The Journal of Mind and Behavior
Winter and Spring 2023, Volume 44, Numbers 1 and 2
Pages 37–56
ISSN 0271–0137

Language as a Perceptual System

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Several modalities are regarded as constituting perceptual systems: vision, audition, touch, smell, proprioception, and interoception. Perception of speech, studied extensively, has been found to be slightly different from audition in other mammals, but is not therefore regarded as entirely different from other forms of mammalian audition. In comparison, language is regarded as something distinct from any perceptual modality. It is assumed that the function of language is communication, not perception. This assumption presupposes a further assumption: communicating cannot be in the same class of functions as perceiving. But why should one assume that the function — in terms of evolution and epistemology — of either language or communication is not that of a perceptual system? These notes argue that language constitutes an evolved conceptual and perceptual system. It is that combined system (especially in its capacity to transcend space and time, ramifications of the development of consciousness, and the increased capacity for memory) that has made hominins superior to other mammalian life forms. We "perceive" (or more inclusively, conceive) better because we possess language. Language is our presently ultimate (latest, most highly developed) perceptual system. We need to reorient our theories accordingly.

Keywords: conception, perceptual systems, anticipatory modeling, epistemology

From the standpoint of evolution and epistemology, language and perception are similar rather than different functions. They are equally and primarily conceptual or epistemic functions. From this perspective we are not primarily concerned with the interaction of language and (usually visual) perception, as summarized in Vulchanova, Vulchanov, Fritz, and Milburn (2019) [such as the earlier Whorf–Sapir hypothesis, or Miller and Johnson–Laird, 1976], or even with Barsalou (2009) with language affecting visual anticipatory modeling (although the latter research is much closer to language functioning as perception). Lacking from such studies is the fundamental premise that language is, *in itself*, a perceptual system, and the theoretical perspective — the evolutionary approach and evolutionary epistemology — from which it follows. This essay argues that language is equally an independent(ly) evolved open ended

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perception system, complementing and enhancing the semantic information or "*picture* of the econiche" that all perceptual systems (which provide different forms of functional or semantic information for an organism) make available. It is part of the functional repertoire of evolved adaptive systems of primates of the *Homo* series populating this planet. As such we should not focus only on language's *separate* ability to be a communication system. We should study language as the most recently evolved anticipatory modeling system of primates, as an addition to the earlier evolved modeling systems provided by the traditional modalities of perception. It will be more fruitful, from both empirical and theoretical points of view, to study language as an evolved perceptual system. We need to exploit the superiority of the conceptual power gained by treating language as an evolved perceptual system.

This is not a task for new factual or empirical studies (although many should be suggested by adoption of the new perspective) as much as a redirection of attention. Late in the eighteenth century the polymath German romantic von Hardenberg, writing under his pen name of Novalis, put the situation we face in a telling aphorism: when viewed from afar, the whale is the largest of fishes; viewed up close, the whale is no fish at all. From our usual theoretical viewing distance, language is unique and distinct from the senses. Viewed more closely from an evolutionary point of view, it is a perceptual system of unique nature and emergent power, capable of going far beyond earlier perceptual modalities, but still functionally a perceptual system.

Separation of the Physical and Functional

Life begins with the separation (emergence) of the functional from the physical. The origin of life and the classic mind–body problems are manifestations of this separation. To the extent that there has been progress in these issues it has involved understanding this fundamental and unavoidable duality. Life undoubtedly began when heritable information in one-dimensional genetic physical sequences became symbols which constrain three-dimensional physical protein dynamics (by copolymer folding). As Pattee (2012, 2021, 2022) has emphasized, this is a direct *physical* entity-to-action conversion that leaves no degrees of physical freedom, and thus no need for an interpreter or any interpretive process (semantic closure) to close any degrees of freedom. All interpretation (semantic meaning, function, intention, etc.) occurs *after* the genetic symbol sequences have been expressed or (as Harnad, 1990, put it) *grounded* (realized) in some physical process sequence.

The same situation constrains the converse: the initial "sensory" input to action. This must also be grounded. The action-to-symbol conversion of sensory input begins with single folded macro molecules which, when stimulated (physically impacted) by external actions, become *functional* detectors whose

outputs are symbolic signals to action. As Pattee (2021) noted, "the initial symbol production by the detector molecule is genetically determined and not subject to interpretation. Sensory information is *not heritable*. Interpretive intervention makes sense only at higher levels where many output symbols can be combined and where there are many actual alternatives" (p. 6). At those higher levels — where alternatives (degrees of freedom to the physicist) are physically possible — the functional realm comes into existence. Functionality depends upon choice (the existence of equally physically realizable, which is to say energy degenerate and thus *genuine* alternatives), and arises simultaneously with agency (which comes into existence when a physically specifiable choice is made). All theories of perception are by definition functional, since they deal with these "higher" levels of constraints and functional choices on the part of agency (organisms). In the traditional philosophical literature, this is the transition to "the mental" from "the physical," although such older concepts have no useful meaning when the contrast between physicality and functionality is correctly drawn (Weimer, 2023a).

Syntax versus semantics: Structure is not meaning. Syntax is structure or form. As such it has no intrinsic meaning, just as, say, a line of dots on a piece of paper is meaningless until some subject — an agent who makes choices — interprets that meaningless structure and in so doing gives a semantic content to correspond to that form. Semantics is a functional, therefore higher order constraint, limiting the allowable physically realizable alternatives to particular ones. To the extent that it is pragmatically useful (has an epistemic outcome) it tries to eliminate the ambiguity of indeterminate possibilities. Perceptual ambiguity, as in the classic examples of the Necker Cube or the figure whch is either "my wife" or "my mother in law," is best understood on the model of linguistic ambiguity. The theory of Post (1943, 1965) provides the best available framework for understanding how the interpretation of linear syntactic strings (whether in language or perception) can come about, and shows how such ambiguity can be decreased, or by looking at its derivational history, explained (and thus interpreted).

Semantic–pragmatic information (the meaning content of language) is not syntactical: it is not just bits. One cannot substitute study of communication theory bits, meaningful in the context that Shannon and Weaver provided for the study of language transmission without degradation by "noise" in the physical transmission channel, for a theory of either reference or meaning in cognition. Such bits are physical only, and having no functional component, do not address semantic meaning at all (Pattee, 2012; Weimer, 2023a, 2023b). The physical realm (the bits) remains a substrate (the "lower" order existents) upon which the semantic constraints operate. This is why all agency must be embodied in one or another physical form: the higher order agency can only operate upon the given substrate, not on "thin air."

The function of a perceptual system. From the standpoint of evolution the overriding function of perception is to aid the survival of an organism. This is done

by providing semantic (organism relevant) rather than syntactic information — providing functional information, semantic content, that enables the organism to interact with itself and its econiche — about itself and its environment. This is why the discussion of "first principles" of living organisms involves life-sustaining versus life-threatening distinctions such as approach–avoidance, pleasure–pain, harmless–harmful, and many others, and carries through to the "highest" philosophical and religious discussions such as good versus evil and right versus wrong. All this begins with the attempt to survive, and it explains why doing so involves what philosophers have termed "success words." This is the enormous gamut of instances in which Polanyi's (1969) thesis that "life harnesses physicality" has occurred, from single-celled organisms up to our present species. As he (and Campbell, 1974) noted, questions about the function of a particular lower-level or *physical* system require discussion and explanation of the higher order *functional* constraints which harness them. The functional constrains the physical. The function of a perceptual system — be it vision, audition, the contact senses, or whatever — can only be understood by moving to the level of analysis of the functional constraints which control the system. This is the domain of evolutionary epistemology. Perceiving is *for* knowing. And the semantic domain in which we find ourselves (in which any and all knowledge exists) exists only when the econiche is physically *under*determined, and therefore allows *choices* (and therefore agency) to have come into existence. This is why no syntactic concept of information — like bits of Shannon's theory — ever substitute for information in the functional domain: it is in the wrong phase of existence. The physical domain has nothing even faintly resembling agency, because choice and alternatives cannot exist in it (Abel, 2010, 2011). Without choice, agency has no meaning. Without meaning there is no knowledge, nor any perceptual experience. Without knowledge neither you nor I nor this article exists.

Perceptual systems as vicars. Biology depends upon drawing a fundamental distinction — between that which is inside and that which is outside. This is why the biosemiotics and cognitive psychology expression "surfaces are where it is at" is not only true but a tautology in biology. The boundary — the cell membrane — creates the first organism–environment (Hoffmeyer, 1998) or, in epistemology, the knower–known distinction. The semi-permeable membrane is what creates life. That which is inside the semi-permeable membrane constituting the boundary of a cell becomes the organism (and later in evolution, develops agency), and that which is outside the semipermeable membrane becomes its environment. That which acts is an agent, that acted upon is the agent's environment. Later in evolution, processes inside the semi-permeable membrane become the nervous system or the knower, while those on the outside become what is known. Nervous systems exist in order to unite perception and action. Everything else they can do — especially in the "higher" organisms — is an unintended consequence, an emergent bonus superimposed upon that primary function.

The first senses arose at those surfaces with those knower–known distinctions. Touch distinguishes that which is inside versus that which is outside the surface of the organism. With the development of more complex organisms, senses which could pick up information from beyond the surface of the organism began to develop. Smell is a prototypical example, dependent upon the pickup of molecules from things that are not in direct contact with the surface of the organism. Audition, dependent upon vibrations in the atmosphere impinging upon the organism, is another distance sense. Of the classic senses, humans are most dependent upon vision, picking up information available in the electromagnetic spectrum surrounding us, for our initial "contact" with and understanding of most of our more distance objects (beyond the range of the other senses, including audition).

The external sensory systems have developed from what impinges upon the surface or boundary layer (receptors) to the pickup of information originating far from the boundary layer of the organism itself. They have become, as Popperians (Bartley, 1984; Popper, 1963/2014; Weimer, 2023a) emphasize, like vicars in the Protestant religious tradition. There the vicar (the local church religious figure) functions to *go out* and "hear the word of God" and then to *bring it back* to the local flock of believers. Thus a vicar functions as a combined auditory and perhaps visual sensory *system* (which includes the vicar's legs and motor apparatus) for the faithful flock. The vicar as a perceptual system is an "objectification" of the external and distant for individual or isolated percipients.This is exactly analogous to how mammalian perceptual systems retrieve information from the far away and bring it back across the membrane into or make it available to the percipient organism. A perceptual system enables perceivers to get knowledge or information (potential knowledge) originating beyond their own surfaces.

Language is always vicarious. Viewed functionally, language is a (perhaps *the* most highly skilled, even more so than vision) vicar: it goes out from the speaker and brings back (in response) to the speaker-as-hearer semantic content without limitations of location or time (or even physical reality) about the "external" world. The primary function of language is thus the same as a perceptual system — by eliminating ambiguity and increasing differentation, to increase the organism's adequacy of adaptation to the econiche by providing knowledge about the econiche. It is thus a means of obviating the false dichotomization of subjective versus objective, making the so-called subjective an intrinsically objective aspect of existence (Cassirer, 1923, 1957, Weimer, 2023a). It does this by objectifying experiential awareness or acquaintance by describing it with the aid of linguistic terms which are always the shared property of a linguistic community.

Like the other perceptual modes language is an indispensable part of the human modeling system. It enables us to anticipate future states, and to compare what information "picked up" in the present tense (the specious moment) tells us about what our prior anticipatory model(s) specified should presently be occurring. It enables us to correct (and to improve by decreasing) the discrepancy

between expectation in the model of the future and present perceptual input. It helps us to travel in time, in addition to traveling in space (Louie, 2012; Rosen, 1985/2012). No other primates seem to have this ability.

It is the addition of the ability to go backwards or forwards in the temporal dimension, to compare our present state of affairs with that prescribed by an anticipatory model of the future state of affairs we will encounter, that brings out language as inherently conceptual as well as perceptual at the same time. This has increased our ability to "think," and thus to anticipate the future and reconstruct the past, in a degree of completeness that far exceeds that of any other species on this planet.

The functional origin of language. Language came into full flower in hominin species because of the long history of increasing encephalization having reached a breaking point with respect to anatomical structure. In Homo sapiens, infant heads were becoming so large that giving birth caused increasing injuries and deaths to the mothers. So "Mother" Nature was forced to find a way to retain large heads (and therefore brain capacity and competence) without killing or debilitating hominin mothers (and therir offspring) in the birth process. The solution that arose is obvious with hindsight — neoteny. By having newborns arrive before their otherwise in utero development of (too) large heads, the maternal birth trauma (as well as deformed infants) was largely obviated. Human infants are born deliberately prematurely in comparison to all other mammals. This in itself creates the problem situation which caused vocalization to change from earlier functions such as expression (Ow! after stepping on a sharp stone) or signalling (Shh! when a predator was nearby) to what Karl Bühler (1934) noted as a *higher* function, that of description of the environment. In order to keep their offspring (to say nothing of themselves!) alive and safe while in a very "incompetent" state (compared to the newborns of other species), mothers (and family members) had to *communicate* with their offspring about their momentary states (such as hunger, fear, or being cold) and their econiche (such as nearby danger) until they matured (developed their full sized heads, and with that the concommitant sensory and neuromuscular apparatus that was required for competence). Such communication is always descriptive of some state of affairs. Adults had to increase the perceptual capabilities of infants, and language qua medium of communication evolved to do this (see Barbieri, 2010; Porges, 2011). Simultaneously it increased the competence (behavioral and linguistic) of the next generation(s) of parents, up until the present. This communication always is both functional (intentional) and epistemic: it is about conveying knowledge in some form from one epistemic agent to another (or to make it available to one's conscious self).

Popper (1963/2014, 1972), building on Bühler, noted a more recent addition beyond the descriptive, but also presupposing it: the argumentative function of language. We can argue for the truth or falsity of a position or theory, make and defend claims, etc. This is a presupposition of modern inquiry — in both science,

philosophy, and commonsense reasoning. Some time ago this was generalized to the full range of behavior (Weimer 1977, 1984), because one can argue without language, in nonverbal behavior. The future development of our species may well see further functionality added in as yet unanticipated ways.

Description requires a communicative function: at least minimally, from one central neural pattern of activity to another, thus changing the overall level and pattern of CNS activity. At this functional level, language and perception are identical. They function equally as epistemic processes, allowing an organism (us, but for this analysis we are just another organism) to attempt to adapt to an econiche.

Interestingly, communication and other forms of perception can argue with one another, and when in conflict we often tend to initially choose the earlier system over the more recent one. Examples of this are found in fog and glass. We are hesitant to walk through fog until we succeed in telling ourselves we can safely do so (locomotor penetrability versus visual impenetrability), and we have to tell ourselves not to walk into a glass door even though it looks like we can walk through it. Earlier psychological literature studied similar conflicts between perceptual systems, such as touch versus vision, etc. The pattern of correction here is evolutionary: the later (higher) evolved system usually corrects the interpretation of the earlier one, as in rare cases such as these two human examples.

Perception as a communication system. It is difficult to draw theoretically definitive distinctions between perception, communication, and language. Perception communicates (within the organism, and between organisms) exactly as language does. Encountering noxious stimulation, a single celled organism will change its shape in what we can anthropomorphize as an avoidance response. Microscopic organisms with self propulsion will obviously flee in that situation. Clearly getting the information inside the organism constitutes communication to it. Primates devote a considerable amount of their perceptual activity to attending to what other organisms, especially members of their species (especially their eyes), are doing. The behavior of one monkey very clearly communicates to another one what is going on in their environment. Just looking at what adults do communicates to a child, without any overt language being involved, what is expected of them in many situations.

From an epistemic standpoint, concerned with how organisms gain knowledge (about themselves and their econiches), it is all but impossible to separate perception, communication, and language (even if the language involved is that of the central nervous system of the organism, it [or they] are communication system[s]). These three functions are conceptually intertwined in any living organism. Consider conception as an umbrella for language and perception. From an epistemic point of view, language and perception stem from and are aspects of conception, not vice versa.

Through Its Epistemic Function, Language Makes Perception into Conception

Competition within an econiche for survival is a basic mechanism of evolution. With respect to the problem of sensory input and its ability to direct behavior, it appears that perceptual systems have evolved in two ways: first, they have become more adequate at the task of discrimination, thus differentiating more and more aspects of the environment that were at first either not perceived at all or were ambiguous; second, organisms have been forced to develop (rather than just refine already available modalities) *new* forms of perception. When competition became intense, contact or touch no longer sufficed. New forms or modalities such as taste and smell emerged (through Darwinian blind variation and selective retention) to supplement direct contact. Subsequently, audition and vision further increased the functional capability of the organism. Some animals developed sonar to aid hearing, some high speed chattering for echo location. Language as a perceptual system has increased human ability to "perceive" by adding an explicit framework (and the mechanisms for) conception. Hominins can now conceive and communicate aspects of reality, as well as postulate things that are not perceptually "real" but can be conceived of [whether internal to our bodies or external] — things that are not perceivable by any of the other sensory means. We can extend "perception" to compress time, to include what is before or after our time frame, imagining or conceiving the universe from the beginning of time to its end, or change space to what is larger or smaller than allowed by the classic senses, and so on. While other mammals (particularly the other higher primates) have precursors or the bare beginnings of understanding that which is not present or has yet to come to pass, the unmatched flowering of that ability in Homo sapiens arose as an unintended consequence of the development and refinement of language into its present forms. We now conceive of ourselves and our universe rather than merely perceive (or passively respond to) them.

While this has only been obvious to us as a result of the last several thousand years of conceptual thought, it is actually the result of the manner in which central nervous systems *must* function when faced with indefinite complexity and uncertainty, and what is new with the development of language is our realization or awareness of that. It is the nervous system that has developed (differentiated) language as a (presently ultimate) perceptual system.

Perceiving is always conceiving. Goethe famously said, were the eye not attuned to see it, the sun could not be seen by it. This means that what we regard or think of as the perceived "sun" exists as a result of the functioning of our perceptual apparatus. What its intrinsic nature is, independent of any perceptual system, is both unknown and inherently unknowable to us, and what we "see" actually happened eight minutes before we perceive it. Because of the structure and functioning of our nervous systems, we know that there is a sun, through its effects upon our perceptual system, but that is all. We have refined our knowledge to the

point that the only form of realism which remains tenable is a representational one, and we have falsified any form of naïve or direct realism. What we know of the external realm, including even of our own bodies, is only of its structural relations and never of its intrinsic properties. Understanding what is called structural realism allows us to see that language is a necessary development in the refinement of our perceptual armamentarium to have reached that point.

Tenable realism is structural, not naive or direct. This was noted decades ago by Bertrand Russell, who was concerned to understand how science, which makes essential use of fundamentally abstract and *nonperceptual* concepts, could disambiguate their reference in the empirical realm. He wanted such "higher order" harnessing concepts to be tied down to reality, not to be left hanging in inherent ambiguity as to their empirical reference: that would render them meaningless and of no use to science. Without that referential anchoring we literally could not know what we are speaking about, let alone what our concepts meant. To do this Russell made use of a fundamental distinction, between acquaintance and knowledge by description, and also of a form of the causal theory of perception.

> Consider first the distinction between acquaintance and description in language: We must attach some meaning to the words we use, if we are to speak significantly and not utter mere noise; and the meaning we attach to our words must be something with which we are acquainted. Thus when, for example, we make a statement about Julius Caesar, it is plain that Julius Caesar himself is not before our minds, since we are not acquainted with him.… Our statement does not mean quite what it seems to mean, but means something involving, instead of Julius Caesar, some description of him which is composed wholly of particulars and universals with which we are acquainted (Russell, 1912, pp. 58–59).

This enables us to unambiguously refer to something which does not, empirically speaking, exist any longer or in our presence. It provides a means of determining the reference (but not yet the meaning) of abstract or purely conceptual terms.

The causal theory of perception codifies the necessary separation between the knower and that which is known. It holds that external objects are themselves the first link in a causal chain that ends in the central neural processes which underlie our perception. Russell's (1927) usual example concerns seeing the sun:

> science holds that when we "see the sun," there is a process, starting from the sun, traversing the space between the sun and the eye, changing its character when it reaches the eye, changing its character again in the optic nerve and the brain, and finally producing the event which we call "seeing the sun." Our knowledge of the sun thus becomes inferential; our direct knowledge is of an event which is, in some sense, "in us." (p. 127)

This causal theory rejects the view that perception gives any sort of direct knowledge of external objects, while asserting that perception must have some external

(to the perceiving agent) causes from which at least *something* can be inferred. If physical science is correct or nearly correct (at least in essentials), it could not matter to us whether or not the sun had the intrinsic properties that are found in our acquaintance. Even if the sun is actually colored, warm, tastes like cheddar cheese, or whatever, the causal chains connecting the sun to us as perceivers are not such that information of that sort could *ever* be conveyed to us.

Physics leads to a *restricted* causal theory of perception: the only properties of non-mental objects we can know are structural properties (Weimer, 2023a), and all we know of them is their structural relations to other structural properties. Maxwell (1968) put this fundamental point clearly:

> the decisive point is not, as is sometimes held, that it is meaningless or self-contradictory to think of electrons, light quanta, etc., or atoms, molecules or even aggregates thereof as being colored; rather, it is that *even if such things were colored it would make no difference*. Even if it made sense to talk of a collection of blue colored molecules or atoms which emitted blue colored light photons, such a "blue" aggregate could cause us to see the surface in question as a red one just as effectively as a collection of red colored ones emitting red colored quanta; the only relevant fact concerning the color we see is the amount of energy per quantum, or, what amounts to the same thing, the frequency of the radiation. (p. 170)

So even if there were actual "colored" entities in reality, we could never see their "color" at all and their being colored plays no role whatever in *any* process whereby we acquire knowledge. Russell's conclusion was that "Wherever we infer from perceptions, it is only structure that we can validly infer; and structure is what can be expressed by mathematical logic, which includes mathematics" (1927, p. 254). The gulf between the knower and that which is known cannot be avoided. The knowledge we have is not of any intrinsic properties of reality, but only of the relations of structure in what we are acquainted with in the modalities of our perceptual systems.

Epistemically, language is perception: A researcher without vision or any other sense can know all of physics. Perception is to provide knowledge of the world(s) external to the nervous system. Any perceptual system can provide knowledge (at least of some aspects of that reality) *independently* of the other systems. This fact is the strongest of supports for realism — the senses are independent in their operation but when taken together, what they provide supports an integrated conception of an econiche external to our "selves" as percipient subjects. We can lose any one (or even several) independent sense and still perceive the world. What we call "the mind" consists in nothing more (or less) than an ordering of events. This evolutionary ability cannot be a consequence of any variant of idealism (such as phenomenalism, presently in vogue), for which such a result would be equally unexpected and incapable of explanation. Understanding the epistemic function of the senses as perceptual

systems is beyond phenomenalism, which can never account for either the congruence or conflict of the "experiences" of the disparate senses.

Hayek (1952) put this clearly decades ago:

> There are no questions which we can intelligibly ask about sensory qualities which could not also conceivably become a problem to a person who has not himself experienced the particular qualities but knows of them only from the descriptions given to him by others.… Nothing can become a problem about sensory qualities which cannot in principle also be described in words; and such a description in words will always have to be a description in terms of the relation of the quality in question to other sensory qualities.… All that can be communicated are the differences between sensory qualities, and only what can be communicated can be discussed. (p. 31)

Knowledge claims are always in the language of description, no matter what sensory modality is to provide co-occurrent empirical support. As such, these claims must presuppose a sharp separation between the agent or knower and that which is to be known or acted upon. Such a separation leads to a structural form of realism, and the requirement that what knowledge claims disclose, separated inside the subject, is an epistemic *construction* rather than the pickup of an independent environmental "given."

The myth of the given: Perception can never be immediately registered. At this juncture a common misperception(!) must be removed. It is the claim that although language is obviously an anticipatory system used in modeling our econiche, the perceptual systems are different in that their objects are directly or immediately presented to the organism, and as such have no anticipatory function comparable to language. The idea is that what "impinges" on the organism in perception is an immediate state of affairs, and that that immediacy is not what spoken language depends upon. Apparently the idea is that the organism has no "choice" in determining perceptual input (think of a baseball bat to the head as unavoidable and predetermined in effect), and that this is different from natural language and communication usage.

Two tasks are required here: refutation of the "direct" perception thesis, and demonstration of anticipatory modeling in classic perceptual modalities as well as language. The range and necessary role of anticipatory modeling is discussed below in "Seeing the Future"; the thesis of allegedly "direct" perceptual input is discussed in this section.

Direct perception is always mediated by the models available within the nervous system for what can constitute stimulation. One can see this by noting that there is not the required constancy between what is "out there" to be perceived and the organismic response patterns of the organism. As Hayek (1952) noted, sometimes physically identical environmental objects create different responses in the perceiving organism, and sometimes identical functional responses by

the organism are created by distinctly different environmental situations. The organism–environment synergy (or "mutuality" as Gibsonians now regard it) is a construction in the nervous system of the organism, the joint product of its evolutionary or species history and the individual learning history of a given organism. The senses never simply record what is out there. A sense could not "record" without a prior theory of what would count as being worthy of recording.

Perception arose from conception at the beginning of the centralized nervous system. The first problem faced by a nervous system that was not coextensive with the semi-permeable membrane of a "simple" organism was fundamentally conceptual in essence. It was the problem of perceiving a *change* from the ongoing level of activity that would spontaneously occur in such a system. The fundamental problem of centralized nervous systems such as all mammals possess (we need not go "lower" in phylogeny for this analysis) is the detection of novelty from the background level of activity. That background occurs simply as a fact that the organism is alive, and thus the nervous system is always alive and functioning, so a "stimulus" has to be differentiated from background activity in order to be perceived *at all* (Lynn, 1966; Sokolov, 1960).

Notice that this makes perceiving an *inherently* conceptual activity: that fundamental separation is not a perceptual phenomenon, but rather a conceptual one. Stimulation is always functional, denoting the non-physical concept of novelty (that this is different from the ongoing background activity). From the response to novelty, differentiating something new from what is ongoing or old, all epistemic issues and problems arise. The problems of biology, psychology, and philosophy literally simultaneously unfold from the detection of novelty. For the purposes of this article, the important thing is that all knowing (the epistemic domain in its entirety) is first and foremost *conc*eptual. The consequence of this is that perception cannot be adequately explained except by subsuming it to (and then explaining) conception. Speaking anthropomorphically, in order to improve our conception of ourselves and our econiche, evolution has added language — which turns out to be inherently a perceptual mechanism no matter what else it may emergently be. Language allows us to make enduring records — to fix in memory percepts (to use Russell's terminology as a neutral description for stimulation of any form) that no longer are present, and to bring to consciousness what has never been present, and need not ever have been perceptual. It allows our anticipatory models of the future (in humans usually called simply our cognition or imagination) to range over the never yet experienced and the heretofore not conceived.

Consciousness as a memory function is perceptual and conceptual. Going beyond the specious present is a prime function of consciousness in humans. It allows us to escape the here and now. Consciousness is a memory aid — it allows us to hold disparate things in memory at the same time, and for a longer period of time, and to bring things back to awareness without waiting for external stimulation as a cue

to do so. This cluster of abilities has allowed us to vastly transcend the capabilities of other primates who, in comparison, exhibit these traits singly and sporadically, if at all. That increased memory capacity has *very* recently (in hominin evolution) been supplemented by another emergent behavioral phenomenon which again indefinitely increases memory capacity — writing. As Schmandt–Besserat (2015) put it, the ability to write has enabled us to move from the concrete particular to the abstract entities of conception:

> the evolution from tokens to script also documents a steady progression in abstracting data, from one-to-one correspondence with three-dimensional tangible tokens, to two-dimensional pictures, the invention of abstract numbers and phonetic syllabic signs and finally, in the second millennium BC, the ultimate abstraction of sound and meaning with representation of phonemes by the letters of the alphabet. (p. 1)

With this progression, language (with the co-occurrent enablement of writing) seamlessly merges into perception in terms of functionality.

We should note that language was a co-occurrent phenomenon to perception, not a causal consequence thereof. If it had a "cause" it was the abstract evolutionary necessity Barbieri (2010) described as incorporating "exosomatic" factors (meaning cultural rather than solely genetic) into our development:

> the brain wiring that occurs in the last phase of fetal development provides the neurological basis for the mental models that the organism is going to use throughout its life. If that phase occurs in a highly stable and reproducible environment of the uterus, the operations of brain wiring follow a pre-established sequence of steps and generate a modeling system that has been highly conserved in evolution. In our species, however, the last phases of fetal development have been progressively displaced outside the uterus, in a radically different environment, and that created the opportunity for a radically new experiment in brain wiring. That was the precondition for the evolution of the uniquely human modeling system…. (p. 215)

That modeling system is unique: it is based on language and its symbolism instead of just momentary (situation specific) perception. Instead of trying to cope with our econiche by "innate" or built-in neural circuitry we developed experientially based (learned) approaches, that increase the interdependency between cognition and perception. As Craik (1943) noted long ago, thought *models* reality. It functions as a perceptual system in doing so.

Perception is thus *always* an anticipation. It is, as Goethe noted, always in a future orientation. We cannot see"what there is" except in terms of "what we think there is to see." This has been emphasized in other domains for a long time. For example, the eighteenth century historian Lord Acton said "Live both in the future and the past. Who does not live in the past does not live in the future." And living in the specious present moment is not living at all.

Seeing the Future: Modeling, Anticipation, and Language

Language as a perceptual system has enabled us to vastly increase our ability to anticipate our indefinitely complex and uncertain econiche. As part of the problem of survival as a self organizing and maintaining system, this has been the task of life since it has arisen. As Hayek said decades ago, no organism does or can live in a world of already given facts to which it merely then responds. Organisms create both their external "facts" of the environment and their responses to them:

> Representation of the existing situation in fact cannot be separated from, and has no significance apart from, the representation of the consequences to which it is likely to lead. Even on a pre-conscious level the organism must live as much in a world of expectation as in a world of "fact," and most responses to a given stimulus are probably determined only *via* fairly complex processes of "trying out" on the model the effects to be expected from alternative courses of action. (Hayek, 1952, p. 121)

Language as the (presently) ultimate modeling and anticipation system. Any learning that an organism can achieve requires an anticipatory model of the environment, and the continual checking of the present state of affairs against that specified in the anticipatory model, which in turn provides the informational basis (a Popperian "falsification" of an hypothesis) for updating the subsequent future model (Butos and McQuade 2023; Weimer 2023a). For creatures with descriptive and argumentative language, internal thought parallels or models external reality. As an unintended consequence of parent–offspring communication, language provides the best available means by which we can build a knowledge of the structural relations of reality. This greatly exceeds the capacity of other organisms (including earlier hominins who did not use language in the manner in which we now do), who can only *see* a limited number of such relations. Their conception was perceptual, in the traditional perceptual senses, rather than being linguistic (descriptive) in any sense. Language lets us build and refine better and better adaptive models of reality. What happens when language and (traditional) perception are in conflict? We usually reject the perception: "I'll see it when I believe it" is the norm, not the exception in both common sense and science. When theories conflict with observations most scientists initially reject or revise the observations instead of giving up the theory: this part of Kuhn's (1970) message may have enraged traditional philosophers of science, but it rang true to the practitioners of science who had themselves been involved in Kuhnian revolutionary period episodes and had seen the "facts" change.

What is a model? Rosen (1985/2012) and his students put this issue in a more contemporary framework. As Louie (2012) put it, the essence of a modeling relation "consists in specifying an *encoding* and a corresponding *decoding* of particular system characteristics into corresponding characteristics of another

system, in such a way that *implication* in the model corresponds to causality in the system" (p. 21). This is what we do with our theories, in both common sense and science: use what the Stoics called the adjunctive conditional form of logic, which is the *since–necessarily* form of implication. We say "Since my theory is true, it necessarily follows that the world is this specific way." This ties language into conception in exactly the manner in which perception is tied to conception in higher organisms, and it is the reason why adherents to a "revolutionary" theory simply reject the observations and assumptions of their rivals. Their conception "sees" the world differently. Their theory sees different facts. They will see a fact only when they believe it follows from their theory.

Anticipatory models tell us what the world *ought to* or *must be* like if they are true or close to the truth. Their if–then reasoning (the traditional "this implies that" of material implication) is found only in determining the logical implications of the model qua theory, not in the modal force of the adherence to the theory. Determining the consequences of theory is "logical" or dispassionate: holding it in the first place is not — it is argumentative and conceptual. Language as a perceptual system, because it embodies both the emotional–argumentative and is also seemingly logical and explicitly rational, is why that is so.

Spoken and written language are not as unique as many believe. The emergent powers of language are presaged far down the evolutionary developmental line of mammalian history. Traditional philosophy regards that as irrelevant, arguing for emergent uniqueness and qualitative superiority of language over "mere" perception. A reviewer of this article argued that this provides evidence against language as a perceptual system: doesn't it make more sense to regard language as a "*distinct* faculty that allows human beings to go *well beyond* the limits of their perceptual capacities to construct deeper, more accurate representations" and much more besides? (endnote 1). This anthropocentric view assumes explicit intentional and "rational" thought is emergent with humans, i.e., therefore *qualitatively* superior to "mere" animal communication (that is the intention of the "well beyond" claim). Against this, looking at recent theories of language evolution shows that this "uniqueness" position — exemplified in linguistics by Chomsky's early views of a separate innate language faculty — has no support, and his last students have embraced a gradualist view in which even the most characteristically unique linguistic support features in anatomy (such as the descent of the hyoid apparatus), or speech production (primate "speech" and syntactic structuring and productivity), even speech comprehension, are found "well down" the evolutionary ladder from Homo (Fitch, 2010). Human linguistic ability shows a gradual emergence from — and therefore evolutionary continuity with — higher mammalian traits and abilities (even birds in some cases), and this emphasizes our point: there is continuity and complementarity between language and other forms of perception (endnote 2). Language is a recently evolved perceptual system.

Summary

By looking at language as a conscious and rational communication system divorced from perception we have failed to see its nature from an evolutionary perspective. Language, as a co-occurrent or enabled manifestation of conception, has become the most recent and most abstract of our presently available perceptual systems. From the standpoint of evolution (when given purpose or intention, anthropomorphized into Mother Nature) the development of the nervous system has always been about more adequately realizing the abstract and fundamentally conceptual task exemplified in its most primitive response, the determination of novelty. Determination that a pattern of activity represents something new, i.e., is in the nonphysical and highly abstract functional category of "novelty," requires conception, not *just* perception. It is an instance of the pickup of something independent of the organism's nervous activity which is neutrally called "information." Novelty is a pragmatic and semantic concept that can never be physically specified in advance. Thus "information" is always inherently conceptual, and only appears to be perceptual (and directly perceived) when we restrict our focus to a single physiological modality. Organisms have developed more and more powerful and increasingly abstract systems of neural functioning (developing new modalities) to accomplish the function of perceiving and interacting with their econiche. Our use of the emergent phenomenon of language (and its equally emergent far later written form) has first and foremost been as a higher order constraint over the traditional "physiological" perceptual systems. The evolutionary purpose of that constraint has been to sharpen and to hold in memory for a longer period the "information" necessary to improve the accuracy of evolutionarily earlier perceptual systems. The import of this continued evolutionary development of *systems* for the pickup of "information" has been the incorporation of more and more bodily action into otherwise static conceptions of perception. We now willingly incorporate locomotion into visual and auditory (indeed, all "distance" senses) perception, and it is time to also incorporate conception — which can transcend both space and time — as a step "above" (a higher order constraint, as Polanyi would call it) that, into our understanding of perception as a dynamical process. Language is the most recently evolved perceptual *system*, and the most recent such higher order constraint.

Endnotes

Endnote 1. The substance of this counter position was put in this fashion:

> One can see that there is a world of difference between how our perceptual systems like vision or olfaction can be said to "communicate" features of the environment to an organism and the way in which speakers communicate with hearers. For one thing, linguistic communication involves Gricean [the reference is to

> Grice, 1957] communicative intentions that must be recognized by the hearer for there to be "uptake." Secondly, linguistic communication invokes various publicly shared conventions of meaning, reference, morphology, pragmatics, syntax and so on. Thirdly, linguistic communication allows for non-literal and indirect uses of language. Nothing comparable can be said about "perceptual communication."

Evidently this was so crystal clear to the Cartesian common sense of a reviewer of this article that it was taken to be a QED argument against the thesis presented in this article, since no evidence was cited in its support. However, these three contentions do not in fact separate language from perception on the issue of communication. All three factor areas are as noted in the quote above — intentionality, shared meaning (reference, conventionality, etc.,), nonliterality and indirection — are found in complex animal behaviors, and are clearly dependent upon the communicative function (within and between organisms) of their perceptual systems. The differences are ones of degree rather than presence versus absence. Ethology and animal behavior studies, such as classic works by Lorenz (1970, 1971), Tinbergen (2008), and Hinde (1975), clearly show self-initiation, self-direction, and clear intentionality in mammals and birds, even some social insects. Biological research into stigmergy (as in Theraulez and Bonabeau, 1999) clearly shows shared meanings and conventions and reference in nonlinguistic behavior. Indirection and nonliterality are present in the "play" of social apes and monkeys, who lie convincingly about things like not having the reward (hiding the grape, etc.) and blaming the other fellow for hitting Dad in the back, detecting injustice or lack of fair play in getting rewards, etc. Listening to the screams of a monkey who did not get a deserved grape reward (when the slacker did) puts the lie to "Nothing comparable can be said" about perceptual communication. Philosophy needs to learn to incorporate tacit processing and evolutionary psychology into its semantic accounts.

Endnote 2. The clash between philosophical approaches to semantics and intentionality and those of the social sciences is apparent if one examines treatments of semiosis in the biosemiotic and origin of life literature. The biological approach regards semiotic content as originating with the origin of life, and thus as continuously developing and expanding throughout the products of evolution up to "philosophical" thought and discourse. Such discussions focus on physical semantic factors (as in the work of Howard Pattee) and semiosis from C. S. Peirce's conception of the pragmatics–semantics–syntax separations in the nineteenth century, through Jesper Hoffmeyer and the Danish School of Research, and the Eastern European Tartu School summarized by Kalevi Kull (adding the umwelt conception as semantic for all life forms). These and similar approaches disclose the evolutionary development of meaning (semantics) and pragmatics (intentionality and our existential predicament), in relation to the development of syntactic structures that are physically utilized in their realization in more

developed complex forms. From that overall perspective Gricean semantics is but a restricted and limited aspect of a comprehensive picture.

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