Boas saw language as an inseparable part of culture and he was among the first to require of ethnographers to learn the native language of the culture under study and to document verbal culture such as myths and legends in the original language.

Boas:

- It does not seem likely [...] that there is any direct relation between the culture of a tribe and the language they speak, except in so far as the form of the language will be moulded by the state of the culture, but not in so far as a certain state of the culture is conditioned by the morphological traits of the language."

Boas' student Edward Sapir reached back to the Humboldtian idea that languages contained the key to understanding the world views of peoples.

He espoused the viewpoint that because of the differences in the grammatical systems of languages no two languages were similar enough to allow for perfect cross-translation. Sapir also thought because language represented reality differently, it followed that the speakers of different languages would perceive reality differently.

Sapir:

- No two languages are ever sufficiently similar to be considered as representing the same social reality. The worlds in which different societies live are distinct worlds, not merely the same world with different labels attached.

On the other hand, Sapir explicitly rejected strong linguistic determinism by stating, "It would be naïve to imagine that any analysis of experience is dependent on pattern expressed in language."

Sapir was explicit that the connections between language and culture were neither thoroughgoing nor particularly deep, if they existed at all:

- It is easy to show that language and culture are not intrinsically associated. Totally unrelated languages share in one culture; closely related languages—even a single language—belong to distinct culture spheres. There are many excellent examples in Aboriginal America. The Athabaskan languages form as clearly unified, as structurally specialized, a group as any that I know of. The speakers of these languages belong to four distinct culture areas... The cultural adaptability of the Athabaskan-speaking peoples is in the strangest contrast to the inaccessibility to foreign influences of the languages themselves.

Sapir offered similar observations about speakers of so-called "world" or "modern" languages, noting, "possession of a

common language is still and will continue to be a smoother of the way to a mutual understanding between England and America, but it is very clear that other factors, some of them rapidly cumulative, are working powerfully to counteract this leveling influence. A common language cannot indefinitely set the seal on a common culture when the geographical, physical, and economics determinants of the culture are no longer the same throughout the area."

While Sapir never made a point of studying directly how languages affected thought, some notion of (probably "weak") linguistic relativity underlay his basic understanding of language, and would be taken up by Whorf.

Independent developments in Europe

Drawing on influences such as Humboldt and Friedrich Nietzsche, some European thinkers developed ideas similar to those of Sapir and Whorf, generally working in isolation from each other. Prominent in Germany from the late 1920s through into the 1960s were the strongly relativist theories of Leo Weisgerber and his key concept of a 'linguistic inter-world', mediating between external reality and the forms of a given language, in ways peculiar to that language. Russian psychologist Lev Vygotsky read Sapir's work and experimentally studied the ways in which the development of concepts in children was influenced by structures given in language. His 1934 work "*Thought and Language*" has been compared to Whorf's and taken as mutually supportive evidence of language's influence on cognition. Drawing on Nietzsche's ideas of perspectivismAlfred Korzybski developed the theory of general semantics that has been compared to

Whorf's notions of linguistic relativity. Though influential in their own right, this work has not been influential in the debate on linguistic relativity, which has tended to center on the American paradigm exemplified by Sapir and Whorf.

Benjamin Lee Whorf

More than any linguist, Benjamin Lee Whorf has become associated with what he called the "linguistic relativity principle". Studying Native American languages, he attempted to account for the ways in which grammatical systems and language-use differences affected perception. Whorf's opinions regarding the nature of the relation between language and thought remain under contention. Critics such as Lenneberg, Black, and Pinker attribute to Whorf a strong linguistic determinism, while Lucy, Silverstein and Levinson point to Whorf's explicit rejections of determinism, and where he contends that translation and commensuration are possible.

Detractors such as Lenneberg, Chomsky and Pinker criticized him for insufficient clarity in his description of how language influences thought, and for not proving his conjectures. Most of his arguments were in the form of anecdotes and speculations that served as attempts to show how "exotic" grammatical traits were connected to what were apparently equally exotic worlds of thought. In Whorf's words:

We dissect nature along lines laid down by our native language. The categories and types that we isolate from the world of phenomena we do not find there because they stare every observer in the face; on the contrary, the world is presented in a kaleidoscope flux of impressions which has to

be organized by our minds—and this means largely by the linguistic systems of our minds. We cut nature up, organize it into concepts, and ascribe significances as we do, largely because we are parties to an agreement to organize it in this way—an agreement that holds throughout our speech community and is codified in the patterns of our language [...] all observers are not led by the same physical evidence to the same picture of the universe, unless their linguistic backgrounds are similar, or can in some way be calibrated.

Among Whorf's best-known examples of linguistic relativity are instances where an indigenous language has several terms for a concept that is only described with one word in European languages (Whorf used the acronym SAE "Standard Average European" to allude to the rather similar grammatical structures of the well-studied European languages in contrast to the greater diversity of less-studied languages).

One of Whorf's examples was the supposedly large number of words for 'snow' in the Inuit language, an example which later was contested as a misrepresentation.

Another is the Hopi language's words for water, one indicating drinking water in a container and another indicating a natural body of water. These examples of polysemy served the double purpose of showing that indigenous languages sometimes made more fine grained semantic distinctions than European languages and that direct translation between two languages, even of seemingly basic concepts such as snow or water, is not always possible.

Another example is from Whorf's experience as a chemical engineer working for an insurance company as a fire inspector.

While inspecting a chemical plant he observed that the plant had two storage rooms for gasoline barrels, one for the full barrels and one for the empty ones. He further noticed that while no employees smoked cigarettes in the room for full barrels, no-one minded smoking in the room with empty barrels, although this was potentially much more dangerous because of the highly flammable vapors still in the barrels. He concluded that the use of the word *empty* in connection to the barrels had led the workers to unconsciously regard them as harmless, although consciously they were probably aware of the risk of explosion.

This example was later criticized by Lenneberg as not actually demonstrating causality between the use of the word *empty* and the action of smoking, but instead was an example of circular reasoning. Pinker in *The Language Instinct* ridiculed this example, claiming that this was a failing of human insight rather than language.

Whorf's most elaborate argument for linguistic relativity regarded what he believed to be a fundamental difference in the understanding of time as a conceptual category among the Hopi. He argued that in contrast to English and other SAE languages, Hopi does not treat the flow of time as a sequence of distinct, countable instances, like "three days" or "five years," but rather as a single process and that consequently it has no nouns referring to units of time as SAE speakers understand them. He proposed that this view of time was fundamental to Hopi culture and explained certain Hopi behavioral patterns. Malotki later claimed that he had found no evidence of Whorf's claims in 1980's era speakers, nor in historical documents dating back to the arrival of Europeans.

Malotki used evidence from archaeological data, calendars, historical documents, modern speech and concluded that there was no evidence that Hopi conceptualize time in the way Whorf suggested. Universalist scholars such as Pinker often see Malotki's study as a final refutation of Whorf's claim about Hopi, whereas relativist scholars such as Lucy and Penny Lee criticized Malotki's study for mischaracterizing Whorf's claims and for forcing Hopi grammar into a model of analysis that doesn't fit the data.

Whorf's argument about Hopi speakers' conceptualization about time is an example of the structure-centered approach to research into linguistic relativity, which Lucy identified as one of three main strands of research in the field. The "structure-centered" approach starts with a language's structural peculiarity and examines its possible ramifications for thought and behavior.

The defining example is Whorf's observation of discrepancies between the grammar of time expressions in Hopi and English. More recent research in this vein is Lucy's research describing how usage of the categories of grammatical number and of numeral classifiers in the Mayan languageYucatec result in Mayan speakers classifying objects according to material rather than to shape as preferred by English speakers.

Whorf died in 1941 at age 44, leaving multiple unpublished papers. His line of thought was continued by linguists and anthropologists such as Hoijer and Lee, who both continued investigations into the effect of language on habitual thought, and Trager, who prepared a number of Whorf's papers for posthumous publishing. The most important event for the

dissemination of Whorf's ideas to a larger public was the publication in 1956 of his major writings on the topic of linguistic relativity in a single volume titled *Language, Thought and Reality*.

Brown and Lenneberg

In 1953, Eric Lenneberg criticized Whorf's examples from an objectivist view of language holding that languages are principally meant to represent events in the real world and that even though languages express these ideas in various ways, the meanings of such expressions and therefore the thoughts of the speaker are equivalent. He argued that Whorf's English descriptions of a Hopi speaker's view of time were in fact translations of the Hopi concept into English, therefore disproving linguistic relativity. However Whorf was concerned with how the habitual *use* of language influences habitual behavior, rather than translatability. Whorf's point was that while English speakers may be able to *understand* how a Hopi speaker thinks, they do not *think* in that way.

Lenneberg's main criticism of Whorf's works was that he never showed the connection between a linguistic phenomenon and a mental phenomenon. With Brown, Lenneberg proposed that proving such a connection required directly matching linguistic phenomena with behavior. They assessed linguistic relativity experimentally and published their findings in 1954.

Since neither Sapir nor Whorf had ever stated a formal hypothesis, Brown and Lenneberg formulated their own. Their two tenets were (i) "the world is differently experienced and conceived in different linguistic communities" and (ii)

"language causes a particular cognitive structure". Brown later developed them into the so-called "weak" and "strong" formulation:

- Structural differences between language systems will, in general, be paralleled by nonlinguistic cognitive differences, of an unspecified sort, in the native speakers of the language.
- The structure of anyone's native language strongly influences or fully determines the worldview he will acquire as he learns the language.

Brown's formulations became widely known and were retrospectively attributed to Whorf and Sapir although the second formulation, verging on linguistic determinism, was never advanced by either of them.

Joshua Fishman's "Whorfianism of the third kind"

Joshua Fishman argued that Whorf's true position was largely overlooked. In 1978, he suggested that Whorf was a "neo-Herderian champion" and in 1982, he proposed "Whorfianism of the third kind" in an attempt to refocus linguists' attention on what he claimed was Whorf's real interest, namely the intrinsic value of "little peoples" and "little languages". Whorf had criticized Ogden's Basic English thus:

But to restrict thinking to the patterns merely of English [...] is to lose a power of thought which, once lost, can never be regained. It is the 'plainest' English which contains the greatest number of unconscious assumptions about nature. [...] We handle even our plain English with much greater effect if we direct it from the vantage point of a multilingual

awareness. Where Brown's weak version of the linguistic relativity hypothesis proposes that language *influences* thought and the strong version that language *determines* thought, Fishman's "Whorfianism of the third kind" proposes that language *is a key to culture*.

Rethinking Linguistic Relativity

The publication of the 1996 anthology *Rethinking Linguistic Relativity* edited by Gumperz and Levinson began a new period of linguistic relativity studies that focused on cognitive and social aspects. The book included studies on the linguistic relativity and universalist traditions. Levinson documented significant linguistic relativity effects in the linguistic conceptualization of spatial categories between languages. For example, men speaking the GuuguYimithirr language in Queensland gave accurate navigation instructions using a compass-like system of north, south, east and west, along with a hand gesture pointing to the starting direction.

Lucy defines this approach as “domain-centered,” because researchers select a semantic domain and compare it across linguistic and cultural groups. Space is another semantic domain that has proven fruitful for linguistic relativity studies. Spatial categories vary greatly across languages. Speakers rely on the linguistic conceptualization of space in performing many ordinary tasks. Levinson and others reported three basic spatial categorizations. While many languages use combinations of them, some languages exhibit only one type and related behaviors. For example, Yimithirr only uses absolute directions when describing spatial relations— the position of everything is described by using the cardinal

directions. Speakers define a location as "north of the house", while an English speaker may use relative positions, saying "in front of the house" or "to the left of the house".

Separate studies by Bowerman and Slobin treated the role of language in cognitive processes. Bowerman showed that certain cognitive processes did not use language to any significant extent and therefore could not be subject to linguistic relativity. Slobin described another kind of cognitive process that he named "thinking for speaking" – the kind of process in which perceptional data and other kinds of prelinguistic cognition are translated into linguistic terms for communication. These, Slobin argues, are the kinds of cognitive process that are at the root of linguistic relativity.

Color terminology

Since Brown and Lenneberg believed that the objective reality denoted by language was the same for speakers of all languages, they decided to test how different languages codified the same message differently and whether differences in codification could be proven to affect behavior. Brown and Lenneberg designed experiments involving the codification of colors. In their first experiment, they investigated whether it was easier for speakers of English to remember color shades for which they had a specific name than to remember colors that were not as easily definable by words. This allowed them to compare the linguistic categorization directly to a non-linguistic task. In a later experiment, speakers of two languages that categorize colors differently (English and Zuni) were asked to recognize colors. In this way, it could be determined whether the differing color categories of the two

speakers would determine their ability to recognize nuances within color categories. Brown and Lenneberg found that Zuñi speakers who classify green and blue together as a single color did have trouble recognizing and remembering nuances within the green/blue category. This approach, which Lucy would later classify as domain-centered, is acknowledged to be sub-optimal, because color perception, unlike other semantic domains, is hardwired into the neural system and as such is subject to more universal restrictions than other semantic domains.

Brown and Lenneberg's study began a tradition of investigation of linguistic relativity through color terminology. The studies showed a correlation between color term numbers and ease of recall in both Zuni and English speakers. Researchers attributed this to focal colors having higher codability than less focal colors, and not with linguistic relativity effects. Berlin/Kay found universal typological color principles that are determined by biological rather than linguistic factors. This study sparked studies into typological universals of color terminology. Researchers such as Lucy, Saunders and Levinson argued that Berlin and Kay's study does not refute linguistic relativity in color naming, because of unsupported assumptions in their study (such as whether all cultures in fact have a clearly defined category of "color") and because of related data problems. Researchers such as Maclaury continued investigation into color naming. Like Berlin and Kay, Maclaury concluded that the domain is governed mostly by physical-biological universals.

Studies by Berlin and Kay continued Lenneberg's color research. They studied color terminology formation and showed

clear universal trends in color naming. For example, they found that even though languages have different color terminologies, they generally recognize certain hues as more focal than others.

They showed that in languages with few color terms, it is predictable from the number of terms which hues are chosen as focal colors, for example, languages with only three color terms always have the focal colors black, white and red. The fact that what had been believed to be random differences between color naming in different languages could be shown to follow universal patterns was seen as a powerful argument against linguistic relativity. Berlin and Kay's research has since been criticized by relativists such as Lucy, who argued that Berlin and Kay's conclusions were skewed by their insistence that color terms encode only color information. This, Lucy argues, made them blind to the instances in which color terms provided other information that might be considered examples of linguistic relativity.

Universalism

Universalist scholars ushered in a period of dissent from ideas about linguistic relativity. Lenneberg was one of the first cognitive scientists to begin development of the Universalist theory of language that was formulated by Chomsky as Universal Grammar, effectively arguing that all languages share the same underlying structure. The Chomskyanschool also holds the belief that linguistic structures are largely innate and that what are perceived as differences between specific languages are surface phenomena that do not affect the brain's universal cognitive processes. This theory became

the dominant paradigm in American linguistics from the 1960s through the 1980s, while linguistic relativity became the object of ridicule.

Other universalist researchers dedicated themselves to dispelling other aspects of linguistic relativity, often attacking Whorf's specific points and examples. For example, Malotki's monumental study of time expressions in Hopi presented many examples that challenged Whorf's "timeless" interpretation of Hopi language and culture, but seemingly failed to address linguistic relativist argument actually posed by Whorf (i.e. that the understanding of time by native Hopi speakers differed from that of speakers of European languages due to the differences in the organization and construction of their respective languages; Whorf never claimed that Hopi speakers lacked any concept of time).Malotki himself acknowledges that the conceptualizations are different, but because he ignores Whorf's use of scare quotes around the word "time" and the qualifier "what we call," takes Whorf to be arguing that the Hopi have no concept of time at all.

Today many followers of the universalist school of thought still oppose linguistic relativity. For example, Pinker argues in *The Language Instinct* that thought is independent of language, that language is itself meaningless in any fundamental way to human thought, and that human beings do not even think in "natural" language, i.e. any language that we actually communicate in; rather, we think in a meta-language, preceding any natural language, called "mentalese." Pinker attacks what he calls "Whorf's radical position," declaring, "the more you examine Whorf's arguments, the less sense they make."

Pinker and other universalists have been accused by relativists of misrepresenting Whorf's views and arguing against strawmen.

Cognitive linguistics

In the late 1980s and early 1990s, advances in cognitive psychology and cognitive linguistics renewed interest in the Sapir–Whorf hypothesis. One of those who adopted a more Whorfian approach was George Lakoff. He argued that language is often used metaphorically and that languages use different cultural metaphors that reveal something about how speakers of that language think.

For example, English employs conceptual metaphors likening time with money, so that time can be saved and spent and invested, whereas other languages do not talk about time in that way. Other such metaphors are common to many languages because they are based on general human experience, for example, metaphors associating *up* with *good* and *bad* with *down*. Lakoff also argued that metaphor plays an important part in political debates such as the "right to life" or the "right to choose"; or "illegal aliens" or "undocumented workers".

Parameters

In his book *Women, Fire and Dangerous Things: What Categories Reveal About the Mind*, Lakoff reappraised linguistic relativity and especially Whorf's views about how linguistic categorization reflects and/or influences mental categories. He concluded that the debate had been confused. He described

four parameters on which researchers differed in their opinions about what constitutes linguistic relativity:

- The degree and depth of linguistic relativity. Perhaps a few examples of superficial differences in language and associated behavior are enough to demonstrate the existence of linguistic relativity. Alternatively, perhaps only deep differences that permeate the linguistic and cultural system suffice.
- Whether conceptual systems are absolute or whether they can evolve
- Whether the similarity criterion is translatability or the use of linguistic expressions
- Whether the focus of linguistic relativity is in language or in the brain

Lakoff concluded that many of Whorf's critics had criticized him using novel definitions of linguistic relativity, rendering their criticisms moot.

Refinements

Researchers such as Boroditsky, Majid, Lucy and Levinson believe that language influences thought in more limited ways than the broadest early claims. Researchers examine the interface between thought (or cognition), language and culture and describe the relevant influences. They use experimental data to back up their conclusions. Kay ultimately concluded that "[the] Whorf hypothesis is supported in the right visual field but not the left". His findings show that accounting for brain lateralization offers another perspective.

Behavior-centered research

Recent studies have also taken the "behavior centered" approach, which starts by comparing behavior across linguistic groups and then searches for causes for that behavior in the linguistic system. In an early example of this approach, Whorf attributed the occurrence of fires at a chemical plant to the workers' use of the word 'empty' to describe the barrels containing only explosive vapors.

More recently, Bloom noticed that speakers of Chinese had unexpected difficulties answering counter-factual questions posed to them in a questionnaire. He concluded that this was related to the way in which counter-factuality is marked grammatically in Chinese. Other researchers attributed this result to Bloom's flawed translations. Strømnes examined why Finnish factories had a higher occurrence of work related accidents than similar Swedish ones. He concluded that cognitive differences between the grammatical usage of Swedish prepositions and Finnish cases could have caused Swedish factories to pay more attention to the work process while Finnish factory organizers paid more attention to the individual worker.

Everett's work on the Pirahã language of the BrazilianAmazon found several peculiarities that he interpreted as corresponding to linguistically rare features, such as a lack of numbers and color terms in the way those are otherwise defined and the absence of certain types of clauses. Everett's conclusions were met with skepticism from universalists who claimed that the linguistic deficit is explained by the lack of need for such concepts.

Recent research with non-linguistic experiments in languages with different grammatical properties (e.g., languages with and without numeral classifiers or with different gender grammar systems) showed that language differences in human categorization are due to such differences. Experimental research suggests that this linguistic influence on thought diminishes over time, as when speakers of one language are exposed to another.

A study published by the American Psychological Association's Journal of Experimental Psychology claimed that language can influence how one estimates time. The study focused on three groups, those who spoke only Swedish, those who spoke only Spanish and bilingual speakers who spoke both of those languages. Swedish speakers describe time using distance terms like "long" or "short" while Spanish speakers do it using quantity related terms like "a lot" or "little". The researchers asked the participants to estimate how much time had passed while watching a line growing across a screen, or a container being filled, or both. The researchers stated that "When reproducing duration, Swedish speakers were misled by stimulus length, and Spanish speakers were misled by stimulus size/quantity." When the bilinguals were prompted with the word "duración" (the Spanish word for duration) they based their time estimates of how full the containers were, ignoring the growing lines. When prompted with the word "tid" (the Swedish word for duration) they estimated the time elapsed solely by the distance the lines had traveled.

Kashima & Kashima showed that people living in countries where spoken languages often drop pronouns (such as Japanese) tend to have more collectivistic values than those

who use non–pronoun drop languages such as English. They argued that the explicit reference to “you” and “I” reminds speakers the distinction between the self and other.

Psycholinguistic research

Psycholinguistic studies explored motion perception, emotion perception, object representation and memory. The gold standard of psycholinguistic studies on linguistic relativity is now finding non-linguistic cognitive differences in speakers of different languages (thus rendering inapplicable Pinker's criticism that linguistic relativity is "circular").

Recent work with bilingual speakers attempts to distinguish the effects of language from those of culture on bilingual cognition including perceptions of time, space, motion, colors and emotion. Researchers described differences between bilinguals and monolinguals in perception of color, representations of time and other elements of cognition.

One experiment found that speakers of languages without numbers greater than two had difficulty counting the number of taps, for example, making more errors distinguishing between six and seven taps. Presumably this is because they could not track the taps using numbers repeated in the phonological loop.

Other domains

Linguistic relativity inspired others to consider whether thought could be influenced by manipulating language.

Science and philosophy

The question bears on philosophical, psychological, linguistic and anthropological questions.

A major question is whether human psychological faculties are mostly innate or whether they are mostly a result of learning, and hence subject to cultural and social processes such as language. The innate view holds that humans share the same set of basic faculties, and that variability due to cultural differences is less important and that the human mind is a mostly biological construction, so that all humans sharing the same neurological configuration can be expected to have similar cognitive patterns.

Multiple alternatives have advocates. The contrary constructivist position holds that human faculties and concepts are largely influenced by socially constructed and learned categories, without many biological restrictions. Another variant is idealist, which holds that human mental capacities are generally unrestricted by biological-material strictures.

Another is essentialist, which holds that essential differences may influence the ways individuals or groups experience and conceptualize the world. Yet another is relativist (Cultural relativism), which sees different cultural groups as employing different conceptual schemes that are not necessarily compatible or commensurable, nor more or less in accord with external reality.

Another debate considers whether thought is a form of internal speech or is independent of and prior to language.

In the philosophy of language the question addresses the relations between language, knowledge and the external world, and the concept of truth. Philosophers such as Putnam, Fodor, Davidson, and Dennett see language as representing directly entities from the objective world and that categorization reflect that world. Other philosophers (e.g. Quine, Searle, and Foucault) argue that categorization and conceptualization is subjective and arbitrary.

Another question is whether language is a tool for representing and referring to objects in the world, or whether it is a system used to construct mental representations that can be communicated.

Therapy and self-development

Sapir/Whorf contemporary Alfred Korzybski was independently developing his theory of general semantics, which was aimed at using language's influence on thinking to maximize human cognitive abilities. Korzybski's thinking was influenced by logical philosophy such as Russell and Whitehead's*Principia Mathematica* and Wittgenstein's *TractatusLogico-Philosophicus*. Although Korzybski was not aware of Sapir and Whorf's writings, the movement was followed by Whorf-admirer Stuart Chase, who fused Whorf's interest in cultural-linguistic variation with Korzybski's programme in his popular work "*The Tyranny of Words*". S. I. Hayakawa was a follower and popularizer of Korzybski's work, writing *Language in Thought and Action*. The general semantics movement influenced the development of neuro-linguistic programming (NLP), another therapeutic technique that seeks to use awareness of language use to influence cognitive patterns.

Korzybski independently described a "strong" version of the hypothesis of linguistic relativity.

We do not realize what tremendous power the structure of an habitual language has. It is not an exaggeration to say that it enslaves us through the mechanism of s[emantic] r[eactions] and that the structure which a language exhibits, and impresses upon us unconsciously, is automatically projected upon the world around us.

— *Korzybski (1930)*

Artificial languages

In their fiction, authors such as Ayn Rand and George Orwell explored how linguistic relativity might be exploited for political purposes. In Rand's *Anthem*, a fictive communist society removed the possibility of individualism by removing the word "I" from the language. In Orwell's *1984* the authoritarian state created the language Newspeak to make it impossible for people to think critically about the government, or even to contemplate that they might be impoverished or oppressed, by reducing the number of words to reduce the thought of the locutor.

Others have been fascinated by the possibilities of creating new languages that could enable new, and perhaps better, ways of thinking. Examples of such languages designed to explore the human mind include Loglan, explicitly designed by James Cooke Brown to test the linguistic relativity hypothesis, by experimenting whether it would make its speakers think more logically. Speakers of Lojban, an evolution of Loglan, report that they feel speaking the language enhances their

ability for logical thinking. Suzette Haden Elgin, who was involved in the early development of neuro-linguistic programming, invented the language Láadan to explore linguistic relativity by making it easier to express what Elgin considered the female worldview, as opposed to Standard Average European languages which she considered to convey a "male centered" world view. John Quijada's language Ithkuilwas designed to explore the limits of the number of cognitive categories a language can keep its speakers aware of at once. Similarly, Sonja Lang's Toki Ponawas developed according to a Taoistpoint of view for exploring how (or if) such a language would direct human thought.

Programming languages

APL programming language originator Kenneth E. Iverson believed that the Sapir–Whorf hypothesis applied to computer languages (without actually mentioning it by name). His Turing Award lecture, "Notation as a Tool of Thought", was devoted to this theme, arguing that more powerful notations aided thinking about computer algorithms.

The essays of Paul Graham explore similar themes, such as a conceptual hierarchy of computer languages, with more expressive and succinct languages at the top. Thus, the so-called *blub* paradox (after a hypothetical programming language of average complexity called *Blub*) says that anyone preferentially using some particular programming language will *know* that it is more powerful than some, but not that it is less powerful than others. The reason is that *writing* in some language means *thinking* in that language. Hence the paradox, because typically programmers are "satisfied with whatever

language they happen to use, because it dictates the way they think about programs".

In a 2003 presentation at an open source convention, Yukihiro Matsumoto, creator of the programming languageRuby, said that one of his inspirations for developing the language was the science fiction novel *Babel-17*, based on the Sapir–Whorf Hypothesis.

In popular culture

Ted Chiang's short story "Story of Your Life" developed the concept of the Sapir–Whorf hypothesis as applied to an alien species which visits Earth. The aliens' biology contributes to their spoken and written languages, which are distinct. In the 2016 American film *Arrival*, based on Chiang's short story, the Sapir–Whorf hypothesis is the premise. The protagonist explains that "the Sapir–Whorf hypothesis is the theory that the language you speak determines how you think".

In his science fiction novel *The Languages of Pao* the author Jack Vance describes how specialized languages are a major part of a strategy to create specific classes in a society, to enable the population to withstand occupation and develop itself.

In the Samuel R. Delany science fiction novel, "Babel-17," the author describes a highly advanced, information-dense language that can be used as a weapon. Learning it turns one into an unwilling traitor as it alters perception and thought.

The Totalitarian regime depicted in George Orwell's *Nineteen Eighty Four* in effect acts on the basis of the Sapir–Whorf

hypothesis, seeking to replace English with *Newspeak*, a language constructed specifically with the intention that thoughts subversive of the regime cannot be expressed in it, and therefore people educated to speak and think in it would not have such thoughts.

Chapter 4

Truth-bearer, Proposition and Use–mention Distinction

Truth-bearer

A truth-bearer is an entity that is said to be either true or false and nothing else. The thesis that some things are true while others are false has led to different theories about the nature of these entities. Since there is divergence of opinion on the matter, the term *truth-bearer*is used to be neutral among the various theories. Truth-bearer candidates include propositions, sentences, sentence-tokens, statements, beliefs, thoughts, intuitions, utterances, and judgements but different authors exclude one or more of these, deny their existence, argue that they are true only in a derivative sense, assert or assume that the terms are synonymous, or seek to avoid addressing their distinction or do not clarify it.

Introduction

Some distinctions and terminology as used in this article, based on Wolfram 1989 (Chapter 2 Section1) follow. *It should be understood that the terminology described is not always used in the ways set out, and it is introduced solely for the purposes of discussion in this article.* Use is made of the type–token and use–mention distinctions. Reflection on occurrences of numerals might be helpful. In grammar a sentence can be a declaration, an explanation, a question, a command. In logic a

declarative sentence is considered to be a sentence that can be used to communicate truth. Some sentences which are grammatically declarative are not logically so.

A character is a typographic character (printed or written) etc.

A word-token is a pattern of characters. A word-type is an identical pattern of characters. A meaningful-word-token is a meaningful word-token. Two word-tokens which mean the sameare of the same word-meaning

A sentence-token is a pattern of word-tokens. A meaningful-sentence-token is a meaningful sentence-token or a meaningful pattern of meaningful-word-tokens. Two sentence-tokens are of the same sentence-type if they are identical patterns of word-tokens characters A declarative-sentence-token is a sentence-token which that can be used to communicate truth or convey information. A meaningful-declarative-sentence-token is a meaningful declarative-sentence-token Two meaningful-declarative-sentence-tokens are of the same meaningful-declarative-sentence-type if they are identical patterns of word-tokens. A nonsense-declarative-sentence-token is a declarative-sentence-token which is not a meaningful-declarative-sentence-token. A meaningful-declarative-sentence-token-use occurs when and only when a meaningful-declarative-sentence-token is used declaratively.

A referring-expression is expression that can be used to pick out or refer to particular entity. A referential success is a referring-expression's success in identifying a particular entity. A referential failure is a referring-expression's failure to identify a particular entity. A referentially-successful-meaningful-declarative-sentence-token-use is a meaningful-

declarative-sentence-token-use containing no referring-expression that fails to identify a particular entity.

Sentences in natural languages

As Aristotle pointed out, since some sentences are questions, commands, or meaningless, not all can be truth-bearers. If in the proposal "What makes the sentence *Snow is white* true is the fact that snow is white" it is assumed that **sentences** like *Snow is white* are truth-bearers, then it would be more clearly stated as "What makes the meaningful-declarative-sentence *Snow is white* true is the fact that snow is white".

Theory 1a:

- All and only meaningful-declarative-sentence-**types** are truth-bearers

Criticisms of theory 1a

Some meaningful-declarative-sentence-**types** will be both truth and false, contrary to our definition of truth-bearer, for example, (i) in liar-paradox sentences such as "This sentence is false", (see Fisher 2008) (ii) and in time, place, and person-dependent sentences such as "It is noon", "This is London", and "I'm Spartacus".

Anyone may ..ascribe truth and falsity to the deterministic propositional signs we here call utterances. But if he takes this line, he must, like Leibniz, recognise that truth cannot be an affair solely of actual utterances, since it makes sense to talk of

the discovery of previously un-formulated truths. (Kneale, W&M (1962))

Revision to Theory 1a, by making a distinction between type and token.

To escape the time, place and person dependent criticism the theory can be revised, making use or the type–token distinction, as follows

Theory 1b:

- All and only meaningful-declarative-sentence-tokens are truth-bearers

Quine argued that the **primary** truth-bearers are utterances

Having now recognised in a general way that what are true are sentences, we must turn to certain refinements. What are best seen as primarily true or false are not sentences but events of utterances. If a man utters the words 'It is raining' in the rain, or the words 'I am hungry' while hungry, his verbal performance counts as true. Obviously one utterance of a sentence may be true and another utterance of the same sentence be false.

Source: Quine 1970, page 13

Criticisms of theory 1b

(i) Theory 1b prevents sentences which are meaningful-declarative-sentence-types from being truth-bearers. If all meaningful-declarative-sentence-types typographically

identical to "The whole is greater than the part" are true then it surely follows that the meaningful-declarative-sentence-type "The whole is greater than the part" is true (just as all meaningful-declarative-sentence-tokens typographically identical to "The whole is greater than the part" are English entails the meaningful-declarative-sentence-types "The whole is greater than the part" is English) (ii) Some meaningful-declarative-sentences-tokens will be both truth and false, or neither, contrary to our definition of truth-bearer. E.g. A token, t, of the meaningful-declarative-sentence-type ‘P: I'm Spartacus’, written on a placard.

The token t would be true when used by Spartacus, false when used by Bertrand Russell, neither true nor false when mentioned by Spartacus or when being neither used nor mentioned.

Theory 1b.1

All meaningful-declarative-sentence-token-uses are truth-bearers; some meaningful-declarative-sentence-types are truth-bearers

To allow that at least some meaningful-declarative-sentence-types can be truth-bearers, Quine allowed so-called "eternal sentences" to be truth-bearers.

In Peirces's terminology, utterances and inscriptions are *tokens* of the sentence or other linguistic expression concerned; and this linguistic expression is the *type* of those utterances and inscriptions. In Frege's terminology, truth and falsity are the two *truth values*. Succinctly then, an eternal sentence is a sentence whose tokens have the same truth

values.... What are best regarded as true and false are not propositions but sentence tokens, or sentences if they are eternal

Quine 1970 pages 13–14

Theory 1c

All and only meaningful-declarative-sentence-token-uses are truth-bearers

Arguments for theory 1c

By respecting the use–mention distinction, Theory 1c avoids criticism (ii) of Theory 1b.

Criticisms of theory 1c

(i) Theory 1c does not avoid criticism (i) of Theory 1b. (ii) meaningful-declarative-sentence-token-uses are events (located in particular positions in time and space) and entail a user. This implies that (a) nothing (no truth-bearer) exists and hence nothing (no truth-bearer) is true (or false) anytime anywhere (b) nothing (no truth-bearer) exists and hence nothing (no truth-bearer) is true (or false) in the absence of a user.

This implies that (a) nothing was true before the evolution of users capable of using meaningful-declarative-sentence-tokens and (b) nothing is true (or false) accept when being used (asserted) by a user. Intuitively the truth (or falsity) of 'The tree continues to be in the quad' continues in the absence of an agent to asset it.

Referential Failure A problem of some antiquity is the status of sentences such as U: The King of France is bald V: The highest prime has no factors W: Pegasus did not exist Such sentences purport to refer to entitles which do not exist (or do not always exist). They are said to suffer from referential failure. We are obliged to choose either (a) That they are not truth-bearers and consequently neither true nor false or (b) That they are truth-bearers and per se are either true or false.

Theory 1d

All and only referentially-successful-meaningful-declarative-sentence-token-uses are truth-bearers.

Theory 1d takes option (a) above by declaring that meaningful-declarative-sentence-token-uses that fail referentially are not truth-bearers.

Theory 1e

All referentially-successful-meaningful-declarative-sentence-token-uses are truth-bearers; some meaningful-declarative-sentence-types are truth-bearers

Arguments for theory 1e

Theory 1e has the same advantages as Theory 1d. Theory 1e allows for the existence of truth-bearers (i.e., meaningful-declarative-sentence-types) in the absence of users and between uses. If for any x, where x is a use of a referentially successful token of a meaningful-declarative-sentence-type y x is a truth-bearer then y is a truth-bearer otherwise y is not a truth bearer. E.g. If all uses of all referentially successful

tokens of the meaningful-declarative-sentence-type 'The whole is greater than the part' are truth-bearers (i.e. true or false) then the meaningful-declarative-sentence-type 'The whole is greater than the part' is a truth-bearer.

If some but not all uses of some referentially successful tokens of the meaningful-declarative-sentence-type 'I am Spartacus' are true then the meaningful-declarative-sentence-type 'I am Spartacus' is not a truth-bearer.

Criticisms of theory 1e

Theory 1e makes implicit use of the concept of an agent or user capable of using (i.e. asserting) a referentially-successful-meaningful-declarative-sentence-token.

Although Theory 1e does not depend on the actual existence (now, in the past or in the future) of such users, it does depend on the possibility and cogency of their existence.

Consequently, the concept of truth-bearer under Theory 1e is dependent upon giving an account of the concept of a 'user'. In so far as referentially-successful-meaningful-declarative-sentence-tokens are particulars (locatable in time and space) the definition of truth-bearer just in terms of referentially-successful-meaningful-declarative-sentence is attractive to those who are (or would like to be) nominalists.

The introduction of 'use' and 'users' threatens the introduction of intentions, attitudes, minds &c. as less-than welcome ontological baggage.

Sentences in languages of classical logic

In classical logic a sentence in a language is true or false under (and only under) an interpretation and is therefore a truth-bearer. For example, a language in the first-order predicate calculus might include one or more predicate symbols and one or more individual constants and one or more variables. The interpretation of such a language would define a domain (universe of discourse); assign an element of the domain to each individual constant; assign the denotation in the domain of some property to each unary (one-place) predicate symbol.

For example, if a language L consisted in the individual constant *a*, two unary predicate letters *F* and *G* and the variable *x*, then an interpretation I of L might define the Domain D as animals, assign Socrates to *a*, the denotation of the property being a man to *F*, and the denotation of the property being mortal to *G*. Under the interpretation I of L, *Fa* would be true if, and only if Socrates is a man, and the sentence *x(Fx Gx)* would be true if, and only if all men (in the domain) are mortal. In some texts an interpretation is said to give "meaning" to the symbols of the language. Since *Fa* has the value true under some (but not all) interpretations, it is not the sentence-type *Fa* which is said to be true but only some sentence-tokens of *Fa* under particular interpretations. A token of *Fa* without an interpretation is neither true nor false. Some sentences of a language like L are said to be true under

all interpretations of the sentence, e.g. *x(Fx Fx)*, such sentences are termed logical truths, but again such sentences are neither true nor false in the absence of an interpretation.

Propositions

A number of authors use the term **proposition** as truth-bearers. There is no single definition or usage.

Sometimes it is used to mean a *meaningful declarative sentence* itself; sometimes it is used to mean **the meaning of** a meaningful declarative sentence.

This provides two possible definitions for the purposes of discussion as below

Theory 2a:

All and only meaningful-declarative-sentences are propositions

Theory 2b:

A meaningful-declarative-sentence-token expresses a proposition; two meaningful-declarative-sentence-tokens which have the same meaning express the same proposition; two meaningful-declarative-sentence-tokens with different meanings express different propositions.

(cf Wolfram 1989, p. 21)

Proposition is not always used in one or other of these ways.

Criticisms of theory 2a.

- If all and only meaningful-declarative-sentences **are** propositions, as advanced by Theory 2a, then the terms are synonymous and we can just as well speak of the meaningful-declarative-sentences themselves as the trutbearers - there is no distinct concept of proposition to consider, and the term *proposition* is literally redundant.

Criticisms of Theory 2b

- Theory 2b entails that if all meaningful-declarative-sentence-tokens typographically identical to say, "I am Spartacus" have the same meaning then they (i) express the same proposition (ii) that proposition is both true and false, contrary to the definition of truth-bearer.
- The concept of a proposition in this theory rests upon the concept of meaning as applied to meaningful-declarative-sentences, in a word **synonymy** among meaningful-declarative-sentence s. Quine 1970 argues that the concept of synonymy among meaningful-declarative-sentences cannot be sustained or made clear, consequently the concepts of "propositions" and "meanings of sentences" are, in effect, vacuous and superfluous

Statements

Many authors consider *statements* as truth-bearers, though as with the term "proposition" there is divergence in definition

and usage of that term. Sometimes 'statements' are taken to be meaningful-declarative-sentences; sometimes they are thought to be what is asserted by a meaningful-declarative-sentence.

It is not always clear in which sense the word is used.

This provides two possible definitions for the purposes of discussion as below.

A particular concept of a statement was introduced by Strawson in the 1950s.,

Consider the following:

- I: The author of Waverley is dead
- J: The author of Ivanhoe is dead
- K: I am less than six feet tall
- L: I am over six feet tall
- M: The conductor is a bachelor
- N: The conductor is married

On the assumption that the same person wrote Waverley and Ivanhoe, the two distinct patterns of characters (meaningful-declarative-sentences) I and J make the same statement but express different propositions.

The pairs of meaningful-declarative-sentences (K, L) & (M, N) have different meanings, but they are not necessarily contradictory, since K & L may have been asserted by different people, and M & N may have been asserted about different conductors.

What these examples show is that we cannot identify that which is true or false (the statement) with the sentence used in making it; for the same sentence may be used to make different statements, some of them true and some of them false. (Strawson, P.F. (1952))

This suggests:

- Two meaningful-declarative-sentence-tokens which say the same thing of the same object(s) make the same statement.

Theory 3a

All and only statements are meaningful-declarative-sentences.

Theory 3b

All and only meaningful-declarative-sentences can be used to make statements

*Statement*is not always used in one or other of these ways.

Arguments for theory 3a

- "All and only statements are meaningful-declarative-sentences." is either a stipulative definition or a descriptive definition. If the former, the stipulation is useful or it is not; if the latter, either the descriptive definition correctly describes English usage or it does not. In either case no arguments, as such, are applicable

Criticisms of theory 3a

- If the term *statement* is synonymous with the term *meaningful-declarative-sentence*, then the applicable criticisms are the same as those outlined under sentence below
- If all and only meaningful-declarative-sentences **are** statements, as advanced by Theory 3a, then the terms are synonymous and we can just as well speak of the meaningful-declarative-sentences themselves as the truth-bearers – there is no distinct concept of statement to consider, and the term *statement* is literally redundant.

Thoughts

Frege (1919) argued that an indicative sentence in which we communicate or state something, contains both a thought and an assertion, it expresses the thought, and the thought is the sense of the sentence.

Proposition

In logic and linguistics, a **proposition** is the meaning of a declarative sentence. In philosophy, "meaning" is understood to be a non-linguistic entity which is shared by all sentences with the same meaning.

Equivalently, a proposition is the non-linguistic bearer of truth or falsity which makes any sentence that expresses it either true or false.

While the term "proposition" may sometimes be used in everyday language to refer to a linguistic statement which can be either true or false, the technical philosophical term, which differs from the mathematical usage, refers exclusively to the non-linguistic meaning behind the statement. The term is often used very broadly and can also refer to various related concepts, both in the history of philosophy and in contemporary analytic philosophy. It can generally be used to refer to some or all of the following: The primary bearers of truth values (such as "true" and "false"); the objects of belief and other propositional attitudes (i.e. what is believed, doubted, etc.); the referents of "that"-clauses (e.g. "It is true *that the sky is blue*" and "I believe *that the sky is blue*" both involve the proposition *the sky is blue*); and the meanings of declarative sentences.

Since propositions are defined as the sharable objects of attitudes and the primary bearers of truth and falsity, this means that the term "proposition" does not refer to particular thoughts or particular utterances (which are not sharable across different instances), nor does it refer to concrete events or facts (which cannot be false). Propositional logic deals primarily with propositions and logical relations between them.

Historical usage

By Aristotle

Aristotelian logic identifies a categorical proposition as a sentence which affirms or denies a predicate of a subject, optionally with the help of a copula. An Aristotelian

proposition may take the form of "All men are mortal" or "Socrates is a man." In the first example, the subject is "men", predicate is "mortal" and copula is "are", while in the second example, the subject is "Socrates", the predicate is "a man" and copula is "is".

By the logical positivists

Often, propositions are related to closed formulae (or logical sentence) to distinguish them from what is expressed by an open formula. In this sense, propositions are "statements" that are truth-bearers.

This conception of a proposition was supported by the philosophical school of logical positivism.

Some philosophers argue that some (or all) kinds of speech or actions besides the declarative ones also have propositional content. For example, yes–no questions present propositions, being inquiries into the truth value of them. On the other hand, some signs can be declarative assertions of propositions, without forming a sentence nor even being linguistic (e.g. traffic signs convey definite meaning which is either true or false).

Propositions are also spoken of as the content of beliefs and similar intentional attitudes, such as desires, preferences, and hopes. For example, "I desire *that I have a new car*," or "I wonder *whether it will snow*" (or, whether it is the case that "it will snow"). Desire, belief, doubt, and so on, are thus called propositional attitudes when they take this sort of content.

By Russell

Bertrand Russell held that propositions were structured entities with objects and properties as constituents. One important difference between Ludwig Wittgenstein's view (according to which a proposition is the set of possible worlds/states of affairs in which it is true) is that on the Russellian account, two propositions that are true in all the same states of affairs can still be differentiated. For instance, the proposition "two plus two equals four" is distinct on a Russellian account from the proposition "three plus three equals six". If propositions are sets of possible worlds, however, then all mathematical truths (and all other necessary truths) are the same set (the set of all possible worlds).

Relation to the mind

In relation to the mind, propositions are discussed primarily as they fit into propositional attitudes. Propositional attitudes are simply attitudes characteristic of folk psychology (belief, desire, etc.) that one can take toward a proposition (e.g. 'it is raining,' 'snow is white,' etc.). In English, propositions usually follow folk psychological attitudes by a "that clause" (e.g. "Jane believes *that* it is raining"). In philosophy of mind and psychology, mental states are often taken to primarily consist in propositional attitudes. The propositions are usually said to be the "mental content" of the attitude. For example, if Jane has a mental state of believing that it is raining, her mental content is the proposition 'it is raining.' Furthermore, since such mental states are *about* something (namely, propositions), they are said to be intentional mental states.

Explaining the relation of propositions to the mind is especially difficult for non-mentalist views of propositions, such as those of the logical positivists and Russell described above, and Frege's view that propositions are Platonist entities, that is, existing in an abstract, non-physical realm. So some recent views of propositions have taken them to be mental. Although propositions cannot be particular thoughts since those are not shareable, they could be types of cognitive events or properties of thoughts (which could be the same across different thinkers).

Philosophical debates surrounding propositions as they relate to propositional attitudes have also recently centered on whether they are internal or external to the agent, or whether they are mind-dependent or mind-independent entities. For more, see the entry on internalism and externalism in philosophy of mind.

Treatment in logic

As noted above, in Aristotelian logic a proposition is a particular kind of sentence (a declarative sentence) that affirms or denies a predicate of a subject, optionally with the help of a copula. Aristotelian propositions take forms like "All men are mortal" and "Socrates is a man."

Propositions show up in modern formal logic as sentences of a formal language. A formal language begins with different types of symbols. These types can include variables, operators, function symbols, predicate (or relation) symbols, quantifiers, and propositional constants. (Grouping symbols such as delimitersare often added for convenience in using the

language, but do not play a logical role.) Symbols are concatenated together according to recursive rules, in order to construct strings to which truth-values will be assigned. The rules specify how the operators, function and predicate symbols, and quantifiers are to be concatenated with other strings. A proposition is then a string with a specific form. The form that a proposition takes depends on the type of logic.

The type of logic called propositional, sentential, or statement logic includes only operators and propositional constants as symbols in its language.

The propositions in this language are propositional constants, which are considered atomic propositions, and composite (or compound) propositions, which are composed by recursively applying operators to propositions. *Application* here is simply a short way of saying that the corresponding concatenation rule has been applied.

The types of logics called predicate, quantificational, or *n*-order logic include variables, operators, predicate and function symbols, and quantifiers as symbols in their languages. The propositions in these logics are more complex. First, one typically starts by defining a term as follows:

- A variable, or
- A function symbol applied to the number of terms required by the function symbol's arity.

For example, if + is a binary function symbol and x, y, and z are variables, then $x+(y+z)$ is a term, which might be written with the symbols in various orders. Once a term is defined, a proposition can then be defined as follows:

- A predicate symbol applied to the number of terms required by its arity, or
- An operator applied to the number of propositions required by its arity, or
- A quantifier applied to a proposition.

For example, if = is a binary predicate symbol and $\forall$ is a quantifier, then $\forall x,y,z\ [(x = y) \rightarrow (x+z = y+z)]$ is a proposition. This more complex structure of propositions allows these logics to make finer distinctions between inferences, i.e., to have greater expressive power.

In this context, propositions are also called sentences, statements, statement forms, formulas, and well-formed formulas, though these terms are usually not synonymous within a single text. This definition treats propositions as syntactic objects, as opposed to semantic or mental objects. That is, propositions in this sense are meaningless, formal, abstract objects. They are assigned meaning and truth-values by mappings called interpretations and valuations, respectively.

In mathematics, propositions are often constructed and interpreted in a way similar to that in predicate logic—albeit in a more informal way. For example. anaxiom can be conceived as a proposition in the loose sense of the word, though the term is usually used to refer to a proven mathematical statement whose importance is generally neutral by nature. Other similar terms in this category include:

- Theorem (a proven mathematical statement of notable importance)

- Lemma (a proven mathematical statement whose importance is derived from the theorem it aims to prove)
- Corollary (a proven mathematical statement whose truth readily follows from a theorem).

Propositions are calledstructured propositions if they have constituents, in some broad sense.

Assuming a structured view of propositions, one can distinguish between singular propositions (also Russellian propositions, named after Bertrand Russell) which are about a particular individual, general propositions, which are not about any particular individual, and particularized propositions, which are about a particular individual but do not contain that individual as a constituent.

Objections to propositions

Attempts to provide a workable definition of proposition include the following:

- Two meaningful declarative sentences express the same proposition, if and only if they mean the same thing.

which defines *proposition* in terms of synonymity. For example, "Snow is white" (in English) and "Schneeistweiß" (in German) are different sentences, but they say the same thing, so they express the same proposition. Another definition of proposition is:

Two meaningful declarative sentence-tokens express the same proposition, if and only if they mean the same thing.

Unfortunately, the above definitions can result in two identical sentences/sentence-tokens appearing to have the same meaning, and thus expressing the same proposition and yet having different truth-values, as in "I am Spartacus" said by Spartacus and said by John Smith, and "It is Wednesday" said on a Wednesday and on a Thursday.

These examples reflect the problem of ambiguity in common language, resulting in a mistaken equivalence of the statements. “I am Spartacus” spoken by Spartacus is the declaration that the individual speaking is called Spartacus and it is true. When spoken by John Smith, it is a declaration about a different speaker and it is false. The term “I” means different things, so “I am Spartacus” means different things.

A related problem is when identical sentences have the same truth-value, yet express different propositions. The sentence “I am a philosopher” could have been spoken by both Socrates and Plato. In both instances, the statement is true, but means something different.

These problems are addressed in predicate logic by using a variable for the problematic term, so that “X is a philosopher” can have Socrates or Plato substituted for X, illustrating that “Socrates is a philosopher” and “Plato is a philosopher” are different propositions. Similarly, “I am Spartacus” becomes “X is Spartacus”, where X is replaced with terms representing the individuals Spartacus and John Smith.

In other words, the example problems can be averted if sentences are formulated with sufficient precision, that their terms have unambiguous meanings.

A number of philosophers and linguists claim that all definitions of a proposition are too vague to be useful. For them, it is just a misleading concept that should be removed from philosophy and semantics.

W. V. Quine, who granted the existence of sets in mathematics, maintained that the indeterminacy of translation prevented any meaningful discussion of propositions, and that they should be discarded in favor of sentences. Strawson, on the other hand, advocated for the use of the term "statement".

Use–mention Distinction

The use–mention distinction is a foundational concept of analytic philosophy, according to which it is necessary to make a distinction between *using* a word (or phrase) and *mentioning* it, and many philosophical works have been "vitiated by a failure to distinguish use and mention". The distinction can sometimes be pedantic, especially in simple cases where it is obvious.

The distinction between use and mention can be illustrated for the word *cheese*:

- *Use*: Cheese is derived from milk.
- *Mention*: 'Cheese' is derived from the Old English word *ċēse*.

The first sentence is a statement about the substance called "cheese": it *uses* the word 'cheese' to refer to that substance. The second is a statement about the word 'cheese' as a signifier: it *mentions* the word without *using* it to refer to anything other than itself.

Grammar

In written language, mentioned words or phrases often appear between single or double quotation marks (as in "The name 'Chicago' contains three vowels") or in italics (as in "When I say *honey*, I mean the sweet stuff that bees make"). In philosophy, single quotation marks are typically used, while in other fields (such as linguistics) italics are much more common. Style authorities such as *Strunk and White* insist that mentioned words or phrases must always be made visually distinct in this manner. On the other hand, used words or phrases (much more common than mentioned ones) do not bear any typographic markings. In spoken language, or in absence of the use of stylistic cues such as quotation marks or italics in written language, the audience must identify mentioned words or phrases through semantic and pragmatic cues.

If quotation marks are used, it is sometimes customary to distinguish between the quotation marks used for speech and those used for mentioned words, with double quotes in one place and single in the other:

- When Larry said, "That has three letters," he was referring to the word 'bee.'
- With reference to 'bumbershoot,' Peter explained that "The term refers to an umbrella."

A few authorities recommend against using different types of quotation marks for speech and mentioned words and recommend one style of quotation mark to be used for both purposes.

In philosophy

The general phenomenon of a term's having different references in different contexts was called *suppositio* (substitution) by medieval logicians. It describes how one has to substitute a term in a sentence based on its meaning—that is, based on the term's referent. In general, a term can be used in several ways. For nouns, they are the following:

- Properly with a *concrete and real referent*: "That is my *pig*" (assuming it exists). (personal supposition)
- Properly with a *concrete but unreal referent*: "Santa Claus's pig is very big." (also personal supposition)
- Properly with a *generic referent*: "Any *pig* breathes air." (simple supposition)
- Improperly by way of *metaphor*: "Your grandfather is a *pig*". (improper supposition)
- As a *pure term*: "*'Pig'* has only three letters". (material supposition)

The last sentence contains a mention example.

The use–mention distinction is especially important in analytic philosophy. Failure to properly distinguish use from mention can produce false, misleading, or meaningless statements or category errors. For example, the following sentences correctly distinguish between use and mention:

- 'Copper' contains six letters, and is not a metal.
- Copper is a metal, and contains no letters.

The first sentence, a mention example, is a statement about the word 'copper' and not the chemical element. The word is composed of six letters, but not any kind of metal or other tangible thing. The second sentence, a use example, is a statement about the chemical element copper and not the word itself. The element is composed of 29 electrons and protons and a number of neutrons, but not any letters.

StanisławLeśniewski was perhaps the first to make widespread use of this distinction and the fallacy that arises from overlooking it, seeing it all around in analytic philosophy of the time, for example in Russell and Whitehead's *Principia Mathematica*. At the logical level, a use–mention mistake occurs when two heterogeneous levels of meaning or context are confused inadvertently.

Donald Davidson told that in his student years, "quotation was usually introduced as a somewhat shady device, and the introduction was accompanied by a stern sermon on the sin of confusing the use and mention of expressions." He presented a class of sentences like

Quine said that "quotation has a certain anomalous feature."

which both use the meaning of the quoted words to complete the sentence, and mention them as they are attributed to W. V. Quine, to argue against his teachers' hard distinction. His claim was that quotations could not be analyzed as simple expressions that mention their content by means of naming it

or describing its parts, as sentences like the above would lose their exact, twofold meaning.

Self-referential statements mention themselves or their components, often producing logical paradoxes, such as Quine's paradox. A mathematical analogy of self-referential statements lies at the core of Gödel's incompleteness theorem (diagonal lemma). There are many examples of self-reference and use–mention distinction in the works of Douglas Hofstadter, who makes the distinction thus:

When a word is used to *refer* to something, it is said to be being *used*. When a word is *quoted*, though, so that someone is examining it for its surface aspects (typographical, phonetic, etc.), it is said to be being *mentioned*.

Although the standard notation for mentioning a term in philosophy and logic is to put the term in quotation marks, issues arise when the mention is itself of a mention. Notating using italics might require a potentially infinite number of typefaces, while putting quotation marks within quotation marks may lead to ambiguity.

Some analytic philosophers have said the distinction "may seem rather pedantic".

In a 1977 response to analytic philosopher John Searle, Jacques Derrida mentioned the distinction as "rather laborious and problematical".

Chapter 5

Concept, Categorization and Set

Concept

Concepts are defined as ordinary ideas or general notions that occur in the mind, in speech, or in thought. They are understood to be the fundamental building blocks of the concept behind principles, thoughts and beliefs. They play an important role in all aspects of cognition. As such, concepts are studied by several disciplines, such as linguistics, psychology, and philosophy, and these disciplines are interested in the logical and psychological structure of concepts, and how they are put together to form thoughts and sentences. The study of concepts has served as an important flagship of an emerging interdisciplinary approach called cognitive science.

In contemporary philosophy, there are at least three prevailing ways to understand what a concept is:

- Concepts as mental representations, where concepts are entities that exist in the mind (mental objects)
- Concepts as abilities, where concepts are abilities peculiar to cognitive agents (mental states)
- Concepts as Fregean senses (see sense and reference), where concepts are abstract objects, as opposed to mental objects and mental states
- Concepts can be organized into a hierarchy, higher levels of which are termed "superordinate" and lower

levels termed "subordinate". Additionally, there is the "basic" or "middle" level at which people will most readily categorize a concept. For example, a basic-level concept would be "chair", with its superordinate, "furniture", and its subordinate, "easy chair".

- Concepts may be exact, or inexact. When the mind makes a generalization such as the concept of *tree*, it extracts similarities from numerous examples; the simplification enables higher-level thinking. A concept is instantiated (reified) by all of its actual or potential instances, whether these are things in the real world or other ideas.
- Concepts are studied as components of human cognition in the cognitive science disciplines of linguistics, psychology and, philosophy, where an ongoing debate asks whether all cognition must occur through concepts. Concepts are used as formal tools or models in mathematics, computer science, databases and artificial intelligence where they are sometimes called classes, schema or categories. In informaluse the word *concept* often just means any idea.

Ontology of concepts

A central question in the study of concepts is the question of what they *are*. Philosophers construe this question as one about the ontology of concepts—what kind of things they are. The ontology of concepts determines the answer to other questions, such as how to integrate concepts into a wider

theory of the mind, what functions are allowed or disallowed by a concept's ontology, etc. There are two main views of the ontology of concepts: (1) Concepts are abstract objects, and (2) concepts are mental representations.

Concepts as mental representations

The psychological view of concepts

Within the framework of the representational theory of mind, the structural position of concepts can be understood as follows: Concepts serve as the building blocks of what are called *mental representations* (colloquially understood as *ideas in the mind*). Mental representations, in turn, are the building blocks of what are called *propositional attitudes* (colloquially understood as the stances or perspectives we take towards ideas, be it "believing", "doubting", "wondering", "accepting", etc.). And these propositional attitudes, in turn, are the building blocks of our understanding of thoughts that populate everyday life, as well as folk psychology. In this way, we have an analysis that ties our common everyday understanding of thoughts down to the scientific and philosophical understanding of concepts.

The physicalist view of concepts

In a physicalisttheory of mind, a concept is a mental representation, which the brain uses to denote a class of things in the world. This is to say that it is literally, a symbol or group of symbols together made from the physical material of the brain. Concepts are mental representations that allow us to draw appropriate inferences about the type of entities we

encounter in our everyday lives. Concepts do not encompass all mental representations, but are merely a subset of them. The use of concepts is necessary to cognitive processes such as categorization, memory, decision making, learning, and inference.

Concepts are thought to be stored in long termcortical memory, in contrast to episodic memory of the particular objects and events which they abstract, which are stored in hippocampus. Evidence for this separation comes from hippocampal damaged patients such as patient HM. The abstraction from the day's hippocampal events and objects into cortical concepts is often considered to be the computation underlying (some stages of) sleep and dreaming. Many people (beginning with Aristotle) report memories of dreams which appear to mix the day's events with analogous or related historical concepts and memories, and suggest that they were being sorted or organised into more abstract concepts. ("Sort" is itself another word for concept, and "sorting" thus means to organise into concepts.)

Concepts as abstract objects

The semantic view of concepts suggests that concepts are abstract objects. In this view, concepts are abstract objects of a category out of a human's mind rather than some mental representations.

There is debate as to the relationship between concepts and natural language. However, it is necessary at least to begin by understanding that the concept "dog" is philosophically distinct from the things in the world grouped by this concept—

or the reference class or extension. Concepts that can be equated to a single word are called "lexical concepts".

The study of concepts and conceptual structure falls into the disciplines of linguistics, philosophy, psychology, and cognitive science.

In the simplest terms, a concept is a name or label that regards or treats an abstraction as if it had concrete or material existence, such as a person, a place, or a thing. It may represent a natural object that exists in the real world like a tree, an animal, a stone, etc. It may also name an artificial (man-made) object like a chair, computer, house, etc. Abstract ideas and knowledge domains such as freedom, equality, science, happiness, etc., are also symbolized by concepts. It is important to realize that a concept is merely a symbol, a representation of the abstraction. The word is not to be mistaken for the thing. For example, the word "moon" (a concept) is not the large, bright, shape-changing object up in the sky, but only *represents* that celestial object. Concepts are created (named) to describe, explain and capture reality as it is known and understood.

A priori concepts

Kant maintained the view that human minds possess pure or *a priori* concepts. Instead of being abstracted from individual perceptions, like empirical concepts, they originate in the mind itself. He called these concepts categories, in the sense of the word that means predicate, attribute, characteristic, or quality. But these pure categories are predicates of things *in general*, not of a particular thing. According to Kant, there are

twelve categories that constitute the understanding of phenomenal objects. Each category is that one predicate which is common to multiple empirical concepts. In order to explain how an*a priori* concept can relate to individual phenomena, in a manner analogous to an *a posteriori* concept, Kant employed the technical concept of the schema. He held that the account of the concept as an abstraction of experience is only partly correct. He called those concepts that result from abstraction "a posteriori concepts" (meaning concepts that arise out of experience). An empirical or an *a posteriori* concept is a general representation (*Vorstellung*) or non-specific thought of that which is common to several specific perceived objects (Logic, I, 1., §1, Note 1)

A concept is a common feature or characteristic. Kant investigated the way that empirical *a posteriori* concepts are created.

The logical acts of the understanding by which concepts are generated as to their form are:

- *comparison*, i.e., the likening of mental images to one another in relation to the unity of consciousness;
- *reflection*, i.e., the going back over different mental images, how they can be comprehended in one consciousness; and finally
- *abstraction* or the segregation of everything else by which the mental images differ ...

In order to make our mental images into concepts, one must thus be able to compare, reflect, and abstract, for these three logical operations of the understanding are essential and general conditions of generating any concept whatever. For

example, I see a fir, a willow, and a linden. In firstly comparing these objects, I notice that they are different from one another in respect of trunk, branches, leaves, and the like; further, however, I reflect only on what they have in common, the trunk, the branches, the leaves themselves, and abstract from their size, shape, and so forth; thus I gain a concept of a tree.

— *Logic, §6*

Embodied content

In cognitive linguistics, abstract concepts are transformations of concrete concepts derived from embodied experience. The mechanism of transformation is structural mapping, in which properties of two or more source domains are selectively mapped onto a blended space (Fauconnier& Turner, 1995; see conceptual blending).

A common class of blends are metaphors. This theory contrasts with the rationalist view that concepts are perceptions (or *recollections*, in Plato's term) of an independently existing world of ideas, in that it denies the existence of any such realm. It also contrasts with the empiricist view that concepts are abstract generalizations of individual experiences, because the contingent and bodily experience is preserved in a concept, and not abstracted away.

While the perspective is compatible with Jamesian pragmatism, the notion of the transformation of embodied concepts through structural mapping makes a distinct contribution to the problem of concept formation.

Realist universal concepts

Platonist views of the mind construe concepts as abstract objects. Plato was the starkest proponent of the realist thesis of universal concepts.

By his view, concepts (and ideas in general) are innate ideas that were instantiations of a transcendental world of pure forms that lay behind the veil of the physical world. In this way, universals were explained as transcendent objects. Needless to say, this form of realism was tied deeply with Plato's ontological projects.

This remark on Plato is not of merely historical interest. For example, the view that numbers are Platonic objects was revived by Kurt Gödel as a result of certain puzzles that he took to arise from the phenomenological accounts.

Sense and reference

GottlobFrege, founder of the analytic tradition in philosophy, famously argued for the analysis of language in terms of sense and reference. For him, the sense of an expression in language describes a certain state of affairs in the world, namely, the way that some object is presented.

Since many commentators view the notion of sense as identical to the notion of concept, and Frege regards senses as the linguistic representations of states of affairs in the world, it seems to follow that we may understand concepts as the manner in which we grasp the world. Accordingly, concepts (as senses) have an ontological status.

Concepts in calculus

According to Carl Benjamin Boyer, in the introduction to his *The History of the Calculus and its Conceptual Development*, concepts in calculus do not refer to perceptions. As long as the concepts are useful and mutually compatible, they are accepted on their own. For example, the concepts of the derivative and the integralare not considered to refer to spatial or temporal perceptions of the external world of experience. Neither are they related in any way to mysterious limits in which quantities are on the verge of nascence or evanescence, that is, coming into or going out of existence. The abstract concepts are now considered to be totally autonomous, even though they originated from the process of abstracting or taking away qualities from perceptions until only the common, essential attributes remained.

Notable theories on the structure of concepts

Classical theory

The classical theory of concepts, also referred to as the empiricist theory of concepts, is the oldest theory about the structure of concepts (it can be traced back to Aristotle), and was prominently held until the 1970s. The classical theory of concepts says that concepts have a definitional structure. Adequate definitions of the kind required by this theory usually take the form of a list of features. These features must have two important qualities to provide a comprehensive

definition. Features entailed by the definition of a concept must be both *necessary* and *sufficient* for membership in the class of things covered by a particular concept. A feature is considered necessary if every member of the denoted class has that feature. A feature is considered sufficient if something has all the parts required by the definition. For example, the classic example *bachelor* is said to be defined by *unmarried* and *man*. An entity is a bachelor (by this definition) if and only if it is both unmarried and a man. To check whether something is a member of the class, you compare its qualities to the features in the definition. Another key part of this theory is that it obeys the *law of the excluded middle*, which means that there are no partial members of a class, you are either in or out.

The classical theory persisted for so long unquestioned because it seemed intuitively correct and has great explanatory power. It can explain how concepts would be acquired, how we use them to categorize and how we use the structure of a concept to determine its referent class. In fact, for many years it was one of the major activities in philosophy—concept analysis. Concept analysis is the act of trying to articulate the necessary and sufficient conditions for the membership in the referent class of a concept. For example, Shoemaker's classic "Time Without Change" explored whether the concept of the flow of time can include flows where no changes take place, though change is usually taken as a definition of time.

Arguments against the classical theory

Given that most later theories of concepts were born out of the rejection of some or all of the classical theory, it seems

appropriate to give an account of what might be wrong with this theory. In the 20th century, philosophers such as Wittgenstein and Rosch argued against the classical theory. There are six primary arguments summarized as follows:

- It seems that there simply are no definitions—especially those based in sensory primitive concepts.
- It seems as though there can be cases where our ignorance or error about a class means that we either don't know the definition of a concept, or have incorrect notions about what a definition of a particular concept might entail.
- Quine's argument against analyticity in Two Dogmas of Empiricism also holds as an argument against definitions.
- Some concepts have fuzzy membership. There are items for which it is vague whether or not they fall into (or out of) a particular referent class. This is not possible in the classical theory as everything has equal and full membership.
- Rosch found typicality effects which cannot be explained by the classical theory of concepts, these sparked the prototype theory. See below.
- Psychological experiments show no evidence for our using concepts as strict definitions.

Prototype theory

Prototype theory came out of problems with the classical view of conceptual structure. Prototype theory says that concepts specify properties that members of a class tend to possess, rather than must possess. Wittgenstein, Rosch, Mervis, Berlin,

Anglin, and Posner are a few of the key proponents and creators of this theory. Wittgenstein describes the relationship between members of a class as *family resemblances*. There are not necessarily any necessary conditions for membership; a dog can still be a dog with only three legs. This view is particularly supported by psychological experimental evidence for prototypicality effects. Participants willingly and consistently rate objects in categories like 'vegetable' or 'furniture' as more or less typical of that class. It seems that our categories are fuzzy psychologically, and so this structure has explanatory power. We can judge an item's membership of the referent class of a concept by comparing it to the typical member—the most central member of the concept. If it is similar enough in the relevant ways, it will be cognitively admitted as a member of the relevant class of entities. Rosch suggests that every category is represented by a central exemplar which embodies all or the maximum possible number of features of a given category. Lech, Gunturkun, and Suchan explain that categorization involves many areas of the brain. Some of these are: visual association areas, prefrontal cortex, basal ganglia, and temporal lobe.

The Prototype perspective is proposed as an alternative view to the Classical approach. While the Classical theory requires an all-or-nothing membership in a group, prototypes allow for more fuzzy boundaries and are characterized by attributes. Lakeoff stresses that experience and cognition are critical to the function of language, and Labov's experiment found that the function that an artifact contributed to what people categorized it as. For example, a container holding mashed potatoes versus tea swayed people toward classifying them as a

bowl and a cup, respectively. This experiment also illuminated the optimal dimensions of what the prototype for "cup" is.

Prototypes also deal with the essence of things and to what extent they belong to a category. There have been a number of experiments dealing with questionnaires asking participants to rate something according to the extent to which it belongs to a category. This question is contradictory to the Classical Theory because something is either a member of a category or is not. This type of problem is paralleled in other areas of linguistics such as phonology, with an illogical question such as "is /i/ or /o/ a better vowel?" The Classical approach and Aristotelian categories may be a better descriptor in some cases.

Theory-theory

Theory-theory is a reaction to the previous two theories and develops them further. This theory postulates that categorization by concepts is something like scientific theorizing. Concepts are not learned in isolation, but rather are learned as a part of our experiences with the world around us. In this sense, concepts' structure relies on their relationships to other concepts as mandated by a particular mental theory about the state of the world. How this is supposed to work is a little less clear than in the previous two theories, but is still a prominent and notable theory. This is supposed to explain some of the issues of ignorance and error that come up in prototype and classical theories as concepts that are structured around each other seem to account for errors such as whale as a fish (this misconception came from an incorrect theory about what a whale is like, combining with our theory of what a fish is). When we learn that a whale is not

a fish, we are recognizing that whales don't in fact fit the theory we had about what makes something a fish. Theory-theory also postulates that people's theories about the world are what inform their conceptual knowledge of the world. Therefore, analysing people's theories can offer insights into their concepts. In this sense, "theory" means an individual's mental explanation rather than scientific fact. This theory criticizes classical and prototype theory as relying too much on similarities and using them as a sufficient constraint. It suggests that theories or mental understandings contribute more to what has membership to a group rather than weighted similarities, and a cohesive category is formed more by what makes sense to the perceiver. Weights assigned to features have shown to fluctuate and vary depending on context and experimental task demonstrated by Tversky. For this reason, similarities between members may be collateral rather than causal.

Ideasthesia

According to the theory of ideasthesia (or "sensing concepts"), activation of a concept may be the main mechanism responsible for the creation of phenomenal experiences. Therefore, understanding how the brain processes concepts may be central to solving the mystery of how conscious experiences (or qualia) emerge within a physical system e.g., the sourness of the sour taste of lemon. This question is also known as the hard problem of consciousness. Research on ideasthesia emerged from research on synesthesia where it was noted that a synesthetic experience requires first an activation

of a concept of the inducer. Later research expanded these results into everyday perception.

There is a lot of discussion on the most effective theory in concepts. Another theory is semantic pointers, which use perceptual and motor representations and these representations are like symbols.

Etymology

The term "concept" is traced back to 1554–60 (Latin *conceptum* – "something conceived").

Categorization

Categorization is the human ability and activity of recognizing shared features or similarities between the elements of the experience of the world (such as objects, events, or ideas), organizing and classifying experience by associating them to a more abstract group (that is, a category, class, or type), on the basis of their traits, features, similarities or other criteria. Categorization is considered one of the most fundamental cognitive abilities, and as such it is studied particularly by psychology and cognitive linguistics.

Categorization is sometimes considered synonymous with classification (cf., Classification synonyms). Categorization and classification allow humans to organize things, objects, and ideas that exist around them and simplify their understanding of the world. Categorization is something that humans and other organisms *do*: "doing the right thing with the right *kind*

of thing." The activity of categorizing things can be nonverbal or verbal. For humans, both concrete objects and abstract ideas are recognized, differentiated, and understood through categorization. Objects are usually categorized for some adaptive or pragmatic purposes.

Categorization is grounded in the features that distinguish the category's members from nonmembers. Categorization is important in learning, prediction, inference, decision making, language, and many forms of organisms' interaction with their environments.

Overview of categorization

Categories are distinct collections of concrete or abstract instances (category members) that are considered equivalent by the cognitive system. Using category knowledge requires one to access mental representations that define the core features of category members (cognitive psychologists refer to these category-specific mental representations as concepts).

To categorization theorists, the categorization of objects is often considered using taxonomies with three hierarchical levels of abstraction. For example, a plant could be identified at a high level of abstraction by simply labeling it a flower, a medium level of abstraction by specifying that the flower is a rose, or a low level of abstraction by further specifying this particular rose as a dog rose. Categories in a taxonomy are related to one another via class inclusion, with the highest level of abstraction being the most inclusive and the lowest level of abstraction being the least inclusive. The three levels of abstraction are as follows:

- **Superordinate level** (e.g., Flower) - The highest and most inclusive level of abstraction. Exhibits the highest degree of generality and the lowest degree of within-category similarity.
- **Basic Level** (e.g., Rose) - The middle level of abstraction. Rosch and colleagues (1976) suggest the basic level to be the most cognitively efficient. Basic level categories exhibit high within-category *similarities* and high between-category *dissimilarities*. Furthermore, the basic level is the most inclusive level at which category exemplars share a generalized identifiable shape. Adults most-often use basic level object names, and children learn basic object names first.
- **Subordinate level** (e.g., Dog Rose) - The lowest level of abstraction. Exhibits the highest degree of specificity and a high degree of within-category similarity.

Theories of categorization

Classical view

The classical theory of categorization, is a term used in cognitive linguistics to denote the approach to categorization that appears in Plato and Aristotle and that has been highly influential and dominant in Western culture, particularly in philosophy, linguistics and psychology. The classical view of categories can be summarized into three assumptions: a category can be described as a list of necessary and sufficient features that its member must have; categories are discrete,

they have clearly defined boundaries (either an element belongs to one or not, with no possibilities in between); all the members of a category have the same status.(i.e. there are not better members of the category which belong more than others). In the classical view, categories need to be clearly defined, mutually exclusive and collectively exhaustive; this way, any entity in the given classification universe belongs unequivocally to one, and only one, of the proposed categories.

The classical view of categories first appeared in the context of Western Philosophy in the work of Plato, who, in his Statesman dialogue, introduces the approach of grouping objects based on their similar properties. This approach was further explored and systematized by Aristotle in his Categories treatise, where he analyzes the differences between classes and objects. Aristotle also applied intensively the classical categorization scheme in his approach to the classification of living beings (which uses the technique of applying successive narrowing questions such as "Is it an animal or vegetable?", "How many feet does it have?", "Does it have fur or feathers?", "Can it fly?"...), establishing this way the basis for naturaltaxonomy.

Examples of the use of the classical view of categories can be found in the western philosophical works of Descartes, Blaise Pascal, Spinoza and John Locke, and in the 20th century in Bertrand Russell, G.E. Moore, the logical positivists. It has been a cornerstone of analytic philosophy and its conceptual analysis, with more recent formulations proposed in the 1990s by Frank Cameron Jackson and Christopher Peacocke.

The classical model of categorization has been used at least since the 1960s from linguists of the structural semantics

paradigm, by Jerrold Katzand Jerry Fodor in 1963, which in turn have infuenced its adoption also by psychologists like Allan M. Collins and M. Ross Quillian.

Modern versions of classical categorization theory study how the brain learns and represents categories by detecting the features that distinguish members from nonmembers.

Prototype theory

The pioneering research by psychologist Eleanor Rosch and colleagues since 1973, introduced the prototype theory, according to which categorization can also be viewed as the process of grouping things based on prototypes. This approach has been highly influential, particularly for cognitive linguistics. It was in part based on previous insights, in particular the formulation of a category model based on family resemblance by Wittgenstein (1953), and by Roger Brown's *How shall a thing be called?* (1958).

Prototype theory has been then adopted by cognitive linguists like George Lakoff. The prototype theory is an example of a similarity-based approach to categorization, in which a stored category representation is used to assess the similarity of candidate category members. Under the prototype theory, this stored representation consists of a summary representation of the category's members. This prototype stimulus can take various forms. It might be a central tendency that represents the category's average member, a modal stimulus representing either the most frequent instance or a stimulus composed of the most common category features, or, lastly, the "ideal" category member, or a caricature that emphasizes the distinct

features of the category. An important consideration of this prototype representation is that it does not necessarily reflect the existence of an actual instance of the category in the world. Furthermore, prototypes are highly sensitive to context. For example, while one's prototype for the category of beverages may be soda or seltzer, the context of brunch might lead them to select mimosa as a prototypical beverage.

The prototype theory claims that members of a given category share a family resemblance, and categories are defined by sets of typical features (as opposed to all members possessing necessary and sufficient features).

Exemplar theory

Another instance of the similarity-based approach to categorization, the exemplar theory likewise compares the similarity of candidate category members to stored memory representations. Under the exemplar theory, all known instances of a category are stored in memory as exemplars. When evaluating an unfamiliar entity's category membership, exemplars from potentially relevant categories are retrieved from memory, and the entity's similarity to those exemplars is summed to formulate a categorization decision. Medin and Schaffer's (1978) Context model employs a nearest neighborapproach which, rather than summing an entity's similarities to relevant exemplars, multiplies them to provide weighted similarities that reflect the entity's proximity to relevant exemplars. This effectively biases categorization decisions towards exemplars most similar to the to be categorized entity.

Conceptual clustering

Conceptual clustering is a machine learning paradigm for unsupervised classification that has been defined by Ryszard S. Michalski in 1980. It is a modern variation of the classical approach of categorization, and derives from attempts to explain how knowledge is represented.

In this approach, classes (clusters or entities) are generated by first formulating their conceptual descriptions and then classifying the entities according to the descriptions.

Conceptual clustering developed mainly during the 1980s, as a machine paradigm for unsupervised learning. It is distinguished from ordinary data clustering by generating a concept description for each generated category.

Conceptual clustering is closely related to fuzzy set theory, in which objects may belong to one or more groups, in varying degrees of fitness. A cognitive approach accepts that natural categories are graded (they tend to be fuzzy at their boundaries) and inconsistent in the status of their constituent members. The idea of necessary and sufficient conditions is almost never met in categories of naturally occurring things.

Category learning

While an exhaustive discussion of category learning is beyond the scope of this article, a brief overview of category learning and its associated theories is useful in understanding formal models of categorization.

If categorization research investigates how categories are maintained and used, the field of category learning seeks to understand how categories are acquired in the first place. To accomplish this, researchers often employ novel categories of arbitrary objects (e.g., dot matrices) to ensure that participants are entirely unfamiliar with the stimuli. Category learning researchers have generally focused on two distinct forms of category learning. classification learning tasks participants with predicting category labels for a stimulus based on its provided features.

Classification learning is centered around learning between-category information and the diagnostic features of categories. In contrast, inference learning tasks participants with inferring the presence/value of a category feature based on a provided category label and/or the presence of other category features. Inference learning is centered on learning within-category information and the category's prototypical features.

Category learning tasks can generally be divided into two categories, supervised and unsupervised learning. Supervised learning tasks provide learners with category labels. Learners then use information extracted from labeled example categories to classify stimuli into the appropriate category, which may involve the abstraction of a rule or concept relating observed object features to category labels. Unsupervised learning tasks do not provide learners with category labels. Learners must therefore recognize inherent structures in a data set and group stimuli together by similarity into classes. Unsupervised learning is thus a process of generating a classification structure. Tasks used to study category learning take various forms:

- **Rule-based tasks** present categories that participants can learn through explicit reasoning processes. In these kinds of tasks, classification of stimuli is accomplished via the use of an acquired rule (i.e., if stimulus is large on dimension x, respond A).
- **Information-integration tasks** require learners to synthesize perceptual information from multiple stimulus dimensions prior to making categorization decisions. Unlike rule-based tasks, information-integration tasks do not afford rules that are easily articulable. Reading an X-ray and trying to determine if a tumor is present can be thought of as a real-world instantiation of an information-integration task.
- **Prototype distortion tasks** require learners to generate a prototype for a category. Candidate exemplars for the category are then produced by randomly manipulating the features of the prototype, which learners must classify as either belonging to the category or not.

Category learning theories

Category learning researchers have proposed various theories for how humans learn categories. Prevailing theories of category learning include the prototype theory, the exemplar theory, and the decision bound theory.

The prototype theory suggests that to learn a category, one must learn the category's prototype. Subsequent categorization

of novel stimuli is then accomplished by selecting the category with the most similar prototype.

The exemplar theory suggests that to learn a category, one must learn about the exemplars that belong to that category. Subsequent categorization of a novel stimulus is then accomplished by computing its similarity to the known exemplars of potentially relevant categories and selecting the category that contains the most similar exemplars.

Decision bound theory suggests that to learn a category, one must either learn the regions of a stimulus space associated with particular responses or the boundaries (the decision bounds) that divide these response regions. Categorization of a novel stimulus is then accomplished by determining which response region it is contained within.

Formal models of categorization

Computational models of categorization have been developed to test theories about how humans represent and use category information. To accomplish this, categorization models can be fit to experimental data to see how well the predictions afforded by the model line up with human performance. Based on the model's success at explaining the data, theorists are able to draw conclusions about the accuracy of their theories and their theory's relevance to human category representations.

To effectively capture how humans represent and use category information, categorization models generally operate under variations of the same three basic assumptions. First, the

model must make some kind of assumption about the internal representation of the stimulus (e.g., representing the perception of a stimulus as a point in a multi-dimensional space). Second, the model must make an assumption about the specific information that needs to be accessed in order to formulate a response (e.g., exemplar models require the collection of all available exemplars for each category). Third, the model must make an assumption about how a response is selected given the available information.

Though all categorization models make these three assumptions, they distinguish themselves by the ways in which they represent and transform an input into a response representation. The internal knowledge structures of various categorization models reflect the specific representation(s) they use to perform these transformations. Typical representations employed by models include exemplars, prototypes, and rules.

- **Exemplar models** store all distinct instances of stimuli with their corresponding category labels in memory. Categorization of subsequent stimuli is determined by the stimulus' collective similarity to all known exemplars.
- **Prototype models** store a summary representation of all instances in a category. Categorization of subsequent stimuli is determined by selecting the category whose prototype is most similar to the stimulus.
- **Rule-based models** define categories by storing summary lists of the necessary and sufficient features required for category membership. Boundary models can be considered as atypical rule

models, as they do not define categories based on their content. Rather, boundary models define the edges (boundaries) between categories, which subsequently serve as determinants for how a stimulus gets categorized.

Examples of categorization models

Prototype models

Weighted Features Prototype Model An early instantiation of the prototype model was produced by Reed in the early 1970's. Reed (1972) conducted a series of experiments to compare the performance of 18 models on explaining data from a categorization task that required participants to sort faces into one of two categories.

Results suggested that the prevailing model was the weighted features prototype model, which belonged to the family of average distance models. Unlike traditional average distance models, however, this model differentially weighted the most distinguishing features of the two categories. Given this model's performance,

Reed (1972) concluded that the strategy participants used during the face categorization task was to construct prototype representations for each of the two categories of faces and categorize test patterns into the category associated with the most similar prototype. Furthermore, results suggested that similarity was determined by each categories most discriminating features.

Exemplar models

Generalized Context Model Medin and Schaffer's (1978) context model was expanded upon by Nosofsky (1986) in the mid-1980's, resulting in the production of the Generalized Context Model (GCM). The GCM is an exemplar model that stores exemplars of stimuli as exhaustive combinations of the features associated with each exemplar. By storing these combinations, the model establishes contexts for the features of each exemplar, which are defined by all other features with which that feature co-occurs. The GCM computes the similarity of an exemplar and a stimulus in two steps. First, the GCM computes the psychological distance between the exemplar and the stimulus.

This is accomplished by summing the absolute values of the dimensional difference between the exemplar and the stimulus. For example, suppose an exemplar has a value of 18 on dimension X and the stimulus has a value of 42 on dimension X; the resulting dimensional difference would be 24. Once psychological distance has been evaluated, an exponential decay function determines the similarity of the exemplar and the stimulus, where a distance of 0 results in a similarity of 1 (which begins to decrease exponentially as distance increases). Categorical responses are then generated by evaluating the similarity of the stimulus to each category's exemplars, where each exemplar provides a "vote" to their respective categories that varies in strength based on the exemplar's similarity to the stimulus and the strength of the exemplar's association with the category. This effectively assigns each category a selection probability that is determined by the proportion of votes it receives, which can then be fit to data.

Rule-based models

RULEX (Rule-Plus-Exception) Model While simple logical rules are ineffective at learning poorly defined category structures, some proponents of the rule-based theory of categorization suggest that an imperfect rule can be used to learn such category structures if exceptions to that rule are also stored and considered. To formalize this proposal, Nosofsky and colleagues (1994) designed the RULEX model. The RULEX model attempts to form a decision tree composed of sequential tests of an object's attribute values. Categorization of the object is then determined by the outcome of these sequential tests. The RULEX model searches for rules in the following ways:

- **Exact** Search for a rule that uses a single attribute to discriminate between classes without error.
- **Imperfect** Search for a rule that uses a single attribute to discriminate between classes with few errors
- **Conjunctive** Search for a rule that uses multiple attributes to discriminate between classes with few errors.
- **Exception** Search for exceptions to the rule.

The method that RULEX uses to perform these searches is as follows: First, RULEX attempts an exact search. If successful, then RULEX will continuously apply that rule until misclassification occurs. If the exact search fails to identify a rule, either an imperfect or conjunctive search will begin. A sufficient, though imperfect, rule acquired during one of these search phases will become permanently implemented and the

RULEX model will then begin to search for exceptions. If no rule is acquired, then the model will attempt the search it did not perform in the previous phase. If successful, RULEX will permanently implement the rule and then begin an exception search. If none of the previous search methods are successful RULEX will default to only searching for exceptions, despite lacking an associated rule, which equates to acquiring a random rule.

Hybrid models

SUSTAIN (Supervised and Unsupervised STratified Adaptive Incremental Network) It is often the case that learned category representations vary depending on the learner's goals, as well as how categories are used during learning. Thus, some categorization researchers suggest that a proper model of categorization needs to be able to account for the variability present in the learner's goals, tasks, and strategies. This proposal was realized by Love and colleagues (2004) through the creation of SUSTAIN, a flexible clustering model capable of accommodating both simple and complex categorization problems through incremental adaptation to the specifics of problems.

In practice, the SUSTAIN model first converts a stimulus' perceptual information into features that are organized along a set of dimensions. The representational space that encompasses these dimensions is then distorted (e.g., stretched or shrunk) to reflect the importance of each feature based on inputs from an attentional mechanism. A set of clusters (specific instances grouped by similarity) associated with distinct categories then compete to respond to the

stimulus, with the stimulus being subsequently assigned to the cluster whose representational space is closest to the stimulus'. The unknown stimulus dimension value (e.g., category label) is then predicted by the winning cluster, which, in turn, informs the categorization decision.

The flexibility of the SUSTAIN model is realized through its ability to employ both supervised and unsupervised learning at the cluster level. If SUSTAIN incorrectly predicts a stimulus as belonging to a particular cluster, corrective feedback (i.e., supervised learning) would signal sustain to recruit an additional cluster that represents the misclassified stimulus. Therefore, subsequent exposures to the stimulus (or a similar alternative) would be assigned to the correct cluster. SUSTAIN will also employ unsupervised learning to recruit an additional cluster if the similarity between the stimulus and the closest cluster does not exceed a threshold, as the model recognizes the weak predictive utility that would result from such a cluster assignment. SUSTAIN also exhibits flexibility in how it solves both simple and complex categorization problems. Outright, the internal representation of SUSTAIN contains only a single cluster, thus biasing the model towards simple solutions. As problems become increasingly complex (e.g., requiring solutions consisting of multiple stimulus dimensions), additional clusters are incrementally recruited so SUSTAIN can handle the rise in complexity.

Social categorization

Social categorization consists of putting human beings into groups in order to identify them based on different criteria. Categorization is a process studied by scholars in cognitive

science but can also be studied as a social activity. Social categorization is different from the categorization of other things because it implies that people create categories for themselves and others as human beings. Groups can be created based on ethnicity, country of origin, religion, sexual identity, social privileges, economic privileges, etc. Various ways to sort people exist according to one's schemas. People belong to various social groups because of their ethnicity, religion, or age.

Social categories based on age, race, and gender are used by people when they encounter a new person. Because some of these categories refer to physical traits, they are often used automatically when people don't know each other. These categories are not objective and depend on how people see the world around them. They allow people to identify themselves with similar people and to identify people who are different. They are useful in one's identity formation with the people around them. One can build their own identity by identifying themselves in a group or by rejecting another group.

Social categorization is similar to other types of categorization since it aims at simplifying the understanding of people. However, creating social categories implies that people will position themselves in relation to other groups. A hierarchy in group relations can appear as a result of social categorization.

Scholars argue that the categorization process starts at a young age when children start to learn about the world and the people around them. Children learn how to know people according to categories based on similarities and differences. Social categories made by adults also impact their

understanding of the world. They learn about social groups by hearing generalities about these groups from their parents. They can then develop prejudices about people as a result of these generalities.

Another aspect about social categorization is mentioned by Stephen Reicher and Nick Hopkins and is related to political domination. They argue that political leaders use social categories to influence political debates.

Negative aspects

The activity of sorting people according to subjective or objective criteria can be seen as a negative process because of its tendency to lead to violence from a group to another. Indeed, similarities gather people who share common traits but differences between groups can lead to tensions and then the use of violence between those groups. The creation of social groups by people is responsible of a hierarchization of relations between groups.

These hierarchical relations participate in the promotion of stereotypes about people and groups, sometimes based on subjective criteria. Social categories can encourage people to associate stereotypes to groups of people. Associating stereotypes to a group, and to people who belong to this group, can lead to forms of discrimination towards people of this group. The perception of a group and the stereotypes associated with it have an impact on social relations and activities.

Some social categories have more weight than others in society. For instance, in history and still today, the category of

"race" is one of the first categories used to sort people. However, only a few categories of race are commonly used such as "Black", "White", "Asian" etc. It participates in the reduction of the multitude of ethnicities to a few categories based mostly on people's skin color.

The process of sorting people creates a vision of the other as ‘different’, leading to the dehumanization of people. Scholars talk about intergroup relations with the concept of social identity theory developed by H. Tajfel.

Indeed, in history, many examples of social categorization have led to forms of domination or violence from a dominant group to a dominated group. Periods of colonisation are examples of times when people from a group chose to dominate and control other people belonging to other groups because they considered them as inferior. Racism, discrimination and violence are consequences of social categorization and can occur because of it. When people see others as different, they tend to develop hierarchical relation with other groups.

Miscategorization

There cannot be categorization without the possibility of miscategorization. To do "the right thing with the right *kind* of thing.", there has to be both a right and a wrong thing to do. Not only does a category of which "everything" is a member lead logically to the Russell paradox ("is it or is it not a member of itself?"), but without the possibility of error, there is no way to detect or define what distinguishes category members from nonmembers.

An example of the absence of nonmembers is the problem of the poverty of the stimulus in language learning by the child: children learning the language do not hear or make errors in the rules of Universal Grammar (UG). Hence they never get corrected for errors in UG. Yet children's speech obeys the rules of UG, and speakers can immediately detect that something is wrong if a linguist generates (deliberately) an utterance that violates UG. Hence speakers can categorize what is UG-compliant and UG-noncompliant. Linguists have concluded from this that the rules of UG must be somehow encoded innately in the human brain.

Ordinary categories, however, such as "dogs," have abundant examples of nonmembers (cats, for example). So it is possible to learn, by trial and error, with error-correction, to detect and define what distinguishes dogs from non-dogs, and hence to correctly categorize them. This kind of learning, called reinforcement learning in the behavioral literature and supervised learning in the computational literature, is fundamentally dependent on the possibility of error, and error-correction. Miscategorization—examples of nonmembers of the category—must always exist, not only to make the category learnable, but for the category to exist and be definable at all.

Set

In mathematics, a **set** is a collection of elements. The elements that make up a set can be any kind of mathematical objects: numbers, symbols, points in space, lines, other geometrical shapes, variables, or even other sets. The set with no element is the empty set; a set with a single element is a singleton. A set may have a finite number of elements or be an infinite set.

Two sets are equal if and only if they have precisely the same elements. Sets are ubiquitous in modern mathematics. Indeed, set theory, more specifically Zermelo–Fraenkel set theory, has been the standard way to provide rigorous foundations for all branches of mathematics since the first half of the 20th century.

Origin

- The concept of a set emerged in mathematics at the end of the 19th century. The German word for set, *Menge*, was coined by Bernard Bolzano in his work *Paradoxes of the Infinite*.

Georg Cantor, one of the founders of set theory, gave the following definition at the beginning of his *Beiträgezur Begründung der transfinitenMengenlehre*:

A set is a gathering together into a whole of definite, distinct objects of our perception or our thought—which are called elements of the set.

Bertrand Russell called a set a *class*: "When mathematicians deal with what they call a manifold, aggregate, *Menge*, *ensemble*, or some equivalent name, it is common, especially where the number of terms involved is finite, to regard the object in question (which is in fact a class) as defined by the enumeration of its terms, and as consisting possibly of a single term, which is in that case *is* the class."

Naïve set theory

The foremost property of a set is that it can have elements, also called *members*. Two sets are equal when they have the same elements. More precisely, sets A and B are equal if every element of A is a member of B, and every element of B is an element of A; this property is called the *extensionality of sets*.

The simple concept of a set has proved enormously useful in mathematics, but paradoxes arise if no restrictions are placed on how sets can be constructed:

- Russell's paradox shows that the "set of all sets that *do not contain themselves*", i.e., $\{x \mid x \text{ is a set and } x \notin x\}$, cannot exist.
- Cantor's paradox shows that "the set of all sets" cannot exist.

Naïve set theory defines a set as any *well-defined* collection of distinct elements, but problems arise from the vagueness of the term *well-defined*.

Axiomatic set theory

In subsequent efforts to resolve these paradoxes since the time of the original formulation of naïve set theory, the properties of sets have been defined by axioms. Axiomatic set theory takes the concept of a set as a primitive notion.

The purpose of the axioms is to provide a basic framework from which to deduce the truth or falsity of particular mathematical propositions (statements) about sets, using first-order logic. According to Gödel's incompleteness theorems however, it is

not possible to use first-order logic to prove any such particular axiomatic set theory is free from paradox.

How sets are defined and set notation

Mathematical texts commonly denote sets by capital letters in italic, such as *A*, *B*, *C*. A set may also be called a *collection* or *family*, especially when its elements are themselves sets.

Roster notation

Roster or **enumeration notation** defines a set by listing its elements between curly brackets, separated by commas:

- $A = \{4, 2, 1, 3\}$
- $B = \{\text{blue, white, red}\}$.

In a set, all that matters is whether each element is in it or not, so the ordering of the elements in roster notation is irrelevant (in contrast, in a sequence, a tuple, or a permutation of a set, the ordering of the terms matters). For example, {2, 4, 6} and {4, 6, 4, 2} represent the same set.

For sets with many elements, especially those following an implicit pattern, the list of members can be abbreviated using an ellipsis '...'. For instance, the set of the first thousand positive integers may be specified in roster notation as

- {1, 2, 3, ..., 1000}.

Infinite sets in roster notation

An infinite set is a set with an endless list of elements. To describe an infinite set in roster notation, an ellipsis is placed at the end of the list, or at both ends, to indicate that the list continues forever. For example, the set of nonnegative integers is

- {0, 1, 2, 3, 4, ...},

and the set of all integers is

- {..., −3, −2, −1, 0, 1, 2, 3, ...}.

Semantic definition

Another way to define a set is to use a rule to determine what the elements are:

- Let *A* be the set whose members are the first four positive integers.
- Let *B* be the set of colors of the French flag.

Such a definition is called a *semantic description*.

Classifying methods of definition

Philosophy uses specific terms to classify types of definitions:

- An *intensional definition* uses a *rule* to determine membership. Semantic definitions and definitions using set-builder notation are examples.

- An *extensional definition* describes a set by *listing all its elements*. Such definitions are also called*enumerative*.
- An *ostensive definition* is one that describes a set by giving *examples* of elements; a roster involving an ellipsis would be an example.

The empty set

The *empty set* (or *null set*) is the unique set that has no members. It is denoted ∅ or or { } or ϕ (or ϕ).

Singleton sets

A *singleton set* is a set with exactly one element; such a set may also be called a *unit set*. Any such set can be written as {*x*}, where *x* is the element. The set {*x*} and the element *x* mean different things; Halmos draws the analogy that a box containing a hat is not the same as the hat.

Subsets

If every element of set *A* is also in *B*, then *A* is described as being a *subset of B*, or *contained in B*, written $A \subseteq B$, or $B \supseteq A$. The latter notation may be read *B contains A*, *B includes A*, or *B is a superset of A*. The relationship between sets established by ⊆is called*inclusion* or *containment*. Two sets are equal if they contain each other: $A \subseteq B$ and $B \subseteq A$ is equivalent to $A = B$.

If A is a subset of B, but A is not equal to B, then $A$is called a *proper subset* of B. This can be written $A \subsetneq B$. Likewise, $B \supsetneq A$ means B *is a proper superset of* A, i.e. B contains A, and is not equal to A.

A third pair of operators $\subset$ and $\supset$ are used differently by different authors: some authors use $A \subset B$ and $B \supset A$ to mean A is any subset of B (and not necessarily a proper subset), while others reserve $A \subset B$ and $B \supset A$ for cases where A is a proper subset of B.

Examples:

- The set of all humans is a proper subset of the set of all mammals.
- $\{1, 3\} \subset \{1, 2, 3, 4\}$.
- $\{1, 2, 3, 4\} \subseteq \{1, 2, 3, 4\}$.

The empty set is a subset of every set, and every set is a subset of itself:

- $\emptyset \subseteq A$.
- $A \subseteq A$.

Euler and Venn diagrams

An Euler diagram is a graphical representation of a collection of sets; each set is depicted as a planar region enclosed by a loop, with its elements inside. If A is a subset of B, then the region representing A is completely inside the region representing B. If two sets have no elements in common, the regions do not overlap.

A Venn diagram, in contrast, is a graphical representation of n sets in which the n loops divide the plane into 2 zones such that for each way of selecting some of the n sets (possibly all or none), there is a zone for the elements that belong to all the selected sets and none of the others. For example, if the sets are A, B, and C, there should be a zone for the elements that are inside A and C and outside B (even if such elements do not exist).

Functions

A *function* (or *mapping*) from a set A to a set B is a rule that assigns to each "input" element of A an "output" that is an element of B; more formally, a function is a special kind of relation, one that relates each element of A to *exactly one* element of B. A function is called

- injective (or one-to-one) if it maps any two different elements of A to *different* elements of B,
- surjective (or onto) if for every element of B, there is at least one element of A that maps to it, and
- bijective (or a one-to-one correspondence) if the function is both injective and surjective — in this case, each element of A is paired with a unique element of B, and each element of B is paired with a unique element of A, so that there are no unpaired elements.

An injective function is called an *injection*, a surjective function is called a *surjection*, and a bijective function is called a *bijection* or *one-to-one correspondence*.

Cardinality

The cardinality of a set S, denoted $|S|$, is the number of members of S. For example, if B = {blue, white, red}, then |B| = 3. Repeated members in roster notation are not counted, so |{blue, white, red, blue, white}| = 3, too.

More formally, two sets share the same cardinality if there exists a one-to-one correspondence between them.

The cardinality of the empty set is zero.

Infinite sets and infinite cardinality

The list of elements of some sets is endless, or *infinite*. For example, the set of natural numbers is infinite. In fact, all the special sets of numbers mentioned in the section above, are infinite. Infinite sets have *infinite cardinality*.

Some infinite cardinalities are greater than others. Arguably one of the most significant results from set theory is that the set of real numbers has greater cardinality than the set of natural numbers. Sets with cardinality less than or equal to that of are called *countable sets*; these are either finite sets or *countably infinite sets* (sets of the same cardinality as); some authors use "countable" to mean "countably infinite". Sets with cardinality strictly greater than that of are called*uncountable sets*.

However, it can be shown that the cardinality of a straight line (i.e., the number of points on a line) is the same as the cardinality of any segment of that line, of the entire plane, and indeed of any finite-dimensionalEuclidean space.

The Continuum Hypothesis

The Continuum Hypothesis, formulated by Georg Cantor in 1878, is the statement that there is no set with cardinality strictly between the cardinality of the natural numbers and the cardinality of a straight line. In 1963, Paul Cohen proved that the Continuum Hypothesis is independent of the axiom system ZFC consisting of Zermelo–Fraenkel set theory with the axiom of choice. (ZFC is the most widely-studied version of axiomatic set theory.)

Power sets

The power set of a set S is the set of all subsets of S. The empty set and S itself are elements of the power set of S, because these are both subsets of S. For example, the power set of {1, 2, 3} is {∅, {1}, {2}, {3}, {1, 2}, {1, 3}, {2, 3}, {1, 2, 3}}. The power set of a set S is commonly written as $P(S)$ or 2^S.

If S has n elements, then $P(S)$ has 2^n elements. For example, {1, 2, 3} has three elements, and its power set has $2^3 = 8$ elements, as shown above.

If S is infinite (whether countable or uncountable), then $P(S)$ is uncountable. Moreover, the power set is always strictly “bigger” than the original set, in the sense that any attempt to pair up the elements of S with the elements of $P(S)$ will leave

some elements of $P(S)$ unpaired. (There is never a bijection from S onto $P(S)$.)

Partitions

A partition of a set$S$ is a set of nonempty subsets of S, such that every element x in S is in exactly one of these subsets. That is, the subsets are pairwise disjoint (meaning any two sets of the partition contain no element in common), and the union of all the subsets of the partition is S.

Basic operations

There are several fundamental operations for constructing new sets from given sets.

Unions

Two sets can be joined: the *union* of A and B, denoted by $A \cup B$, is the set of all things that are members of A or of B or of both.

Examples:

- $\{1, 2\} \cup \{1, 2\} = \{1, 2\}$.
- $\{1, 2\} \cup \{2, 3\} = \{1, 2, 3\}$.
- $\{1, 2, 3\} \cup \{3, 4, 5\} = \{1, 2, 3, 4, 5\}$.

Some basic properties of unions:

- $A \cup B = B \cup A$.
- $A \cup (B \cup C) = (A \cup B) \cup C$.

- $A \subseteq (A \cup B)$.
- $A \cup A = A$.
- $A \cup \emptyset = A$.
- $A \subseteq B$ if and only if $A \cup B = B$.

Intersections

- A new set can also be constructed by determining which members two sets have "in common". The *intersection* of A and B, denoted by $A \cap B$, is the set of all things that are members of both A and B. If $A \cap B = \emptyset$, then A and B are said to be *disjoint*.

Examples:

- $\{1, 2\} \cap \{1, 2\} = \{1, 2\}$.
- $\{1, 2\} \cap \{2, 3\} = \{2\}$.
- $\{1, 2\} \cap \{3, 4\} = \emptyset$.

Some basic properties of intersections:

- $A \cap B = B \cap A$.
- $A \cap (B \cap C) = (A \cap B) \cap C$.
- $A \cap B \subseteq A$.
- $A \cap A = A$.
- $A \cap \emptyset = \emptyset$.
- $A \subseteq B$ if and only if $A \cap B = A$.

Complements

Two sets can also be "subtracted". The *relative complement* of B in A (also called the *set-theoretic difference* of A and B),

denoted by $A \setminus B$ (or $A-B$), is the set of all elements that are members of A, but not members of B. It is valid to "subtract" members of a set that are not in the set, such as removing the element *green* from the set {1, 2, 3}; doing so will not affect the elements in the set.

In certain settings, all sets under discussion are considered to be subsets of a given universal set U. In such cases, $U \setminus A$ is called the *absolute complement* or simply *complement* of A, and is denoted by A' or A.

$A' = U \setminus A$

Examples:

$\{1, 2\} \setminus \{1, 2\} = \emptyset$.

$\{1, 2, 3, 4\} \setminus \{1, 3\} = \{2, 4\}$.

If U is the set of integers, E is the set of even integers, and O is the set of odd integers, then $U \setminus E = E' = O$.

Some basic properties of complements include the following:

$A \setminus B \neq B \setminus A$ for $A \neq B$.

$A \cup A' = U$.

$A \cap A' = \emptyset$.

$(A')' = A$.

$\emptyset \setminus A = \emptyset$.

$A \setminus \emptyset = A$.

$A \setminus A = \emptyset$.

$A \setminus U = \emptyset$.

$A \setminus A' = A$ and $A' \setminus A = A'$.

$U' = \emptyset$ and $\emptyset' = U$.

$A \setminus B = A \cap B'$.

if $A \subseteq B$ then $A \setminus B = \emptyset$.

Cartesian product

A new set can be constructed by associating every element of one set with every element of another set. The *Cartesian product* of two sets A and B, denoted by $A \times B$, is the set of all ordered pairs (a, b) such that a is a member of A and b is a member of B.

Examples:

- {1, 2} × {red, white, green} = {(1, red), (1, white), (1, green), (2, red), (2, white), (2, green)}.
- {1, 2} × {1, 2} = {(1, 1), (1, 2), (2, 1), (2, 2)}.
- {a, b, c} × {d, e, f} = {(a, d), (a, e), (a, f), (b, d), (b, e), (b, f), (c, d), (c, e), (c, f)}.

Some basic properties of Cartesian products:

- $A \times \emptyset = \emptyset$.
- $A \times (B \cup C) = (A \times B) \cup (A \times C)$.

- $(A \cup B) \times C = (A \times C) \cup (B \times C)$.

Let A and B be finite sets; then the cardinality of the Cartesian product is the product of the cardinalities:

- $|A \times B| = |B \times A| = |A| \times |B|$.

Applications

Sets are ubiquitous in modern mathematics. For example, structures in abstract algebra, such as groups, fields and rings, are sets closed under one or more operations.

One of the main applications of naive set theory is in the construction of relations. A relation from a domain$A$ to a codomain$B$ is a subset of the Cartesian product $A \times B$. For example, considering the set S = {rock, paper, scissors} of shapes in the game of the same name, the relation "beats" from S to S is the set B = {(scissors,paper), (paper,rock), (rock,scissors)}; thus x beats y in the game if the pair (x,y) is a member of B. Another example is the set F of all pairs (x, x), where x is real. This relation is a subset of $\mathbf{R} \times \mathbf{R}$, because the set of all squares is subset of the set of all real numbers. Since for every x in $\mathbf{R}$, one and only one pair $(x,\ldots)$ is found in F, it is called a function. In functional notation, this relation can be written as $F(x) = x$.

Chapter 6

Class, Family Resemblance and Intension

Class

A class is a collection whose members either fall under a predicate or are classified by a rule. Hence, while a set can be extensionally defined only by its elements, a class has also an intensional dimension that unite its members. When the term 'class' is applied such that it includes those sets elements of which are intended to be collected without a common predicate or rule, the distinction can be indicated by calling such sets "improper class."

Philosophers sometimes distinguish classes from types and kinds. We can talk about the *class* of human beings, just as we can talk about the *type* (or *natural kind*), human being, or humanity. How, then, might classes differ from types? One might well think they are not actually different categories of being, but typically, while both are treated as abstract objects, classes are not usually treated as universals, whereas types usually are. Whether natural kinds ought to be considered universals is vexed; see natural kind.

There is, in any case, a difference in how we talk about types or kinds. We say that Socrates is a *token* of a type, or an *instance* of the natural kind, *humanbeing*. But notice that we say instead that Socrates is a *member* of the class of human

beings. We would not say that Socrates is a "member" of the type or kind, human beings. Nor would we say he is a type (or kind) of a class. He is a token (instance) of the type (kind). So the linguistic difference is: types (or kinds) have tokens (or instances); classes, on the other hand, have members.

The concept of a class is similar to the concept of a set defined by its members. Here, the class is extensional. If, however, a set is definedintensionally, then it is a set of things that meet some requirement to be a member. Thus, such a set can be seen as creating a type. Note that it also creates a class from the extension of the intensional set. A type always has a corresponding class (though that class might have no members), but a class does not necessarily have a corresponding type.

Family resemblance

Family resemblance (German: *Familienähnlichkeit*) is a philosophical idea made popular by Ludwig Wittgenstein, with the best known exposition given in his posthumously published book *Philosophical Investigations* (1953). It argues that things which could be thought to be connected by one essential common feature may in fact be connected by a series of overlapping similarities, where no one feature is common to all of the things. Games, which Wittgenstein used as an example to explain the notion, have become the paradigmatic example of a group that is related by family resemblances. It has been suggested that Wittgenstein picked up the idea and the term from Friedrich Nietzsche, who had been using it, as did many nineteenth century philologists, when discussing language families.

The first occurrence of the term *family resemblance* is found in Arthur Schopenhauer (1788–1860; *The World As Will and Representation §§17, 27, 28*) who attributed the term to the school developed by Friedrich Wilhelm Joseph von Schelling (1775–1854). The next occurrence appeared in a note from 1930, commenting on Oswald Spengler's ideas. The notion itself features widely in Wittgenstein's later work, and in the *Investigations* it is introduced in response to questions about the general form of propositions and the essence of language – questions which were central to Wittgenstein throughout his philosophical career. This suggests that family resemblance was of prime importance for Wittgenstein's later philosophy; however, like many of his ideas, it is hard to find precise agreement within the secondary literature on either its place within Wittgenstein's later thought or on its wider philosophical significance.

Since the publication of the *Investigations*, the notion of family resemblance has been discussed extensively not only in the philosophical literature, but also, for example, in works dealing with classification where the approach is described as "polythetic", distinguishing it from the traditional approach known now as "monothetic". Prototype theory is a recent development in cognitive science where this idea has also been explored. As the idea gained popularity, earlier instances of its occurrence were rediscovered e.g. in 18th-century taxonomy, in the writings of Lev Vygotsky or WładysławTatarkiewicz.

Philosophical context

The local context where the topic of family resemblances appears is Wittgenstein's critique of language. In *Philosophical*

Investigations §65-71 the plurality of language uses is compared to the plurality of games. Next it is asserted that games have common features but no one feature is found in all of them. The whole argument has become famous under the heading 'language games'.

The larger context in which Wittgenstein's philosophy is seen to develop considers his uncompromising opposition to essences, mental entities and other forms of idealism which were accepted as a matter of fact in continental philosophy at the turn of the preceding century. In his view, the main cause for such errors is language and its uncritical use. In the received view, concepts, categories or classes are taken to rely on necessary features common to all items covered by them. Abstraction is the procedure which acknowledges this necessity and derives essences, but in the absence of a single common feature, it is bound to fail.

Terminology

The term "Family resemblance" as feature of Wittgenstein's philosophy owes much to its translation in English. Wittgenstein, who wrote mostly in German, used the compound word 'Familienähnlichkeit', but as he lectured and conversed in English he used 'family likeness' (e.g. *The Blue Book*, p. 17,33; *The Brown Book*,§66). However, in the *Philosophical Investigations* the separate word 'Ähnlichkeit' has been translated as 'similarity' (§§11,130,185,444) and on two occasions (§§9,90) it is given as 'like'. The German family-word is common and it is found in Grimm's dictionary; a rare occurrence of 'family likeness' has been noted in a lecture by J. F. Moulton in 1877.

Examples and quotes

Games are the main example considered by Wittgenstein in his text where he also mentions numbers and makes an analogy with a thread. He develops his argument further by insisting that in such cases there is not a clear cut boundary but there arises some ambiguity if this indefiniteness can be separated from the main point.

In §66 Wittgenstein invites us to consider for example the proceedings that we call "games"...[to] look and see whether there is anything common to all.

The section mentions card games, board games, ball games, games like ring-a-ring-a-roses and concludes:

- And we can go through the many, many other groups of games in the same way; we can see how similarities crop up and disappear.

And the result of this examination is: we see a complicated network of similarities overlapping and criss-crossing: sometimes overall similarities.

The following §67 begins by stating:

- I can think of no better expression to characterize these similarities than "**family resemblances**"; for the various resemblances between members of a family: build, features, colour of eyes, gait, temperament, etc. etc. overlap and criss-cross in the

> same way. – And I shall say: "games" form a family. and extends the illustration

for instance the kinds of number form a family in the same way. Why do we call something a "number"? Well, perhaps because it has a direct relationship with several things that have hitherto been called number; and this can be said to give it an indirect relationship to other things we call the same name. And we extend our concept of number as in spinning a thread we twist fibre on fibre. And the strength of the thread does not reside in the fact that some onefibre runs through its whole length, but in the overlapping of many fibres.

The problem of boundaries begins in §68

I can give the concept 'number' rigid limits ... that is, use the word "number" for a rigidly limited concept, but I can also use it so that the extension of the concept is not closed by a frontier. And this is how we do use the word "game". For how is the concept of a game bounded? What still counts as a game and what no longer does? Can you give the boundary? No. You can draw one; for none has so far been drawn. (But that never troubled you before when you used the word "game".)

Formal models

There are some simple models which can be derived from the text of §66-9. The most simple one, which fits Wittgenstein's exposition, seems to be the sorites type. It consists in a collection of items *Item_1*, *Item_2*, *Item_3*... described by features A, B, C, D, ...:

Item_1: A B C D

Item_2: B C D E

Item_3: C D E F

Item_4: D E F G

Item_5: E F G H

…… . . . .

In this example, which presents an indefinitely extended ordered family, resemblance is seen in shared features: each item shares three features with his neighbors e.g. *Item_2* is like *Item_1* in respects B, C, D, and like *Item_3* in respects C, D, E. Obviously what we call 'resemblance' involves different aspects in each particular case. It is also seen to be of a different 'degree' and here it fades with 'distance': *Item_1* and *Item_5* have nothing in common.

Another simple model is described as:

Item_1: A B C

Item_2: B C D

Item_3: A C D

Item_4: A B D

It exhibits the presence of a constant degree of resemblance and the absence of a common feature without extending to infinity.

Wittgenstein rejects the disjunction of features or 'properties', i.e. the set {A,B,C,D,..}, as something shared by all items. He admits that a 'sharing' is common to all but deems that it is only verbal:

if someone wished to say: "There is something common to all these constructions – namely the disjunction of all their common properties" – I should reply: Now you are only playing with words. One might as well say: "Something runs through the whole thread – namely the continuous overlapping of those fibres".

Notable applications

- Thomas Kuhn uses Wittgenstein's concept in chapter V ('The Priority of Paradigms) of his famous *The Structure of Scientific Revolutions* (1962). Paradigms are not reducible to single discoverable sets of scientific rules, but consist of assumptions that relate to other rules that are recognized by parts of a scientific community.
- Morris Weitz first applied family resemblances in an attempt to describe art. which opened a still continuing debate.
- Ezra LaFleur argues for using the idea of family resemblance to clarify discussion of musical genre.
- Umberto Eco argued that while regimes may differ wildly in their particulars, manifestations of fascismcan be recognized by a kind of family resemblance.

- RenfordBambrough proposed that 'Wittgenstein solved what is known as "the problem of universals"' and said of his solution (as Hume said of Berkeley's treatment of the same topic) that it is "one of the greatest and most valuable discoveries that has been made of late years in the republic of letters". His view provided the occasion for numerous further comments.
- Rodney Needham explored family resemblances in connection with the problem of alliance and noted their presence in taxonomy where they are known as a polythetic classification.
- Eleanor Rosch used family resemblances in her cognitivist studies. Other cognitive research has shown that children and even rhesus monkeys tend to use family resemblance relationships rather than explicit rules when learning categories.

Game studies

Wittgenstein's suggestion (PI, §66) about the impossibility of formulating a definition of games portrays a predicament for disciplines, which entail games as their subject matter, because it denies the possibility to know what games are. One possible solution is to point out that Wittgenstein merely acts out his failing attempt to define the concept of game, because he wanted to demonstrate a mechanism of language. He wasn't particularly concerned about games, nor about the concept of 'game', but he was interested in the consequence of a definitory failure. The demonstration aims to show, that there is no reason to search for real definitions, which describe

essential attributes of things, but rather nominal definitions, which describe the use of the term in a community. He connected this idea to language games – lingual expressions combined with action – as a more adequate alternative to explain the function of language. Confusing this is his choice to denominate the approach (PI, §7) as 'language games', further fueling the impression that he provides insights about the concept of game. Wittgenstein wasn't interested in games but in language, therefore his theories and examples are only superficially related to academic disciplines with games as subject matter.

Criticism and comments

Philosophical Investigations is the primary text used in discussing family resemblances, even though the topic appears also in other works by Wittgenstein, notably *The Brown Book*. Many contributions to the discussion are by people involved in philosophical research but concerned with more pragmatic questions such as taxonomy or information processing. Hans Sluga has observed that "the notion of family resemblance... draws on two quite different sets of ideas, two different vocabularies, but treats them as if they were one and the same. The first is the vocabulary of kinship, of descent, of some sort of real and causal connection..the second is that of similarity, resemblance, affinity and correspondence."

Wittgenstein's insistence that boundaries do not really exist but can be traced arbitrarily has been described as conventionalism and more generally the acceptance of his conception has been seen to present a refined nominalism.

Intension

In linguistics, logic, philosophy, and other fields, an **intension** is any property or qualityconnoted by a word, phrase, or another symbol. In the case of a word, the word's definition often implies an intension. For instance, the intensions of the word *plant* include properties such as "being composed of cellulose", "alive", and "organism", among others. A *comprehension* is the collection of all such intensions.

Overview

The meaning of a word can be thought of as the bond between the *idea the word means* and the *physical form of the word*. Swiss linguist Ferdinand de Saussure (1857–1913) contrasts three concepts:

- the *signifier* – the "sound image" or the string of letters on a page that one recognizes as the form of a sign
- the *signified* – the meaning, the concept or idea that a sign expresses or evokes
- the*referent* – the actual thing or set of things a sign refers to. See *Dyadic signs* and *Reference (semantics)*.

Without intension of some sort, a word has no meaning. For instance, the terms *rantans* or *brillig* have no intension and hence no meaning. Such terms may be suggestive, but a term can be *suggestive* without being meaningful. For instance, *ran tan* is an archaic onomatopoeia for chaotic noise or din and

may suggest to English speakers a din or meaningless noise, and *brillig* though made up by Lewis Carroll may be suggestive of 'brilliant' or 'frigid'. Such terms, it may be argued, are always intensional since they connote the property 'meaningless term', but this is only an apparent paradox and does not constitute a counterexample to the claim that without intension a word has no meaning. Part of its intension is that it has no extension. Intension is analogous to the signified in the Saussurean system, extension to the referent.

In philosophical arguments about dualism versus monism, it is noted that thoughts have intensionality and physical objects do not (S. E. Palmer, 1999), but rather have extension in space and time.

Statement forms

A statement-form is simply a form obtained by putting blanks into a sentence where one or more expressions with extensions occur—for instance, "The quick brown ___ jumped over the lazy ___'s back." An instance of the form is a statement obtained by filling the blanks in.

Intensional statement form

An *intensional statement-form* is a statement-form with at least one instance such that substituting co-extensive expressions into it does not always preserve logical value. An *intensional statement* is a statement that is an instance of an intensional statement-form. Here co-extensive expressions are expressions with the same extension.

That is, a statement-form is intensional if it has, as one of its instances, a statement for which there are two co-extensive expressions (in the relevant language) such that one of them occurs in the statement, and if the other one is put in its place (uniformly, so that it replaces the former expression wherever it occurs in the statement), the result is a (different) statement with a different logical value. An intensional statement, then, is an instance of such a form; it has the same form as a statement in which substitution of co-extensive terms fails to preserve logical value.

Examples

- Everyone who has read *Huckleberry Finn* knows that Mark Twain wrote it.
- It is possible that Aristotle did not tutor Alexander the Great.
- Aristotle was pleased that he had a sister.

To see that these are intensional, make the following substitutions: (1) "Mark Twain" → "The author of 'Corn-pone Opinions'"; (2) "Aristotle" → "the tutor of Alexander the Great"; (3) can be seen to be intensional given "had a sister" → "had a female sibling."

The intensional statements above feature expressions like "knows", "possible", and "pleased". Such expressions always, or nearly always, produce intensional statements when added (in some intelligible manner) to an extensional statement, and thus they (or more complex expressions like "It is possible that") are sometimes called *intensional operators*. A large class

of intensional statements, but by no means all, can be spotted from the fact that they contain intensional operators.

Extensional statement form

An *extensional* statement is a non-intensional statement. Substitution of co-extensive expressions into it always preserves logical value. A language is intensional if it contains intensional statements, and extensional otherwise. All natural languages are intensional. The only extensional languages are artificially constructed languages used in mathematical logic or for other special purposes and small fragments of natural languages.

Examples

- Mark Twain wrote *Huckleberry Finn*.
- Aristotle had a sister.

Note that if "Samuel Clemens" is put into (1) in place of "Mark Twain", the result is as true as the original statement. It should be clear that no matter what is put for "Mark Twain", so long as it is a singular term picking out the same man, the statement remains true. Likewise, we can put in place of the predicate any other predicate belonging to Mark Twain and only to Mark Twain, without changing the logical value. For (2), likewise, consider the following substitutions: "Aristotle" → "The tutor of Alexander the Great"; "Aristotle" → "The author of the 'Prior Analytics'"; "had a sister" → "had a sibling with two X-chromosomes"; "had a sister" → "had a parent who had a female child".

Thomas Kuhn

Thomas Samuel Kuhn (/kuːn/; July 18, 1922 – June 17, 1996) was an American philosopher of science whose 1962 book *The Structure of Scientific Revolutions* was influential in both academic and popular circles, introducing the term *paradigm shift*, which has since become an English-language idiom.

Kuhn made several claims concerning the progress of scientific knowledge: that scientific fields undergo periodic "paradigm shifts" rather than solely progressing in a linear and continuous way, and that these paradigm shifts open up new approaches to understanding what scientists would never have considered valid before; and that the notion of scientific truth, at any given moment, cannot be established solely by objective criteria but is defined by a consensus of a scientific community. Competing paradigms are frequently incommensurable; that is, they are competing and irreconcilable accounts of reality. Thus, our comprehension of science can never rely wholly upon "objectivity" alone. Science must account for subjective perspectives as well, since all objective conclusions are ultimately founded upon the subjective conditioning/worldview of its researchers and participants.

Life

Kuhn was born in Cincinnati, Ohio, to Samuel L. Kuhn, an industrial engineer, and Minette Stroock Kuhn, both Jewish.

From kindergarten through fifth grade, he was educated at Lincoln School, a private progressive school in Manhattan, which stressed independent thinking rather than learning facts and subjects. The family then moved 40 miles north to the small town of Croton-on-Hudson where, once again, he attended a private progressive school – Hessian Hills School. It was here that, in sixth through ninth grade, he learned to love mathematics. He left Hessian Hills in 1937. He graduated from The Taft School in Watertown, Connecticut, in 1940.

He obtained his BSc degree in physics from Harvard College in 1943, where he also obtained MSc and PhD degrees in physics in 1946 and 1949, respectively, under the supervision of John Van Vleck. As he states in the first few pages of the preface to the second edition of *The Structure of Scientific Revolutions*, his three years of total academic freedom as a Harvard Junior Fellow were crucial in allowing him to switch from physics to the history and philosophy of science.

He later taught a course in the history of science at Harvard from 1948 until 1956, at the suggestion of university president James Conant. After leaving Harvard, Kuhn taught at the University of California, Berkeley, in both the philosophy department and the history department, being named Professor of the history of science in 1961. Kuhn interviewed and tape recorded Danish physicist Niels Bohr the day before Bohr's death. At Berkeley, he wrote and published (in 1962) his best known and most influential work: *The Structure of Scientific Revolutions*. In 1964, he joined Princeton University as the M. Taylor Pyne Professor of Philosophy and History of Science. He served as the president of the History of Science Society from 1969 to 1970. In 1979 he joined the Massachusetts

Institute of Technology (MIT) as the Laurance S. Rockefeller Professor of Philosophy, remaining there until 1991. In 1994 Kuhn was diagnosed with lung cancer. He died in 1996.

Thomas Kuhn was married twice, first to Kathryn Muhs with whom he had three children, then to Jehane Barton Burns (Jehane B. Kuhn).

The Structure of Scientific Revolutions

The Structure of Scientific Revolutions (*SSR*) was originally printed as an article in the *International Encyclopedia of Unified Science*, published by the logical positivists of the Vienna Circle. In this book, Kuhn argued that science does not progress via a linear accumulation of new knowledge, but undergoes periodic revolutions, also called "paradigm shifts" (although he did not coin the phrase, he did contribute to its increase in popularity), in which the nature of scientific inquiry within a particular field is abruptly transformed. In general, science is broken up into three distinct stages. Prescience, which lacks a central paradigm, comes first.

This is followed by "normal science", when scientists attempt to enlarge the central paradigm by "puzzle-solving". Guided by the paradigm, normal science is extremely productive: "when the paradigm is successful, the profession will have solved problems that its members could scarcely have imagined and would never have undertaken without commitment to the paradigm".

In regard to experimentation and collection of data with a view toward solving problems through the commitment to a paradigm, Kuhn states: "The operations and measurements that a scientist undertakes in the laboratory are not 'the given' of experience but rather 'the collected with difficulty.' They are not what the scientist sees—at least not before his research is well advanced and his attention focused. Rather, they are concrete indices to the content of more elementary perceptions, and as such they are selected for the close scrutiny of normal research only because they promise opportunity for the fruitful elaboration of an accepted paradigm. Far more clearly than the immediate experience from which they in part derive, operations and measurements are paradigm-determined. Science does not deal in all possible laboratory manipulations. Instead, it selects those relevant to the juxtaposition of a paradigm with the immediate experience that that paradigm has partially determined. As a result, scientists with different paradigms engage in different concrete laboratory manipulations."

During the period of normal science, the failure of a result to conform to the paradigm is seen not as refuting the paradigm, but as the mistake of the researcher, contra Popper'sfalsifiability criterion. As anomalous results build up, science reaches a *crisis*, at which point a new paradigm, which subsumes the old results along with the anomalous results into one framework, is accepted. This is termed *revolutionary science*.

In *SSR*, Kuhn also argues that rival paradigms are incommensurable—that is, it is not possible to understand one paradigm through the conceptual framework and terminology

of another rival paradigm. For many critics, for example David Stove (*Popper and After*, 1982), this thesis seemed to entail that theory choice is fundamentally irrational: if rival theories cannot be directly compared, then one cannot make a rational choice as to which one is better. Whether Kuhn's views had such relativistic consequences is the subject of much debate; Kuhn himself denied the accusation of relativism in the third edition of *SSR*, and sought to clarify his views to avoid further misinterpretation. Freeman Dyson has quoted Kuhn as saying "I am not a Kuhnian!", referring to the relativism that some philosophers have developed based on his work.

The Structure of Scientific Revolutions is the single most widely cited book in the social sciences. The enormous impact of Kuhn's work can be measured in the changes it brought about in the vocabulary of the philosophy of science: besides "paradigm shift", Kuhn popularized the word "paradigm" itself from a term used in certain forms of linguistics and the work of Georg Lichtenberg to its current broader meaning, coined the term "normal science" to refer to the relatively routine, day-to-day work of scientists working within a paradigm, and was largely responsible for the use of the term "scientific revolutions" in the plural, taking place at widely different periods of time and in different disciplines, as opposed to a single scientific revolution in the late Renaissance. The frequent use of the phrase "paradigm shift" has made scientists more aware of and in many cases more receptive to paradigm changes, so that Kuhn's analysis of the evolution of scientific views has by itself influenced that evolution.

Kuhn's work has been extensively used in social science; for instance, in the post-positivist/positivist debate within

International Relations. Kuhn is credited as a foundational force behind the post-Mertoniansociology of scientific knowledge. Kuhn's work has also been used in the Arts and Humanities, such as by Matthew Edward Harris to distinguish between scientific and historical communities (such as political or religious groups): 'political-religious beliefs and opinions are not epistemologically the same as those pertaining to scientific theories'. This is because would-be scientists' worldviews are changed through rigorous training, through the engagement between what Kuhn calls 'exemplars' and the Global Paradigm. Kuhn's notions of paradigms and paradigm shifts have been influential in understanding the history of economic thought, for example the Keynesian revolution, and in debates in political science.

A defense Kuhn gives against the objection that his account of science from *The Structure of Scientific Revolutions* results in relativism can be found in an essay by Kuhn called "Objectivity, Value Judgment, and Theory Choice." In this essay, he reiterates five criteria from the penultimate chapter of *SSR* that determine (or help determine, more properly) theory choice:

- *Accurate* – empirically adequate with experimentation and observation
- *Consistent* – internally consistent, but also externally consistent with other theories
- *Broad Scope* – a theory's consequences should extend beyond that which it was initially designed to explain
- *Simple* – the simplest explanation, principally similar to Occam's razor

- *Fruitful* – a theory should disclose new phenomena or new relationships among phenomena

He then goes on to show how, although these criteria admittedly determine theory choice, they are imprecise in practice and relative to individual scientists. According to Kuhn, "When scientists must choose between competing theories, two men fully committed to the same list of criteria for choice may nevertheless reach different conclusions." For this reason, the criteria still are not "objective" in the usual sense of the word because individual scientists reach different conclusions with the same criteria due to valuing one criterion over another or even adding additional criteria for selfish or other subjective reasons. Kuhn then goes on to say, "I am suggesting, of course, that the criteria of choice with which I began function not as rules, which determine choice, but as values, which influence it." Because Kuhn utilizes the history of science in his account of science, his criteria or values for theory choice are often understood as descriptive normative rules (or more properly, values) of theory choice for the scientific community rather than prescriptive normative rules in the usual sense of the word "criteria", although there are many varied interpretations of Kuhn's account of science.

Post-*Structure* Philosophy

Years after the publication of *The Structure of Scientific Revolutions*, Kuhn dropped the concept of a paradigm and began to focus on the semantic aspects of scientific theories. In particular, Kuhn focuses on the taxonomic structure of scientific kind terms. As a consequence, a scientific revolution is not defined as a 'change of paradigm' anymore, but rather as

a change in the taxonomic structure of the theoretical language of science. Some scholars describe this change as resulting from a 'linguistic turn'. In their book, Andersen, Barker and Chen use some recent theories in cognitive psychology to vindicate Kuhn's mature philosophy.

Apart from dropping the concept of a paradigm, Kuhn also began to look at the process of scientific specialisation. In a scientific revolution, a new paradigm (or a new taxonomy) replaces the old one; by contrast, specialisation leads to a proliferation of new specialties and disciplines. This attention to the proliferation of specialties would make Kuhn's model less 'revolutionary' and more 'evolutionary'. Some philosophers claim that Kuhn attempted to describe different kinds of scientific change: revolutions and specialty-creation. Others claim that the process of specialisation is in itself a special case of scientific revolutions. It is also possible to argue that, in Kuhn's model, science evolves *through* revolutions.

Polanyi–Kuhn debate

Although they used different terminologies, both Kuhn and Michael Polanyi believed that scientists' subjective experiences made science a relativized discipline. Polanyi lectured on this topic for decades before Kuhn published *The Structure of Scientific Revolutions*.

Supporters of Polanyi charged Kuhn with plagiarism, as it was known that Kuhn attended several of Polanyi's lectures, and that the two men had debated endlessly over epistemology before either had achieved fame. After the charge of plagiarism, Kuhn acknowledged Polanyi in the *Second* edition of *The*

Structure of Scientific Revolutions. Despite this intellectual alliance, Polanyi's work was constantly interpreted by others within the framework of Kuhn's paradigm shifts, much to Polanyi's (and Kuhn's) dismay.

Thomas Kuhn Paradigm Shift Award

In honor of his legacy, the "Thomas Kuhn Paradigm Shift Award" is awarded by the American Chemical Society to speakers who present original views that are at odds with mainstream scientific understanding.

The winner is selected based on the novelty of the viewpoint and its potential impact if it were to be widely accepted.

Honors

Kuhn was named a Guggenheim Fellow in 1954, and in 1982 was awarded the George Sarton Medal by the History of Science Society. He also received numerous honorary doctorates.

Morris Weitz

Morris Weitz (/ˈwiːts/; July 24, 1916 – February 1, 1981) "was an American philosopher of aesthetics who focused primarily on ontology, interpretation, and literary criticism". From 1972 until his death he was Richard Koret Professor of Philosophy at Brandels University.

Biography

Personal life

Morris Weitz was born on July 24, 1916, in Detroit, his parents having emigrated from Europe (and his father having worked as a painting contractor). He was husband to Margaret (née) Collins ("an author and renowned scholar of French women, French culture and the French Resistance") and the father of three children, Richard, David, and Catherine (the former being a director of the Center for Political-Military Analysis and a Senior Fellow at the Hudson Institute). Morris Weitz died on February 1, 1981, in hospital in Roxbury after a long illness aged 64, having lived latterly in Newton, Massachusetts.

Tertiary education and academic career

Weitz obtained his BA in 1938 from Wayne State University. While doing graduate work in French history at the University of Chicago he met Bertrand Russell, which directed Weitz's interests towards philosophy. He received his Masters and, in 1943, his PhD in philosophy from the University of Michigan with a dissertation titled *The Method of Analysis in the Philosophy of Bertrand Russell*. During the course of his career he taught philosophy at the University of Washington (1944–45), Vassar College (1945–48), and Ohio State University (1954–69). In 1969Weitz moved to Brandeis University where, in 1972, he was named Richard Koret Professor of Philosophy in 1972, a position he retained until his death. He was also a visiting professor at Columbia, Cornell, and Harvard. He was

recognised with a Guggenheim Fellowship in 1959, and was also honored as a Fulbright Senior Scholar.

Philosophical thought, influence, and criticisms

Weitz spent a year in Oxford which led to lifelong friendships with Oxford philosophers such as Gilbert Ryle, H.L.A. Hart, and Isaiah Berlin and, in 1953, the publication in *The Philosophical Review* of *Oxford Philosophy* (1953). In the same, according to Aaron W. Meskin writing in *The Dictionary of Modern American Philosophers,"*Weitz argued that postwar Oxford philosophy was not unified by any general meta-philosophical position but rather by a commitment to investigating the logic of concepts". Meskin notes that this "was a significant publication in the United States as it served for many as an introduction to postwar Oxford philosophy". Meskin suggests the work also "illuminates the course of Weitz's career" - the "task of elucidating both ordinary and technical concepts" becoming central to his philosophical pursuits and his philosophical method becoming "one of conceptual analysis, so long as this pursuit is not understood to be predicated on the goal of providing necessary and sufficient conditions".

Weitz is perhaps best known for his "influential and frequently anthologized" 1956 paper *The Role of Theory in Aesthetics* which was to win him a 1955 Matchette Prize (an award now replaced by the American Philosophical Association book and article prizes). This essay explicitly modified the theory of art initially provided in his 1950 book *Philosophy of the Arts* which

had been "[s]ubject to devastating criticisms from Margaret McDonald among others". In *The Role of Theory in Aesthetics*Weitz "overturned his original claim.. that his empirical and organic theory could produce a closed or real definition of art" according to AiliBresnahan and it is "this revised version that many philosophers have considered the *sine qua non* in support of the position that theories of art should be 'open'". Supporters of Weitz's later view "for similar but non-identical reasons" include W.B. Gallie, W. E. Kennick and Benjamin R. Tilghman and detractors include M.H. Abrams, M.W. Beal, Lee Brown, George Dickie, and Maurice Mandelbaum.

Mandelbaum in his 1965 paper *Family Resemblances and Generalizations Concerning the Arts* refers to Weitz's paper and includes its author amongst those who, in support of the contention "that it is a mistake to attempt to discuss what art, or beauty, or the aesthetic, or a poem, *essentially* is" have made "explicit use of Wittgenstein's doctrine of family resemblances". Mandelbaum claims that though he has "placed this at the forefront of his discussion.. Professor Weitz [has] made no attempt to analyze, clarify, or defend the doctrine itself".

Weitz's 1956 paper has been, as Meskin notes, "one of the most influential works in contemporary philosophy of art, and.. continues to generate debate and discussion".

Works

- *Philosophy of the Arts*, 1950

- *Weitz, Morris (1956). "The Role of Theory in Aesthetics". Journal of Aesthetics and Art Criticism.* ***15*** *(1): 27–35. doi:10.2307/427491. JSTOR 427491.*reprinted in P. Lamarque and S. H. Olsen (eds), *Aesthetics and the Philosophy of Art: The Analytic Tradition*, (Oxford: Blackwell, 2004), pp. 12–18.
- *Philosophy in literature* (1963)
- *Hamlet and the philosophy of literary criticism* (1964) ISBN 978-0226892399
- editor of "*Problems in aesthetics*" (1959, 1970)

Umberto Eco

Umberto EcoOMRI (5 January 1932 – 19 February 2016) was an Italian medievalist, philosopher, semiotician, cultural critic, political and social commentator, and novelist. In English, he is best known for his popular 1980 novel *The Name of the Rose*, a historical mystery combiningsemiotics in fiction with biblical analysis, medieval studies, and literary theory, and *Foucault's Pendulum,* his 1988 novel which touches on similar themes.

Eco wrote prolifically throughout his life, with his output including children's books, translations from French and English, and a twice-monthly newspaper column “La Bustina di Minerva” (Minerva’s Matchbook) in the magazine *L'Espresso* beginning in 1985, with his last column (a critical appraisal of the Romantic paintings of Francesco Hayez) appearing 27 January 2016. At the time of his death, he was an emeritus professor at the University of Bologna, where he taught for much of his life.

Early life and education

Eco was born on 5 January 1932 in the city of Alessandria, in Piedmont in northern Italy, and he attended high school there. His father, Giulio, one of thirteen children, was an accountant before the government called him to serve in three wars. During World War II, Umberto and his mother, Giovanna (Bisio), moved to a small village in the Piedmontese mountainside. Eco received a Salesian education and made references to the order and its founder in his works and interviews. Towards the end of his life, Eco came to believe that his family name was an acronym of *ex caelisoblatus* (from Latin: a gift from the heavens). As was the custom at the time, the name had been given to his grandfather (a foundling) by an official in city hall. In a 2011 interview, Eco explained that a friend happened to come across the acronym on a list of Jesuit acronyms in the Vatican Library, informing him of the likely origin of the name.

Umberto's father urged him to become a lawyer, but he entered the University of Turin (UNITO), writing his thesis on the aesthetics of medieval philosopher and theologian Thomas Aquinas under the supervision of Luigi Pareyson, for which he earned his Laurea degree in philosophy in 1954.

Career

Medieval aesthetics and philosophy 1954–1964

After graduating, Eco worked for the state broadcasting station RadiotelevisioneItaliana (RAI) in Milan, producing a variety of

cultural programming. Following the publication of his first book in 1956, he became an assistant lecturer at his alma mater. In 1958, Eco left RAI and the University of Turin to complete 18 months of compulsory military service in the Italian Army.

In 1959, following his return to university teaching, Eco was approached by Valentino Bompiani to edit a series on "Ideenuove" (New Ideas) for his eponymous publishing house in Milan. According to the publisher, he became aware of Eco through his short pamphlet of cartoons and verse *Filosofi in libertà* (Philosophers in Freedom, or Liberated Philosophers), which originally been published in a limited print run of 550 under the James Joyce-inspired pseudonym Daedalus.

That same year, Eco published his second book, *Sviluppodell'esteticamedievale* (*The Development of Medieval Aesthetics*), a scholarly monograph building on his work on Aquinas. Earning his liberadocenza in aesthetics in 1961, Eco was promoted to the position of Lecturer in the same subject in 1963, before leaving the University of Turin to take a position as Lecturer in Architecture at the University of Milan in 1964.

Early writings on semiotics and popular culture 1961–1964

Among his work for a general audience, in 1961 Eco's short essay "Phenomenology of Mike Bongiorno", a critical analysis of a popular but unrefined quiz show host, appeared as part of series of articles by Eco on mass media published in the magazine of the tyre manufacturer Pirelli. In it, Eco, observed that, "[Bongiorno] does not provoke inferiority complexes,

despite presenting himself as an idol, and the public acknowledge him, by being grateful to him and loving him. He represents an ideal that nobody need strive to reach because everyone is already at his level." Receiving notoriety among the general public thanks to widespread media coverage, the essay was later included in the collection *Diariominimo* (1963).

Over this period, Eco began seriously developing his ideas on the "open" text and on semiotics, writing many essays on these subjects. In 1962 he published *Opera aperta* (translated into English as "The Open Work"). In it, Eco argued that literary texts are fields of meaning, rather than strings of meaning; and that they are understood as open, internally dynamic and psychologically engaged fields. Literature which limits one's potential understanding to a single, unequivocal line, the *closed text*, remains the least rewarding, while texts that are the most active between mind, society and life (open texts) are the liveliest and best—although valuation terminology was not his primary focus. Eco came to these positions through study of language and from semiotics, rather than from psychology or historical analysis (as did theorists such as Wolfgang Iser, on the one hand, and Hans Robert Jauss, on the other).

In his 1964 book *Apocalittici e integrati,* Eco continued his exploration of popular culture, analyzing the phenomenon of mass communication from a sociological perspective.

Visual communication and semiological guerrilla warfare 1965–1975

From 1965 to 1969, he was Professor of Visual Communications at the University of Florence, where he gave

the influential lecture "Towards a Semiological Guerrilla Warfare", which coined the influential term "semiological guerrilla", and influenced the theorization of guerrilla tactics against mainstreammass media culture, such as guerrilla television and culture jamming. Among the expressions used in the essay are "communications guerrilla warfare" and "cultural guerrilla". The essay was later included in Eco's book *Faith in Fakes*.

Eco approach to semiotics is often referred to as "interpretative semiotics." His first book length elaboration his theory appears in *La strutturaassente* (1968; literally: *The Absent Structure*).

In 1969, he left to become Professor of Semiotics at Milan Polytechnic, spending his first year as a visiting professor at New York University. In 1971 he took up a position as Associate Professor at the University of Bologna, spending 1972 as a visiting professor at Northwestern University. Following the publication of *A Theory of Semiotics* in 1975, he was promoted to Professor of Semiotics at the University of Bologna. That same year, Eco stepped down from his position as senior non-fiction editor at Bompiani.

Name of the Rose and Foucault's Pendulum 1975–1988

From 1977 to 1978 Eco was a visiting professor in the US, first at Yale University and then at Columbia University. He returned to Yale from 1980 to 1981, and Columbia in 1984. During this time he completed *The Role of the Reader* (1979) and *Semiotics and Philosophy of Language* (1984).

Eco drew on his background as a medievalist in his first novel *The Name of the Rose* (1980), a historical mystery set in a

14th-century monastery. Franciscan friar William of Baskerville, aided by his assistant Adso, a Benedictinenovice, investigates a series of murders at a monastery that is to host an important religious debate. The novel contains many direct or indirect metatextual references to other sources, requiring the detective work of the reader to 'solve'.

The title is unexplained in the body of the book, but at the end, there is a Latin verse "Stat rosapristina nomine, nomine nudatenemus", that is to say that once a rose has withered, only its name survives. As a symbol, the rose is ubiquitous enough not to confer any single meaning. There is a tribute to Jorge Luis Borges, a major influence on Eco, in the character Jorge of Burgos: Borges, like the blind monk Jorge, lived a celibate life consecrated to his passion for books, and also went blind in later life. The labyrinthine library in *The Name of the Rose* also alludes to Borge's short story "The Library of Babel". William of Baskerville is a logically-minded Englishman who is a friar and a detective, and his name evokes both William of Ockham and Sherlock Holmes (by way of *The Hound of the Baskervilles*); several passages describing him are strongly reminiscent of Sir Arthur Conan Doyle's descriptions of Holmes. The underlying mystery of the murder is borrowed from the "Arabian Nights". *The Name of the Rose* was later made into a motion picture starring Sean Connery, F. Murray Abraham, Christian Slater and Ron Perlman, which follows the plot, though not the philosophical and historical themes, of the novel and a made-for-television mini-series.

In *Foucault's Pendulum* (1988), three under-employed editors who work for a minor publishing house decide to amuse themselves by inventing a conspiracy theory. Their conspiracy,

which they call "The Plan", is about an immense and intricate plot to take over the world by a secret order descended from the Knights Templar. As the game goes on, the three slowly become obsessed with the details of this plan. The game turns dangerous when outsiders learn of The Plan, and believe that the men have really discovered the secret to regaining the lost treasure of the Templars.

Anthropology of the West and *The Island of the Day Before* 1988–2000

In 1988, Eco founded the Department of Media Studies at the University of the Republic of San Marino, and in 1992 he founded the Institute of Communication Disciplines at University of Bologna, later founding the Higher School for the Study of the Humanities at the same institution.

In 1988, at the University of Bologna, Eco created an unusual program called *Anthropology of the West* from the perspective of non-Westerners (African and Chinese scholars), as defined by their own criteria. Eco developed this transcultural international network based on the idea of Alain le Pichon in West Africa. The Bologna program resulted in the first conference in Guangzhou, China, in 1991 entitled "Frontiers of Knowledge". The first event was soon followed by an Itinerant Euro-Chinese seminar on "Misunderstandings in the Quest for the Universal" along the silk trade route from Guangzhou to Beijing. The latter culminated in a book entitled *The Unicorn and the Dragon*, which discussed the question of the creation of knowledge in China and in Europe. Scholars contributing to this volume were from China, including Tang Yijie, Wang Bin

and Yue Daiyun, as well as from Europe: Furio Colombo, Antoine Danchin, Jacques Le Goff, Paolo Fabbri and Alain Rey.

Eco published *The Limits of Interpretation* in 1990.

From 1992 to 1993, Eco was a visiting professor at Harvard University and from 2001 to 2002, at St Anne's College, Oxford.

The Island of the Day Before (1994) was Eco's third novel. The book, set in the 17th century, is about a man stranded on a ship within sight of an island which he believes is on the other side of the international date-line. The main character is trapped by his inability to swim and instead spends the bulk of the book reminiscing on his life and the adventures that brought him to be stranded.

He returned to semiotics in *Kant and the Platypus* in 1997, a book which Eco himself reputedly warned fans of his novels away from, saying, "This a hard-core book. It's not a page turner. You have to stay on every page for two weeks with your pencil. In other words, don't buy it if you are not Einstein."

In 2000 a seminar in Timbuktu, Mali, was followed up with another gathering in Bologna to reflect on the conditions of reciprocal knowledge between East and West. This, in turn, gave rise to a series of conferences in Brussels, Paris and Goa, culminating in Beijing in 2007. The topics of the Beijing conference were "Order and Disorder", "New Concepts of War and Peace", "Human Rights" and "Social Justice and Harmony". Eco presented the opening lecture. Among those giving presentations were anthropologists Balveer Arora, Varun Sahni, and Rukmini Bhaya Nair from India, Moussa Sow from

Africa, Roland Marti and Maurice Olender from Europe, Cha Insuk from Korea, and Huang Ping and Zhao Tinyang from China. Also on the program were scholars from the fields of law and science including Antoine Danchin, Ahmed Djebbar and Dieter Grimm. Eco's interest in east–west dialogue to facilitate international communication and understanding also correlates with his related interest in the international auxiliary language Esperanto.

Later novels and writing 2000–2016

*Baudolino*was published in 2000. Baudolino is a much-travelled polyglot Piedmontese scholar who saves the Byzantine historian NiketasChoniates during the sack of Constantinople in the Fourth Crusade.

Claiming to be an accomplished liar, he confides his history, from his childhood as a peasant lad endowed with a vivid imagination, through his role as adopted son of Emperor Frederick Barbarossa, to his mission to visit the mythical realm of Prester John. Throughout his retelling, Baudolino brags of his ability to swindle and tell tall tales, leaving the historian (and the reader) unsure of just how much of his story was a lie.

The Mysterious Flame of Queen Loana (2005) is about Giambattista Bodoni, an old bookseller specializing in antiques who emerges from a coma with only some memories to recover his past. Bodoni is pressed to make a very difficult choice, one between his past and his future. He must either abandon his past to live his future or regain his past and sacrifice his future.

The Prague Cemetery, Eco's sixth novel, was published in 2010. It is the story of a secret agent who "weaves plots, conspiracies, intrigues and attacks, and helps determine the historical and political fate of the European Continent". The book is a narrative of the rise of Modern-day antisemitism, by way of the Dreyfus affair, *The Protocols of the Elders of Zion* and other important 19th-century events which gave rise to hatred and hostility toward the Jewish people.

In 2012, Eco and Jean-Claude Carrière published a book of conversations on the future of information carriers. Eco criticized social networks, saying for example that "Social media gives legions of idiots the right to speak when they once only spoke at a bar after a glass of wine, without harming the community ... but now they have the same right to speak as a Nobel Prize winner. It's the invasion of the idiots."

From the Tree to the Labyrinth: Historical Studies on the Sign and Interpretation (2014).

*Numero Zero*was published in 2015. Set in 1992 and narrated by Colonna, a hack journalist working on a Milan newspaper, it offers a satire of Italy's kickback and bribery culture as well as, among many things, the legacy of Fascism.

Influences and themes

A group of avant-garde artists, painters, musicians and writers, whom he had befriended at RAI, the Neoavanguardia or Gruppo '63, became an important and influential component in Eco's writing career.

In 1971, Eco co-founded *Versus:Quaderni di studisemiotici* (known as *VS* among Italian academics), a semiotic journal. *VS* is used by scholars whose work is related to signs and signification.

The journal's foundation and activities have contributed to semiotics as an academic field in its own right, both in Italy and in the rest of Europe. Most of the well-known European semioticians, including Eco, A. J. Greimas, Jean-Marie Floch, and Jacques Fontanille, as well as philosophers and linguists like John Searle and George Lakoff, have published original articles in *VS*. His work with Serbian and Russian scholars and writers included thought on MiloradPavić and a meeting with Alexander Genis.

Beginning in the early 1990s, Eco collaborated with artists and philosophers such as Enrico Baj, Jean Baudrillard, and Donald Kuspit to publish a number of tongue-in-cheek texts on the imaginary science of 'pataphysics.

Eco's fiction has enjoyed a wide audience around the world, with many translations. His novels are full of subtle, often multilingual, references to literature and history. Eco's work illustrates the concept of intertextuality, or the inter-connectedness of all literary works. Eco cited James Joyce and Jorge Luis Borges as the two modern authors who have influenced his work the most.

Eco was also a translator: he translated into Italian Raymond Queneau's*Exercices de style* (1947). Eco's translation was published under the title *Esercizi di stile* in 1983. He was also the translator of *Sylvie*, a novella by Gérard de Nerval.

Critical reception and legacy

As an academic studying philosophy, semiotics, and culture, Eco divided critics as to whether his theorizing should be seen as brilliant or an unnecessary vanity project obsessing over minutiae, while his fiction writing stunned critics with its simultaneous complexity and popularity.

In his 1980 review of *The Role of the Reader*, philosopher Roger Scruton, attacking Eco's esoteric tendencies, writes that, "[Eco seeks] the rhetoric of technicality, the means of generating so much smoke for so long that the reader will begin to blame his own lack of perception, rather than the author's lack of illumination, for the fact that he has ceased to see."In his 1986 review of *Faith in Fakes* and *Art and Beauty in the Middle Ages*, art historian Nicholas Penny, meanwhile, accuses Eco of pandering, writing "I suspect that Eco may have first been seduced from intellectual caution, if not modesty, by the righteous cause of 'relevance' (a word much in favour when the earlier of these essays appeared) – a cause which Medievalists may be driven to embrace with particularly desperate abandon."

At the other end of the spectrum, Eco has been praised for his levity and encyclopedic knowledge, which allowed him to make abstruse academic subjects accessible and engaging. In a 1980 review of *The Name of the Rose*, literary critic and scholar Frank Kermode refers to *Theory of Semiotics*, as "a vigorous but difficult treatise", finding Eco's novel, "a wonderfully interesting book – a very odd thing to be born of a passion for the Middle Ages and for semiotics, and a very modern pleasure." Gilles Deleuze cites Eco's 1962 book *The Open Work*

approvingly in his seminal 1968 text *Difference and Repetition*, a book which poststructuralist philosopher Jacques Derridais said to have also taken inspiration from. In an obituary by the philosopher and literary critic Carlin Romano, meanwhile, Eco is described as having "[become], over time, the critical conscience at the center of Italian humanistic culture, uniting smaller worlds like no one before him."

In 2017, a retrospective of Eco's work was published by Open Court as the 35th volume in the prestigious *Library of Living Philosophers,* edited by Sara G. Beardsworth and Randall E. Auxier, featuring essays by 23 contemporary scholars.

Honors

Following the publication of *In the Name of the Rose* in 1980, in 1981 Eco was awarded the Strega prize, Italy's most prestigious literary award, receiving the Anghiari prize the same year. The following year, he received the Mendicis prize, and in 1985 the McLuhan Teleglobe prize. In 2005, Eco was honoured with the *Kenyon Review* Award for Literary Achievement, along with Roger Angell. In 2010, Eco was invited to join the AccademiadeiLincei.

Eco was awarded honorary doctorate degrees by the University of Odense in 1986, Loyola University Chicago in 1987, the University of Glasgow in 1990, the University of Kent in 1992, Indiana University Bloomington in 1992, University of Tartu in 1996, Rutgers University in 2002, and the University of Belgrade in 2009. Additionally, Eco was an honorary fellow of Kellogg College, Oxford.

Religious views

During his university studies, Eco stopped believing in God and left the Catholic Church, later helping co-found the Italian skeptic organization *ComitatoItaliano per ilControllodelle AffermazionisullePseudoscienze* (Italian Committee for the Investigation of Claims of the Pseudosciences) CICAP.

Personal life and death

In September 1962 he married Renate Ramge, a German graphic designer and art teacher with whom he had a son and a daughter.

Eco divided his time between an apartment in Milan and a vacation house near Urbino. He had a 30,000 volumelibrary in the former and a 20,000 volume library in the latter.

Eco died at his Milanese home of pancreatic cancer, from which he had been suffering for two years, on the night of 19 February 2016. From 2008 to the time of his death at the age of 84, he was a professor emeritus at the University of Bologna, where he had taught since 1971.

In popular culture

- Eco has a cameo in Michelangelo Antonioni's 1961 film *La Notte* ('The Night'), playing a guest at a party celebrating the publication of protagonist Giovanni

Pontano (Marcello Mastroianni)'s new book by Bompiani (where Eco was an editor in real life).

RenfordBambrough

John RenfordBambrough (29 April 1926 – 17 January 1999) was a British philosopher. He was fellow of St John's College, Cambridge from 1950-1999, where he held the positions of Dean (1964–1979) and President (1979–1983).

Life

John RenfordBambrough was born in Silksworth, Sunderland, England on 29 April 1926. He was born into a mining background, his father having been an electrician at Silksworth Colliery. And he himself worked, as part of his national service, in a coalmine at Wearmouth Colliery from 1944 to 1945 as a Bevin Boy.

He died in Cambridge on 17 January 1999.

Works

Books authored

- *Reason, Truth and God* (1969)
- *Moral Skepticism and Moral Knowledge* (1979)

Books edited

- *The Philosophy of Aristotle* (1963)

- *New Essays on Plato and Aristotle* (1965)
- *Plato, Popper and Politics: Some Contributions to a Modern Controversy* (1967).
- *Wisdom: Twelve Essays* (1974)

Select papers/book chapters etc.

- 'Universals and Family Resemblances', *Proceedings of the Aristotelian Society*, vol. 61 (1960-61), pp.207-22.
- 'A Proof of the Objectivity of Morals', *American Journal of Jurisprudence*, vol. 14 (1969), pp.37-53.
- 'The Shape of Ignorance', in: Lewis, Hywel David (ed.) C*ontemporary British Philosophy Personal Statements Fourth Series* (1971)
- 'Objectivity and Objects', *Proceedings of the Aristotelian Society*, vol. 72 (1971-2), pp.65-81.
- *Conflict and the Scope of Reason, the St. John's College, Cambridge, lecture, 1973-74, delivered at the University of Hull, 8 March 1973,* (1974)
- 'Essay on Man', in R.S. Peters (ed.), *Nature and Conduct,* Royal Institute of Philosophy Lectures, vol. 8 (1975), pp.1-13.
- Thought, Word and Deed', *Proceedings of the Aristotelian Society*, suppl. vol. 54 (1980), pp.105-17.
- 'Discipline and Discipleship', in IlhamDilman (ed.), *Philosophy and Life: Essays on John Wisdom* (The Hague, 1984), pp.201-17.
- 'Articulation and Justification', *The Monist,* vol. 71 (July 1988), pp.311-19.
- 'Ethics and the Limits of Consistency', *Proceedings of the Aristotelian Society*, vol. 90 (1989-90), pp.1-15.

Rodney Needham

Rodney Needham (15 May 1923 – 4 December 2006 in Oxford) was a British social anthropologist.

Born **Rodney Phillip Needham Green**, he changed his name in 1947; the following year he married Maud Claudia (Ruth) Brysz. The couple would collaborate on several works, including an English translation of Robert Hertz's *Death and the Right Hand.*

His fieldwork was with the Penan of Borneo (1951-2) and the Siwang of Malaysia (1953-5). His doctoral thesis on the Penanwas accepted in 1953.

He was University Lecturer in Social Anthropology, Oxford University, 1956–76; Professor of Social Anthropology, Oxford, 1976–90; Official Fellow, Merton College, Oxford, 1971–75; and Fellow, All Souls College, Oxford, 1976-90.

Together with Edmund Leach and Mary Douglas, Needham brought structuralism from France and anglicised it in the process. A prolific scholar, he was also a teacher and a rediscoverer of neglected figures in the history of his discipline, such as Arnold Van Gennep and Robert Hertz.

Among other things, he contributed to the study of family resemblance, introducing the terms "monothetic" and "polythetic" into anthropology.

He had two children, one of whom, Tristan, became a professor of mathematics.

Eleanor Rosch

Eleanor Rosch (once known as Eleanor RoschHeider; born 1938) is an American psychologist. She is a professor of psychology at the University of California, Berkeley, specializing in cognitive psychology and primarily known for her work on categorization, in particular her prototype theory, which has profoundly influenced the field of cognitive psychology.

Throughout her workRosch has conducted extensive research focusing on a range of topics, including semantic categorization, mental representation of concepts, and linguistics. Her research interests include cognition, concepts, causality, thinking, memory, and cross-cultural, and Eastern and religious psychology. Her more recent work in the psychology of religion has sought to show the implications of Buddhism and contemplative aspects of Western religions for modern psychology.

Early life and education

Rosch was born in New York City, the daughter of an English teacher from England and a mother who was a Russian refugee. She completed an undergraduate philosophy thesis at Reed College on Wittgenstein, who she said "cured her of studying philosophy."

After school, she served as a social worker in Portland for several years, returning later to Harvard to study clinical psychology at the then-Department of Social Relations. Rosch

delivered a paradigm-changing doctoral thesis at Harvard about category formation, under the direction of Roger Brown. After a short stint at Brown University and Connecticut College, Rosch joined the Department of Psychology at University of California, Berkeley in 1971.

Research

From field experiments Rosch conducted (alongside her then-husband Karl Heider) in the 1970s with the Dani people of Papua New Guinea, she concluded that when categorizing an everyday object or experience, people rely less on abstract definitions of categories than on a comparison of the given object or experience with what they deem to be the object or experience best representing a category ("prototype").

Although the Dani lack words for all the English colors (their language contained only two color terms dividing all colors into either the "light, bright" category or the "dark, cool" category), Rosch showed that they could still categorize objects by colors for which they had no words. She argued that basic objects have a psychological import that transcends cultural differences and shapes how such objects are mentally represented. She concluded that people in different cultures tend to categorize objects by using prototypes, although the prototypes of particular categories may vary.

Rosch contributed to multiple scholarly works of taxonomic analysis of objects based on these prototype ("chair") and subordinate terms ("tall black leather chair"). She inferred that overuse of subordinate terms could be attributed to the attitude of snobbery and elitism.

Her work has been often referenced by that of computer vision and deep learning researcher Aude Oliva, who has built upon Rosch's object classifications to teach computers to recognize basic scenes instantly interpreted by humans.

Publications

Books

- 1978 (with Lloyd, B., eds). *Cognition and Categorization*. Hillsdale NJ: Lawrence Erlbaum Associates.
- 1991 (with Francisco Varela and Evan F. Thompson). *The Embodied Mind*. MIT Press.

Book chapters

- 1973, "On the Internal Structure of Perceptual and Semantic Categories." In T. Moore (ed.), *Cognitive Development and the Acquisition of Language, New York: Academic Press, 1973.*
- 1974, Linguistic relativity. In: E. Silverstein (ed.) Human Communication: Theoretical Perspectives, Hillsdale, NJ: Lawrence Erlbaum.
- 1977, "Human Categorization" in Warren, Neil, ed., *Advances in Cross-Cultural Psychology 1*: 1-72. Academic Press.
- 1983, "Prototype classification and logical classification: The two systems" in Scholnick, E., *New Trends in Cognitive Representation: Challenges*

to Piaget's Theory. Hillsdale, NJ: Lawrence Erlbaum Associates: 73-86

Papers

Categorization and prototype theory

- *Rosch, E.H. (1973). "Natural categories". Cognitive Psychology.* ***4*** *(3): 328–50. doi:10.1016/0010-0285(73)90017-0.*
- *Rosch, R.H. (1975). "Cognitive reference points". Cognitive Psychology.* ***7*** *(4): 532–47. doi:10.1016/0010-0285(75)90021-3.*
  S2CID 54342276.
- 1975, "Cognitive representation of semantic categories," *Journal of Experimental Psychology 104(3): 192-233.*
- *Rosch, E.H.; Mervis, C.B.; Gray, W.D.; Johnson, D.M.; Boyes-Braem, P. (1976). "Basic objects in natural categories". Cognitive Psychology.* ***8*** *(3): 382–439. CiteSeerX 10.1.1.149.3392. doi:10.1016/0010-0285(76)90013-X. S2CID 5612467.*
- *Mervis, C.B.; Rosch, E. (1981). "Categorization of Natural Objects". Annual Review of Psychology.* ***32****: 89–113. doi:10.1146/annurev.ps.32.020181.000513.*

Psychology of religion

- *Eleanor Rosch (2002). "How to catch James's mystic germ: Religious experience, Buddhist meditation and psychology". Journal of Consciousness Studies.* ***9*** *(9–10): 37–56. ISSN 1355-8250.*

- *Eleanor Rosch (2003). "The basis of compassion: Western science in dialog with the Dalai Lama". PsycCRITIQUES. **48** (3): 330–332. doi:10.1037/000807. ISSN 1554-0138.*
- *Eleanor Rosch (2007). "More than mindfulness: When you have a tiger by the tail, let it eat you". Psychological Inquiry. **18** (4): 258–264. doi:10.1080/10478400701598371. ISSN 1047-840X. S2CID 144196114.*
- *Eleanor Rosch&EmanFallah (2007). "Science and religion, Dalai Lama style". PsycCRITIQUES. **52** (20): np. doi:10.1037/a0007895. ISSN 1554-0138.*

Awards and recognition

Rosch is a Fellow of the Cognitive Science Society. She has mediated several discussions with the Dalai Lama.