

# Semantic Universals

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*"In space, no one can hear you think."*

Table of Contents

Contents

<b>1</b>	<b>Semantic Universals</b>	<b>2</b>
1.1	Introduction to Semantic Universals . . . . .	2
1.2	Historical Development of the Concept . . . . .	5
1.3	Theoretical Foundations . . . . .	8
1.4	Types of Semantic Universals . . . . .	13
1.5	Methodologies for Identifying Universals . . . . .	18
1.6	Section 5: Methodologies for Identifying Universals . . . . .	19
1.7	Core Semantic Domains with Universal Properties . . . . .	24

# 1 Semantic Universals

## 1.1 Introduction to Semantic Universals

The quest to understand what unites the diverse tapestry of human languages has long fascinated philosophers, linguists, and cognitive scientists. Among the most profound discoveries emerging from this inquiry is the existence of semantic universals – fundamental properties or patterns of meaning that appear to be woven into the very fabric of human communication, transcending the vast differences in vocabulary, grammar, and cultural expression found across the globe’s approximately 7,000 languages. These universals represent the deep, underlying commonalities in how humans conceptualize and express the world around them and within them. At their core, semantic universals are those meaning-based elements, categories, structures, or principles that exhibit significant recurrence, if not absolute presence, across all documented human languages. They are not about specific words, but rather about the organization of meaning itself – the shared cognitive architecture that shapes how languages carve up reality. For instance, while the specific words for familial relationships vary dramatically, the fundamental conceptual distinction between a parent and a child appears universally. Similarly, while the number and boundaries of basic color terms differ, the human visual system and cognitive processing lead to recurrent patterns in how languages categorize the color spectrum, as famously documented by Berlin and Kay. The scope of semantic universals is broad, encompassing semantic fields (domains like kinship, space, time, emotions, body parts, natural phenomena), semantic categories (like basic-level terms such as ‘dog’ or ‘chair’ which are cognitively privileged across cultures), and semantic structures (such as taxonomic hierarchies, part-whole relationships, or the tendency to conceptualize abstract domains in terms of concrete experiences). Understanding semantic universals requires grappling with key concepts such as semantic primes (allegedly irreducible concepts like ‘I’, ‘YOU’, ‘SOMEONE’, ‘THING’, ‘GOOD’, ‘BAD’), semantic fields (interrelated lexical sets covering a conceptual area), and conceptual metaphors (systematic mappings between conceptual domains, like ARGUMENT IS WAR). These universals operate at a level deeper than surface-level translation differences, pointing towards shared cognitive and experiential foundations of human language and thought.

Distinguishing semantic universals from other types of linguistic universals is crucial for a precise understanding of the phenomenon. Linguistic universals, broadly defined, are properties shared by all or most human languages, but they manifest at different levels of linguistic structure. Phonological universals, for example, pertain to sound systems. These include patterns like the universal presence of vowel sounds (though their specific qualities vary), the tendency for languages to have more consonants than vowels, the existence of nasal consonants in the vast majority of languages, and constraints on possible sound sequences (e.g., few languages allow words starting with /ŋ/). These universals arise largely from the anatomical and physiological constraints of the human vocal and auditory apparatus. Syntactic universals, conversely, govern sentence structure and grammatical organization. They encompass principles such as the universal distinction between nouns and verbs (though the boundaries can be fuzzy), the existence of constituents (phrases that act as single units), and more specific implicational rules like Greenberg’s universals (e.g., “If a language has dominant VSO order, it always has prepositions”). These universals are often linked to the computational and processing requirements of the human mind for generating and parsing complex hierarchical structures.

Pragmatic universals operate at the level of language use in context, governing how meaning is negotiated in interaction. They include conversational maxims like Grice's Cooperative Principle (e.g., be informative, be relevant, be clear) and the universal tendency to use politeness strategies to mitigate face-threatening acts. Semantic universals, however, reside firmly in the realm of meaning itself – the conceptual content that linguistic forms express. While phonological universals constrain *how* sounds can be combined, syntactic universals constrain *how* words can be arranged, and pragmatic universals constrain *how* utterances are used, semantic universals constrain *what* can be meaningfully expressed and how concepts are structured and related across languages. They are intrinsically linked to the conceptual categories humans employ. For example, the semantic universal of part-whole relationships (meronymy) is distinct from the syntactic universal of phrase structure rules, even though a language must have some syntactic means to express meronymic relationships (e.g., “the wheel *of* the car”). Furthermore, while phonological and syntactic universals often show strong statistical tendencies rather than absolute exceptions, semantic universals can range from absolute (e.g., all languages distinguish animate from inanimate entities to some degree) to strong statistical tendencies (e.g., most languages have a basic term for ‘water’). The relationship between these universals is complex and interdependent; semantic categories often drive syntactic distinctions (like animacy affecting verb agreement), and phonological constraints can influence semantic change (e.g., taboo avoidance leading to semantic shifts). Yet, semantic universals stand apart by directly interrogating the conceptual bedrock upon which all linguistic structures are built.

The significance of semantic universals extends far beyond the descriptive cataloging of linguistic patterns, offering profound insights into the very nature of human cognition, communication, and our shared biological and cultural heritage. They serve as a powerful lens through which to examine universal aspects of human thought, suggesting that despite surface-level cultural and linguistic diversity, there exists a core set of conceptual building blocks and organizational principles that are fundamental to the human mind. The recurrence of concepts like ‘I’, ‘YOU’, ‘SOMEONE’, ‘THING’, ‘GOOD’, ‘BAD’, ‘KNOW’, ‘THINK’, ‘WANT’, ‘SAY’, ‘DO’, ‘HAPPEN’, ‘BIG’, ‘SMALL’ – proposed as semantic primes within frameworks like the Natural Semantic Metalanguage – across vastly unrelated languages points to a shared cognitive infrastructure. These primes appear to function as the irreducible atoms of meaning, the conceptual foundation upon which all other, more complex meanings are constructed in every human language. This has profound implications for theories of mind and consciousness, suggesting that certain ways of carving up reality are not merely cultural constructs but are deeply rooted in our shared neurocognitive architecture. For instance, the near-universal tendency to conceptualize time spatially (e.g., “looking forward to the future,” “putting the past behind us”) or to understand abstract domains like morality, economics, or relationships through concrete metaphors based on physical experiences (up-down, in-out, journey) reveals a mind fundamentally shaped by embodiment – our physical interactions with the world shape our abstract thought. Semantic universals also illuminate the mechanisms of cross-cultural communication and translation. While perfect translation is often elusive due to cultural nuances and language-specific connotations, the existence of shared semantic fields and primes provides a common ground that *makes* communication across linguistic boundaries possible. When encountering a language without a direct word for ‘blue’, we can still communicate the concept through description or comparison because the underlying visual experience and the potential

for categorizing that part of the spectrum exist universally. This shared semantic foundation facilitates not just basic communication but also the exchange of complex ideas, literature, and scientific knowledge across cultures. Furthermore, understanding semantic universals is crucial for comprehending human nature itself and the evolution of language. They suggest that language did not emerge as an infinitely flexible cultural invention but developed upon a pre-existing cognitive structure shaped by millions of years of biological and social evolution. The universals reflect the problems and experiences common to all human societies: navigating social relationships (kinship universals), understanding the physical environment (spatial and color universals), expressing inner states (emotion universals), reasoning about cause and effect, and managing time. They represent the linguistic traces of our shared evolutionary journey as a species, highlighting what it fundamentally means to think and communicate as a human being. Studying them is, in essence, studying the universal contours of the human mind.

This exploration of semantic universals will unfold through a structured journey, designed to build a comprehensive understanding from foundational concepts to specific domains and methodologies. The article begins with this introduction, establishing the core definitions, scope, and significance of semantic universals within the broader landscape of linguistics and cognitive science. Following this foundational groundwork, Section 2 delves into the rich historical tapestry of the concept itself. We will trace the lineage of thought from ancient philosophical inquiries into universal meaning, exemplified by Plato's theory of Forms and Aristotle's categories, through the ambitious 17th and 18th-century projects for universal languages like John Wilkins' *Real Character* and Leibniz's *Characteristica Universalis*. The narrative continues into the 19th century with the rise of comparative linguistics and the early typological work of scholars like Wilhelm von Humboldt, setting the stage for the 20th-century revolutions in structuralism and, most significantly, the cognitive revolution that fundamentally reshaped our approach to meaning and universals. Section 3 then shifts focus to the major theoretical frameworks that provide the conceptual scaffolding for contemporary research. We will examine structural semantics and componential analysis, the rise and fall of generative semantics and its universal base hypothesis, the paradigm-shifting impact of Eleanor Rosch's prototype theory and fuzzy categories, the influential perspective of cognitive semantics with its emphasis on conceptual metaphors and image schemas, and the controversial but detailed program of the Natural Semantic Metalanguage theory. Each theory offers unique insights and methodologies for identifying and explaining universal patterns of meaning, contributing pieces to the complex puzzle of human conceptualization. Section 4 undertakes a systematic classification of semantic universals themselves. We will differentiate between absolute universals (found without exception in all languages) and statistical universals (present in most, but not all, languages), explore substance universals (universal semantic content or fields like kinship or color), analyze formal universals (universal structural patterns like taxonomies), and investigate implicational universals (conditional relationships of the form "if a language has feature X, it will also have feature Y"). Special attention will be given to the concept of universal primitives or semantic primes. Section 5 addresses the crucial methodological question: How do we actually identify and verify these universals? We will survey the diverse research approaches employed, ranging from linguistic typology and systematic cross-linguistic comparison to experimental methods and psychological testing, the increasing role of corpus linguistics and computational approaches, and the vital contribution of fieldwork, particularly the

documentation of endangered languages. This section also confronts the significant challenges inherent in establishing true universals, including issues of sampling, language contact, and disentangling cultural from linguistic factors. Finally, Section 6 immerses the reader in the concrete reality of semantic universals by exploring core semantic domains where universal properties are most evident. Detailed examinations will cover the extensively studied patterns of color term categorization, the intricate universal logic underlying kinship terminologies, the fundamental ways languages spatially orient the world, the expression of emotion, and universal distinctions pertaining to time, causality, and modality. Throughout this journey, certain key themes will resonate: the intricate interplay between language, cognition, and culture; the methodological rigor required to distinguish true universals from strong tendencies or areal features; the ongoing tension between universalist and relativist perspectives; and the profound implications of semantic universals for understanding our shared human identity. This structure provides a logical progression, moving from the general to the specific, from historical context to contemporary theory and evidence, culminating in a detailed look at the semantic domains where these universals manifest most clearly, thereby offering a multifaceted and authoritative account of this fundamental aspect of human language and mind. The next section will transport us back to the origins of this intellectual endeavor, tracing the evolution of thought that led to our modern understanding of semantic universals.

## 1.2 Historical Development of the Concept

The intellectual journey toward understanding semantic universals begins not in the modern laboratory or linguistics department, but in the ancient philosophical schools of Greece, where thinkers first grappled with the fundamental relationship between words, concepts, and reality. Plato's theory of Forms, articulated in dialogues such as the "Phaedo" and "Republic," proposed that abstract concepts like Justice, Beauty, or Chair exist as perfect, eternal entities in a transcendent realm beyond the physical world. This revolutionary idea suggested that languages, in their imperfect attempts to name these Forms, were merely pointing toward universal concepts that existed independently of human thought or linguistic expression. When we call different objects "chairs," according to Plato, we recognize their participation in the perfect Form of Chairness. This philosophical stance implicitly acknowledged semantic universals by positing that certain fundamental concepts exist objectively and universally, regardless of how they are expressed in particular languages. Aristotle, Plato's student, took a more empirical approach in his work "Categories," identifying ten fundamental ways of classifying being and predication: substance, quantity, quality, relation, place, time, position, state, action, and affection. These categories represented not just ontological classifications but also fundamental semantic distinctions that underlie human thought and language. Aristotle's system suggested that all languages, despite their surface differences, must ultimately express these fundamental conceptual categories, making him perhaps the first thinker to systematically propose what we might now recognize as semantic universals. The influence of this ancient Greek philosophical framework echoed through the centuries, particularly in medieval scholasticism, where thinkers like Thomas Aquinas and the Modistae philosophers developed elaborate theories of universal grammar based on Aristotelian principles. The Modistae, working in the 13th and 14th centuries, proposed that all languages reflect universal modes of thinking (*modi intelligendi*) that correspond to universal modes of being (*modi essendi*), which in turn are

expressed through universal modes of signifying (*modi significandi*). This tripartite framework represented a sophisticated medieval attempt to explain how languages, despite their diversity, might share fundamental semantic structures rooted in shared human cognition and the nature of reality itself. The rationalist philosophers of the 17th century, such as René Descartes and the authors of the Port-Royal Grammar (Antoine Arnauld and Claude Lancelot), further developed this tradition by arguing that logical structures underlie all languages. Their 1660 work, “Grammaire générale et raisonnée,” famously declared that “the sole reason for speaking is to make our thoughts known to others,” suggesting that language is fundamentally an expression of universal logical and cognitive structures. This perspective laid crucial groundwork for later inquiries into semantic universals by establishing the principle that beneath the bewildering diversity of human languages lie shared patterns of thought and meaning.

The 17th and 18th centuries witnessed an extraordinary burst of intellectual energy devoted to creating artificial languages that would embody universal semantic principles, driven by a confluence of philosophical, scientific, and practical motivations. Among the most ambitious of these projects was John Wilkins’ “An Essay Towards a Real Character, and a Philosophical Language,” published in 1668. Wilkins, an English clergyman and founding member of the Royal Society, undertook nothing less than a complete reorganization of human knowledge into a comprehensive classification system, which would then serve as the basis for a new language where symbols directly represented concepts rather than words in any existing language. His system divided all concepts into forty primary “Genera,” each further subdivided into “Differences,” “Species,” and “Subspecies,” creating a hierarchical taxonomy of reality itself. Each concept received a unique symbol composed of parts indicating its place in this taxonomy, so that the very structure of the symbol revealed its semantic relationships to other concepts. For instance, Wilkins’ symbol for “salmon” would contain elements indicating that it belonged to the genus of fish, the difference of river-dwelling, and so on. This was not merely a new way of writing but a new way of thinking about meaning itself, suggesting that concepts could be organized and represented according to universal principles independent of any particular language or culture. Though Wilkins’ project ultimately proved too complex for practical use, it represented a monumental attempt to create a semantically universal system and influenced generations of later thinkers. Even more visionary was Gottfried Wilhelm Leibniz’s project for a “*Characteristica Universalis*,” which he conceived of as a universal symbolic language capable of perfectly representing concepts and enabling logical calculation. Leibniz dreamed of a “*calculus ratiocinator*” that would allow disputes to be resolved through calculation: “Let us calculate,” he imagined opponents saying, “without further ado, and see who is right.” Though Leibniz never fully realized this project, his vision of a formal language that could express all human thought with mathematical precision profoundly influenced later developments in logic, computer science, and semantics. Other notable projects of this era included George Dalgarno’s “*Ars Signorum*” (1661), which developed a symbolic language based on a classification of concepts, and Cave Beck’s “*The Universal Character*” (1657), which proposed a numerical system for representing words across languages. These projects were motivated by diverse concerns: practical desires to overcome the confusion of Babel and facilitate international communication, scientific aspirations to create a perfect tool for inquiry and knowledge organization, and philosophical convictions about the nature of meaning and representation. Though none of these artificial languages achieved widespread adoption, their ambitious attempts to system-



atize and universalize human concepts significantly advanced thinking about semantic universals by forcing their creators to confront fundamental questions about how meaning is structured, how concepts relate to one another, and which aspects of meaning might be truly universal versus culturally specific.

The 19th century witnessed the emergence of comparative linguistics as a scientific discipline, transforming the study of language from primarily philosophical speculation to empirical investigation. This transformation began with scholars like Jacob Grimm, Franz Bopp, and Rasmus Rask, who systematically compared Indo-European languages to establish historical relationships and reconstruct proto-languages. Their work revealed that languages change over time according to regular patterns (such as Grimm's Law describing systematic sound changes in Germanic languages) and that seemingly diverse languages could be traced back to common ancestors. This historical-comparative methodology, while primarily focused on establishing genetic relationships between languages, indirectly contributed to the study of universals by developing rigorous methods for cross-linguistic comparison and by revealing patterns of change that might reflect underlying constraints on linguistic structure. Far more directly influential for semantic universals was the work of Wilhelm von Humboldt, whose extensive comparative studies of languages from around the world led him to profound insights about the relationship between language, thought, and culture. Humboldt viewed language as "the formative organ of thought," arguing that each language embodies a distinctive worldview (*Weltanschauung*) that shapes how its speakers perceive and conceptualize reality. Yet despite his emphasis on linguistic diversity, Humboldt also recognized underlying universal structures in human language, describing language as "a truly universal human faculty" that exhibits "the same fundamental form in all nations." His comparative work on languages as diverse as Sanskrit, Basque, and Native American languages led him to identify both the rich diversity and the deep commonalities in how languages express meaning. The latter half of the 19th century saw the rise of linguistic typology and classification, pioneered by scholars like Friedrich Müller and Heymann Steinthal, who began categorizing languages based on structural features rather than just historical relationships. This typological approach, which classified languages according to morphological characteristics (isolating, agglutinative, fusional, etc.), represented a significant step toward identifying universal patterns in linguistic structure. August Schleicher's "Stammbaumtheorie" (family tree theory) and Johannes Schmidt's "Wellentheorie" (wave theory) offered competing models of language relationship and change, both contributing to a more sophisticated understanding of linguistic diversity and commonality. Perhaps most significantly, these 19th century developments established systematic methods for cross-linguistic comparison and documentation, creating the foundation upon which 20th century universalism would be built. By the end of the century, linguists had accumulated substantial evidence of both the diversity of human languages and certain recurring patterns that suggested underlying universal constraints. This tension between diversity and universality would come to define much of 20th century linguistic research, setting the stage for the revolutionary developments to come.

The 20th century opened with a seismic shift in linguistic theory, initiated by Ferdinand de Saussure's posthumously published "*Cours de linguistique générale*" (1916), which fundamentally reconceptualized language as a system of signs and laid the groundwork for structural approaches to meaning. Saussure's key insights included the arbitrary nature of the linguistic sign (the relationship between signifier and signified is conventional rather than natural), the concept of linguistic value (meaning derives from relationships and contrasts



within the system), and the distinction between *langue* (the abstract system of language) and *parole* (individual speech acts). These revolutionary ideas provided a new framework for understanding meaning as relational and systematic rather than referential and atomistic. According to Saussure, the meaning of a word like “sheep” in English is not simply its reference to a particular animal but is determined by its contrast with other words in the English system (e.g., “mutton” refers to the meat, while French uses the same word “mouton” for both animal and meat). This structural view of meaning suggested that while languages might carve up conceptual space differently, they all do so according to systematic principles of contrast and relationship. Saussure’s influence rapidly spread across Europe, giving rise to various structuralist schools that developed different approaches to meaning. The Prague School, particularly through the work of Roman Jakobson and Nikolai Trubetzkoy, emphasized the functional aspects of linguistic elements and their role in communication. Jakobson’s theory of distinctive features in phonology, which identified universal binary contrasts (like vocalic/non-vocalic, consonantal/non-consonantal) underlying all sound systems, represented an important model for later work on semantic features. The Prague School also developed functional approaches to meaning, analyzing how grammatical categories serve communicative functions that might be universal despite their diverse formal realizations across languages. Meanwhile, in the United States, Leonard Bloomfield and other American structuralists focused on distributional analysis and behaviorist principles, avoiding mentalistic concepts and emphasizing observable patterns of language use. While this approach was highly productive for phonology and morphology, it proved limiting for semantic analysis due to its refusal to consider meaning as a legitimate object of scientific study. Bloomfield famously declared that the scientific study of meaning was impossible until other sciences had advanced further, a position that effectively marginalized semantic research in American linguistics for decades. Despite this limitation, the structuralist emphasis on systematic analysis and pattern recognition indirectly contributed to the study of semantic universals by establishing rigorous methods for identifying recurrent patterns across languages. The post-World War II period saw the emergence of semantic fields theory, primarily associated with German scholars like Jost Trier and Leo Weisgerber, who analyzed how related words form conceptual fields that structure different domains of experience. Trier’s analysis of the German vocabulary for knowledge in the Middle Ages, for example, showed how the semantic field covering concepts like “wisdom,” “knowledge,” and “art” had shifted significantly over time, revealing both historical change and systematic organization. Simultaneously, componential analysis was being developed by scholars like Louis Hjelmslev, Bernard Pottier, and later Jerrold Katz and Jerry Fodor, who proposed that word meanings could be decomposed into universal semantic features or components. For instance, the meaning of “bachelor” might be analyzed as [+HUMAN], [+MALE], [+ADULT], [-MARRIED], suggesting that meanings across languages could be built from a universal set of such features. These approaches, though different in their specific methodologies and assumptions, shared the structuralist conviction that

### 1.3 Theoretical Foundations

These approaches, though different in their specific methodologies and assumptions, shared the structuralist conviction that meaning systems could be analyzed through systematic decomposition and relational contrasts. Structural semantics, emerging prominently in the mid-20th century, sought to uncover the underlying

patterns organizing lexical meaning within and across languages. Proponents like Jost Trier, Leo Weisgerber, and later John Lyons argued that words do not exist in isolation but form integrated semantic fields, where the meaning of each term is defined by its relationships to others within the same conceptual domain. For instance, in the semantic field of color, the meaning of “red” in English is determined not just by its reference to a range of wavelengths but also by its contrast with “orange,” “purple,” “pink,” and other color terms. This relational view suggested that while the specific boundaries and internal structures of semantic fields might vary across languages, the principle of organizing meaning through structured fields was itself a universal feature of human language. Building upon this foundation, componential analysis (or feature semantics) offered a more granular approach to identifying semantic universals. Developed independently by European scholars like Bernard Pottier and Algirdas Greimas, and later by American linguists Jerrold Katz and Jerry Fodor within the generative framework, componential analysis proposed that word meanings could be decomposed into a finite set of universal, binary semantic features or components. These features represented fundamental conceptual distinctions, much like distinctive features in phonology. The classic example is the analysis of kinship terms. The word “mother” might be decomposed into components such as [+PARENT], [+FEMALE], [+DIRECT LINEAGE], while “uncle” would be [+PARENT’S SIBLING], [+MALE], [+COLLATERAL LINEAGE]. Similarly, “bachelor” could be analyzed as [+HUMAN], [+MALE], [+ADULT], [-MARRIED]. The hypothesis was that these semantic features themselves were universal conceptual building blocks, present in all languages, even though they might be combined differently or expressed through vastly different lexical forms. Proponents argued that componential analysis could reveal the deep semantic structure underlying surface lexical diversity, exposing universals in how humans categorize fundamental aspects of experience like kinship, spatial relations, or animate/inanimate distinctions. For example, the universal presence of some distinction based on sex (male/female) in kinship terminologies, or the near-universal distinction between containment and support in spatial language, were seen as evidence for universal semantic features. However, this approach faced significant challenges. Critics pointed out the difficulty in establishing a definitive, cross-linguistically valid set of semantic primitives and the often arbitrary nature of the feature assignments. The analysis of “bachelor,” for instance, relies heavily on culturally specific concepts of marriage and adulthood that may not map cleanly onto other societies. Furthermore, the rigid binary nature of the features struggled to capture the graded, fuzzy boundaries evident in many natural categories. Despite these limitations, structural semantics and componential analysis made crucial contributions by establishing rigorous methods for semantic decomposition and demonstrating that cross-linguistic comparison could uncover recurrent patterns in how meaning is structured, laying essential groundwork for subsequent theories of semantic universals.

The emergence of generative linguistics, spearheaded by Noam Chomsky in the late 1950s and early 1960s, revolutionized the study of syntax but initially relegated semantics to a secondary status. Chomsky’s “Aspects of the Theory of Syntax” (1965) proposed a model where a deep structure, generated by phrase structure rules and transformations, was mapped onto a surface structure via phonological rules. Semantic interpretation was seen as operating primarily on the deep structure. However, this framework soon sparked a vigorous internal debate that would profoundly impact the search for semantic universals. By the mid-1960s, a group of Chomsky’s students and colleagues, including George Lakoff, James McCawley, Paul Postal, and Haj

Ross, began developing what became known as generative semantics. This radical alternative challenged the autonomy of syntax and argued that the deepest level of linguistic representation was not syntactic but semantic. The core tenet of generative semantics was the universal base hypothesis: all languages share the same underlying semantic structure, which is then converted into the diverse surface structures of individual languages through a series of transformations. This universal semantic base was conceptualized as a highly abstract, potentially universal set of semantic primitives and combinatorial rules, representing the fundamental “language of thought.” Proponents argued that the same basic semantic relationships, such as CAUSE, BECOME, NOT, or predicate-argument structures, underlay all linguistic expressions, regardless of the specific grammatical forms they took in different languages. For example, the sentence “John killed Bill” would be derived not from a syntactic deep structure but from an underlying semantic representation like [John CAUSE [BECOME [Bill NOT [ALIVE]]]]. This representation, composed of universal semantic elements, would then undergo transformations to yield the surface syntactic form. The universality resided in these primitive semantic concepts and their combinatorial possibilities. Generative semanticists embarked on ambitious projects to uncover these universal primitives and rules, often drawing on insights from logic, philosophy, and anthropology. They analyzed phenomena across languages, such as causatives, comparatives, possession, and modality, attempting to reduce them to a core set of universal semantic operations. The approach promised a direct link between linguistic universals and universal cognitive processes. If the base was truly universal, it would represent the fundamental conceptual structure of the human mind. However, generative semantics faced intense criticism and eventually declined by the mid-1970s. Critics argued that the transformations required to get from the proposed semantic representations to surface forms became impossibly complex and ad hoc, losing the explanatory power that made generative grammar initially attractive. The quest for a finite, definitive set of semantic primitives proved elusive, as did the establishment of a clear boundary between semantic primitives and syntactic rules. Furthermore, the theory struggled to account convincingly for the vast typological diversity in grammatical structures observed across the world’s languages. Despite its eventual decline as a unified research program, generative semantics had a profound and lasting impact. It forcefully reasserted the centrality of semantics within linguistic theory, demonstrated the inadequacy of purely syntactic explanations for many linguistic phenomena, and, crucially, popularized the idea that deep semantic structures might be universal and directly linked to human cognition. Many of its insights, particularly the focus on underlying semantic relationships like CAUSE or BECOME, were absorbed into subsequent frameworks, including later versions of generative grammar and cognitive linguistics, keeping alive the quest for universals at the semantic core.

A paradigm shift in our understanding of semantic categories and their potential universality arrived with the groundbreaking work of psychologist Eleanor Rosch in the 1970s. Challenging the classical view of categories, inherited from Aristotle and implicitly assumed in much of structural and generative semantics, Rosch introduced prototype theory and the concept of fuzzy boundaries. The classical view held that categories were defined by a set of necessary and sufficient conditions; an entity belonged to a category if and only if it possessed all the defining features. This view underpinned componential analysis and suggested that semantic categories should have clear, fixed boundaries. Rosch’s experimental research, however, revealed a radically different picture. Through a series of ingenious studies involving color terms, basic level objects,

and abstract concepts across diverse cultures (including the Dani people of New Guinea, who have only two basic color terms), Rosch demonstrated that natural categories are psychologically structured around prototypes or “best examples.” Category membership is not an all-or-nothing affair but a graded phenomenon. Some members are considered more central or representative of the category than others. For instance, a robin is a more prototypical bird than a penguin or an ostrich for most English speakers; a chair is more prototypical furniture than a telephone or a lamp. Crucially, Rosch identified what she termed the basic level of categorization – an intermediate level in taxonomic hierarchies (e.g., “dog” rather than the superordinate “animal” or the subordinate “Labrador retriever”) that is cognitively privileged across cultures. Basic level categories are learned first by children, named first in languages, processed fastest in recognition tasks, and tend to maximize within-category similarity and between-category difference. The universality of this basic level, Rosch argued, stems from its correspondence to the way the world presents itself to us through our perceptual and motor interactions – the level of “whole objects” that form the natural discontinuities in our environment. Furthermore, Rosch demonstrated that category boundaries are often fuzzy or “graded” rather than sharp. There is no precise point where “red” becomes “orange” or where “cup” becomes “mug”; the transition is gradual and context-dependent. This fuzziness, she argued, reflects the inherent structure of human cognition and experience, not a flaw in categorization. The implications for semantic universals were profound. Prototype theory suggested that while the specific prototypes and the degree of fuzziness might vary across languages and cultures, the fundamental cognitive principles of categorization – the existence of prototypes, the cognitive privilege of the basic level, and the graded nature of category membership – were universal features of human semantic systems. Universals resided not in rigid, classical definitions but in these flexible, psychologically grounded patterns of conceptual organization. For example, while the specific color terms a language has vary (as Berlin and Kay had shown), the way languages tend to evolve color terms follows predictable patterns based on the perceptual salience (prototypicality) of certain focal colors. Similarly, while kinship systems differ enormously, the basic-level terms for immediate family (mother, father, sister, brother) are universally present and learned early, reflecting their psychological centrality. Prototype theory transformed the study of semantic universals by shifting the focus from abstract logical definitions to the psychologically real structure of concepts as they exist in the human mind, providing a powerful framework for understanding how shared cognitive and perceptual biases shape meaning across all languages.

Building upon the foundations laid by prototype theory and reacting against the abstract, disembodied nature of generative semantics, cognitive semantics emerged in the 1980s as a major theoretical framework offering profound insights into semantic universals. Spearheaded by George Lakoff, Mark Johnson, Ronald Langacker, and Leonard Talmy, cognitive semantics fundamentally redefined meaning, viewing it not as an objective relationship between symbols and the world, nor as an abstract formal structure, but as arising from human cognition, experience, and embodiment. The core principle is that meaning is conceptualization – the way humans construe and structure reality based on their bodily interactions with the environment, their perceptual systems, their cultural models, and their imaginative capacities. This perspective directly links semantics to universal aspects of human biology, cognition, and experience. A cornerstone of cognitive semantics is the theory of conceptual metaphor, most famously articulated by Lakoff and Johnson in

their influential book “Metaphors We Live By” (1980). They argued that metaphor is not merely a poetic device but a fundamental cognitive tool for understanding abstract concepts. Abstract domains are systematically structured and understood via mappings from more concrete, experiential domains. Crucially, many of these conceptual metaphors appear to be grounded in universal aspects of embodied experience and thus recur across languages and cultures. For instance, the conceptual metaphor HAPPY IS UP / SAD IS DOWN manifests in English expressions like “feeling up,” “in high spirits,” “feeling down,” “depressed.” Similar mappings are found in unrelated languages like Hungarian, Chinese, and Wolof, suggesting a universal conceptual link between vertical spatial orientation (arising from our upright posture and experiences of physical vitality versus lethargy) and emotional valence. Other widely attested universal conceptual metaphors include AFFECTION IS WARMTH (“warm welcome,” “cold reception”), TIME IS MOTION (“time flies,” “approaching a deadline”), and MORE IS UP (“prices rose,” “high status”). These metaphors are not arbitrary; they arise from recurring correlations in our embodied, sensory-motor experience (e.g., affection is often experienced with warmth; time is perceived as moving as we move through space; adding substance increases its height). Closely related are image schemas – dynamic, recurring patterns of perceptual interactions and motor programs that give coherence to our experience. Identified by Johnson, Lakoff, and Talmy, image schemas include CONTAINER (in-out, boundaries), PATH (source-goal, trajectory), LINK (connection), FORCE (causation, blockage), BALANCE, VERTICALITY, and others. These schemas are pre-conceptual, emerging from our bodily experience (e.g., our bodies are containers; we constantly navigate paths; we experience forces pushing and pulling). Cognitive semanticists argue that these image schemas represent universal conceptual primitives that structure meaning across languages. For example, the CONTAINER schema underlies expressions of state (“in love,” “out of trouble”), the PATH schema structures events involving movement (“go to school,” “come from afar”), and the FORCE schema underlies causation (“the wind broke the window”). While the specific linguistic expressions vary, the underlying image schemas provide a universal repertoire for structuring spatial, temporal, causal, and abstract concepts. Cognitive semantics thus proposes that semantic universals are found in these fundamental patterns of embodied conceptualization – the universal image schemas derived from our bodily form and interactions, and the systematic conceptual metaphors grounded in recurring correlations in experience. This framework shifted the locus of universals from abstract logical features to the structured patterns of embodied cognition, offering a biologically and experientially grounded account of why certain patterns of meaning recur across all human languages.

The quest for a definitive set of universal semantic primitives reached its most systematic and ambitious expression in the Natural Semantic Metalanguage (NSM) theory, developed primarily by linguist Anna Wierzbicka and expanded in collaboration with Cliff Goddard and other researchers. Emerging in the 1970s and refined over subsequent decades, NSM proposes that there exists a small set of irreducible, indefinable conceptual primes – semantic atoms – that are present in the lexicons of all languages and constitute the shared bedrock of human meaning. Furthermore, NSM claims that these primes can be combined according to a universal grammar of meaning, allowing for the precise paraphrase of any complex concept in any language using only these simple, cross-translatable terms. The core hypothesis is that these semantic primes are the ultimate common core of all languages, the minimal conceptual toolkit that every human

speaker possesses, regardless of their linguistic or cultural background. Identifying this set and demonstrating its universality became the central mission of the NSM program. Through decades of meticulous cross-linguistic research, comparing languages from diverse families (Indo-European, Austronesian, Uralic, Austronesian, Australian Aboriginal, African, Native American, etc.), Wierzbicka and her colleagues have proposed a set of approximately 65 semantic primes. These include substantive primes like I, YOU, SOMEONE, SOMETHING/THING, PEOPLE, BODY, mental primes like THINK, KNOW, WANT, FEEL, SEE, HEAR, speech primes like SAY, WORD, TRUE, action, event and movement primes like DO, HAPPEN, MOVE, existential and possessive primes like THERE IS, HAVE, life and death primes like LIVE, DIE, logical primes like NOT, MAYBE, CAN, BECAUSE, IF, intensifiers like VERY, and descriptors like GOOD, BAD, BIG, SMALL. Crucially, these primes are not defined using other words; they are treated as innate, primitive concepts whose meaning is accessible through direct human experience (e.g., the concept of “I” is grounded in self-awareness; “GOOD” in positive evaluation). The universality of each prime is tested through rigorous linguistic analysis: evidence must be found in every language of either a single word or a fixed phrase that expresses the identical concept, and this expression must be simple, non-metaphorical, and not decomposable into simpler meanings within that language. For example, while English uses the single word “think,” Russian uses “думать,” and Polish “myśleć,” NSM argues these are all exact exponents of the same semantic prime THINK. The methodology of NSM involves using these primes as a metalanguage to explicate the meanings of complex words and cultural scripts across languages. For instance, the English concept of “privacy” might be paraphrased as something like: “someone can think something like this: ‘I don’t want other people to know what I am doing, I don’t want other people to see what I am doing, I don’t want other people to be where I am’.” This explication uses only primes and is claimed to be

## 1.4 Types of Semantic Universals

...precisely translatable into any language that has the full set of semantic primes. The NSM program represents perhaps the most systematic attempt to identify a definitive set of universal semantic primitives, proposing that these approximately 65 concepts form the irreducible core of meaning present in all human languages and serving as the foundation for all other semantic structures.

Building upon the theoretical foundations explored in the previous section, we now turn to a systematic classification of the types of semantic universals that researchers have identified across the world’s languages. These universals manifest in various forms, ranging from absolute principles found without exception to statistical tendencies that recur with remarkable frequency. Understanding these different types is essential for appreciating both the robust commonalities and the nuanced variations in how humans conceptualize and express meaning across diverse linguistic and cultural contexts.

The distinction between absolute and statistical universals represents the most fundamental way of categorizing semantic universals based on their distribution across languages. Absolute universals are properties or patterns of meaning that have been documented in every human language examined to date, without exception. These universals represent the strongest evidence for shared cognitive and communicative foundations across all human societies. One compelling example of an absolute semantic universal is the distinction



between animate and inanimate entities. While the specific boundaries of these categories may vary across cultures, every documented language makes some conceptual distinction between entities that are considered alive or capable of independent action versus those that are not. This distinction is not merely a grammatical curiosity; it permeates semantic organization, influencing how languages categorize entities, assign grammatical properties, and structure basic conceptual frameworks. For instance, even in languages without explicit grammatical gender or animacy distinctions in their morphology, speakers still conceptually differentiate between rocks and rabbits, rivers and humans, reflecting a fundamental cognitive partition of the world based on perceived agency and vitality. Another absolute semantic universal is the existence of deictic categories – expressions whose meaning depends on the context of utterance, particularly the speaker’s location and time. Every language has ways to indicate “here” versus “there,” “now” versus “then,” and “I” versus “you,” demonstrating that all human languages anchor meaning in the spatiotemporal perspective of the speaker. Similarly, the capacity to express negation appears to be an absolute semantic universal; no language has been documented that lacks the ability to say “no” or to negate propositions. This reflects a fundamental cognitive need to distinguish between what is and what is not the case, between reality and its absence. The existence of basic temporal distinctions, particularly between past and non-past (which may include present and future), also appears to be an absolute universal. While some languages, like Mandarin Chinese, do not grammatically encode tense in the same way as English, they all have lexical and pragmatic means to locate events in time relative to the moment of speaking.

In contrast to absolute universals, statistical universals are properties or patterns of meaning that are found in most, but not all, human languages. These universals represent strong tendencies rather than exceptionless rules, often with over 90% occurrence in large language samples. The existence of statistical universals is equally revealing of human cognition, suggesting that certain semantic patterns are so cognitively natural or communicatively useful that they develop independently in most linguistic communities, even if a minority find alternative solutions. One well-documented statistical universal is the presence of basic color terms for “black” and “white.” In their groundbreaking research, Brent Berlin and Paul Kay found that while languages vary enormously in their color vocabularies, those with only two basic color terms invariably distinguish between dark/cool colors (approximating “black”) and light/warm colors (approximating “white”). This pattern holds across unrelated language families, suggesting a universal cognitive tendency to categorize the color spectrum along a light/dark dimension. However, this is not an absolute universal because a few languages, such as the Himba language of Namibia, have been argued to organize color space differently, though this remains a subject of ongoing debate. Another statistical semantic universal is the distinction between inclusive and exclusive “we.” Most languages have different words for “we” that includes the addressee (you and I, possibly others) versus “we” that excludes the addressee (I and others, but not you). This distinction is found in languages as diverse as Mandarin Chinese (*zánmen* vs. *wǒmen*), Indonesian (*kita* vs. *kami*), and many Native American languages. Yet some languages, like English, make this distinction only pragmatically rather than lexically, thus rendering it a statistical rather than absolute universal. Similarly, the existence of basic terms for body parts like “hand,” “eye,” “head,” and “foot” is a statistical universal; while nearly all languages have these terms, a few may lack specific words for certain body parts or may categorize them differently. For instance, some languages do not distinguish between



“hand” and “arm” with separate basic terms. The methodological challenges in distinguishing between absolute and statistical universals are significant and ongoing. The primary difficulty lies in obtaining a truly representative sample of the world’s languages. With over 7,000 languages currently spoken and many inadequately documented, claims of absolute universality are always provisional. A pattern believed to be absolute might be challenged by the discovery of a counterexample in a previously undocumented language. Furthermore, the criteria for determining whether two semantic categories in different languages are truly equivalent can be contentious. For instance, does a language that uses the same word for “blue” and “green” truly lack a conceptual distinction, or does it simply categorize the spectrum differently? These methodological complexities require researchers to maintain appropriate caution when making claims about semantic universals, whether absolute or statistical.

Moving beyond the dimension of frequency, we can categorize semantic universals based on their nature as either substance universals or formal universals. Substance universals, also known as universal semantic fields, refer to domains of meaning that are conceptualized and lexicalized in all human languages. These universals concern the content of meaning – what languages talk about – rather than how that meaning is structured. The existence of these universal semantic fields reflects the shared human experience and the problems that all societies must solve through language. One of the most extensively studied universal semantic fields is kinship terminology. Every human society has kinship terms that distinguish at least between generations (parent/child), gender (male/female), and lineage (direct/collateral). While the specific systems vary enormously – from the relatively simple Eskimo system used in English-speaking cultures to the complex Omaha or Crow systems found in some Native American societies – all languages have ways to talk about family relationships. This universality stems from the biological reality of human reproduction and the universal social importance of organizing family relationships for purposes of marriage, inheritance, and social structure. Another universal semantic field is spatial relations and orientation. All languages have terms for basic spatial concepts like “in,” “on,” “under,” “near,” “far,” and directions like “up,” “down,” “left,” and “right.” The work of Stephen Levinson and others has shown that while languages vary in how they organize spatial reference frames (egocentric, absolute, or relative), all have lexical resources for describing spatial relationships and orientations. This reflects the fundamental need for humans to navigate their physical environment and communicate about locations. The domain of basic emotions also represents a universal semantic field, though with more variation in conceptual boundaries. Research by Paul Ekman and others suggests that certain emotions like happiness, sadness, anger, fear, disgust, and surprise have universal facial expressions and are recognized across cultures. Correspondingly, all languages have terms for these basic emotional states, though they may carve up the emotional landscape differently in terms of secondary emotions or the nuances of primary ones. Similarly, all languages have terms for basic natural phenomena like “water,” “fire,” “sun,” “moon,” “day,” and “night,” reflecting the universal human experience of the natural world. The semantic field of perception is also universal, with all languages having terms for basic sensory experiences like “see,” “hear,” “taste,” “smell,” and “touch.” These universal semantic fields manifest differently across languages, with varying degrees of lexical elaboration and different conceptual boundaries. For instance, while English has separate basic terms for “hand” and “arm,” some languages use a single term; while English distinguishes between “blue” and “green,” some languages like Tarahumara use a single term

for both. Yet despite these differences in categorization, the underlying semantic fields themselves – the domains of kinship, space, emotion, natural phenomena, and perception – appear to be universal, reflecting shared human experiences and cognitive imperatives.

In contrast to substance universals, which concern the content of meaning, formal universals involve the structures or patterns that organize semantic content across languages. These universals are about how meaning is organized rather than what meaning is expressed. Formal universals reveal that human languages, despite their surface diversity, employ similar cognitive strategies for structuring conceptual domains. One prominent formal universal is the principle of taxonomy – the hierarchical organization of concepts into inclusive relationships. All human languages organize lexical concepts into taxonomic hierarchies with multiple levels, typically including a superordinate level (e.g., “animal”), a basic level (e.g., “dog”), and a subordinate level (e.g., “Labrador retriever”). As Eleanor Rosch demonstrated, the basic level is cognitively privileged across cultures, being learned first, processed fastest, and used most frequently in everyday speech. This taxonomic structure appears to be a universal cognitive tool for organizing knowledge efficiently, allowing speakers to generalize at appropriate levels while maintaining specificity when needed. Another formal semantic universal is meronymy – the part-whole relationship. All languages have systematic ways to express that something is a part of something else (e.g., “wheel” is part of “car,” “finger” is part of “hand”). This relationship is fundamental to how humans conceptualize objects and their composition, and it manifests across languages in various syntactic constructions (possessive, locative, etc.) while maintaining its conceptual integrity. The principle of antonymy is also a formal universal; all languages have pairs of words with opposite meanings (e.g., “hot”/“cold,” “up”/“down,” “good”/“bad”). These antonymous pairs are not merely lexical coincidences but reflect a fundamental cognitive strategy of organizing concepts along contrasting dimensions. Furthermore, all languages appear to employ metaphor as a formal device for extending meaning from concrete to abstract domains. As George Lakoff and Mark Johnson have shown, while the specific metaphors may vary, the principle of using concrete experiences to understand abstract concepts is universal. For instance, the metaphor ARGUMENT IS WAR manifests in English expressions like “defend a position,” “attack a weak point,” “win an argument,” and similar metaphors are found in unrelated languages, reflecting a universal formal pattern for conceptualizing intellectual conflict in terms of physical combat. Another formal universal is the distinction between count nouns and mass nouns. All languages make some distinction between objects that can be counted discretely (e.g., “books,” “chairs”) and substances that are measured continuously (e.g., “water,” “sand”). While the boundary between these categories may vary across languages (e.g., some languages treat “hair” as countable, others as mass), the formal distinction itself appears to be universal, reflecting a fundamental cognitive partition of the world into discrete objects and continuous substances. These formal universals demonstrate that while languages may vary enormously in their specific lexical items and grammatical structures, they share universal patterns of semantic organization, suggesting common cognitive strategies for making sense of the world.

A particularly interesting type of semantic universal is the implicational universal, which takes the form of conditional relationships: if a language has semantic feature X, then it will also have semantic feature Y. These universals reveal constraints on how semantic systems can vary, suggesting that certain features are logically or cognitively dependent on others. Implicational universals are particularly valuable for under-

standing the possible range of human languages and the principles that constrain linguistic diversity. One of the most famous examples of an implicational universal in semantics is the evolutionary sequence of color term systems discovered by Berlin and Kay. Their research revealed that if a language has only two basic color terms, they will always correspond to “black/dark” and “white/light.” If a language has three color terms, the third will always be “red.” With four terms, the fourth will be either “green” or “yellow.” With five terms, both “green” and “yellow” will be present. With six terms, “blue” will be added, and so on, up to potentially eleven basic color terms. This implicational sequence holds across unrelated language families, suggesting universal cognitive and perceptual constraints on how languages categorize the color spectrum. The implication is that languages cannot have, for instance, a basic term for “purple” without also having terms for “black,” “white,” “red,” “green,” “yellow,” and “blue.” Another implicational universal concerns kinship terminology systems. If a language distinguishes between maternal and paternal grandparents, then it will also distinguish between mother’s brother and father’s brother. This reflects a principle of semantic differentiation where more specific distinctions imply the presence of more general ones. Similarly, in the domain of spatial language, research by Melissa Bowerman and others has shown that if a language uses absolute spatial reference frames (cardinal directions like north/south) rather than egocentric ones (left/right), it will also have a highly elaborated system of landscape terms for describing topographical features. This suggests that absolute spatial orientation is cognitively dependent on a detailed conceptualization of the environment. In the domain of numeral systems, an implicational universal states that if a language has a base for its numeral system higher than 10, then it will also have a base of 10. This means that languages with vigesimal (base-20) systems, like some Mayan languages, will also have decimal elements, reflecting the universal cognitive salience of counting on ten fingers. Implicational universals are powerful explanatory tools because they not only describe patterns but also suggest underlying principles or constraints that give rise to those patterns. They reveal that semantic systems are not arbitrary collections of features but structured systems where the presence of certain elements logically or cognitively necessitates the presence of others. These constraints may reflect perceptual biases (as in color terms), cognitive processing limitations, or the logical structure of conceptual domains. By identifying implicational universals, linguists can develop theories about the possible range of human semantic systems and the principles that shape their evolution and structure.

Perhaps the most fundamental and controversial type of semantic universal is the universal primitive or semantic prime – a concept that is hypothesized to be irreducible and present in all human languages. The search for such primitives represents the deepest level of inquiry into semantic universals, seeking to identify the conceptual “atoms” from which all other meanings are built in every language. As discussed in the previous section, the most systematic approach to identifying semantic primes is the Natural Semantic Metalanguage (NSM) theory developed by Anna Wierzbicka and Cliff Goddard. NSM posits a set of approximately 65 semantic primes – concepts like I, YOU, SOMEONE, THING, THINK, KNOW, WANT, SAY, DO, HAPPEN, GOOD, BAD, BIG, SMALL – that are claimed to be present as indefinable simple concepts in all languages. These primes are not defined using other words but are treated as innate, primitive concepts whose meaning is accessible through direct human experience. The universality of each prime is tested through rigorous cross-linguistic analysis, seeking evidence in every language of either a single word

or a fixed phrase that expresses the identical concept. For example, while English uses “think,” Russian “думать,” and Japanese “omou,” NSM argues these are all exact exponents of the same semantic prime THINK. Similarly, “want” in English, “khochet” in Russian, and “hoshii” in Japanese are claimed to be exact exponents of the prime WANT. The hypothesis is that these primes form the shared conceptual bedrock of all languages, the minimal set of concepts that every human speaker possesses. Beyond NSM, other researchers have proposed different sets of universal semantic primitives based on various theoretical foundations. Ray Jackendoff, working within a generative framework, has proposed a set of conceptual primitives that underlie linguistic and other cognitive systems, including elements like Event, State, Thing, Path, Place, and Property. These primitives are intended to represent the basic building blocks of conceptual structure, universal to human cognition. Similarly, the work of Larry Namy and Sandra Waxman on early word learning suggests that infants are predisposed to attend to certain conceptual distinctions, such as object shape versus material, which might correspond to universal semantic primitives in the domain of object categorization. The evidence for semantic primes comes from several sources. First, linguistic analysis reveals that certain concepts appear to be undefinable within their own language without circularity; any attempt to define “think” or “want” in English inevitably uses those very words or synonyms with the same core meaning. Second, cross-linguistic comparison shows that certain concepts are lexicalized as simple words or fixed expressions in all languages examined, despite enormous variation in other aspects of vocabulary. Third, developmental research indicates that certain concepts are among the first expressed by children across cultures, suggesting cognitive

## 1.5 Methodologies for Identifying Universals

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The section I need to write covers: 5.1 Linguistic Typology and Cross-Linguistic Comparison 5.2 Experimental Methods and Psychological Testing 5.3 Corpus Linguistics and Computational Approaches 5.4 Fieldwork and Documentation of Endangered Languages 5.5 Challenges in Establishing True Universals

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## 1.6 Section 5: Methodologies for Identifying Universals

Third, developmental research indicates that certain concepts are among the first expressed by children across cultures, suggesting cognitive predispositions that might correspond to universal semantic building blocks. This developmental evidence, combined with linguistic analysis and cross-linguistic comparison, points toward the existence of fundamental conceptual primitives that form the bedrock of human meaning systems. However, identifying and verifying these and other semantic universals requires sophisticated methodologies that can systematically uncover patterns across the world's diverse languages. The quest to discover what is universal in human semantics has given rise to a variety of research approaches, each with its own strengths, limitations, and contributions to our understanding of shared meaning structures.

Linguistic typology and cross-linguistic comparison represent the oldest and most fundamental methodology for identifying semantic universals. This approach involves systematically comparing structural features across a diverse sample of languages to identify recurrent patterns or absolute universals. Unlike historical linguistics, which focuses on genetic relationships between languages, typology is concerned with discovering patterns that may appear in unrelated languages, suggesting independent emergence or deep cognitive foundations. The power of typology lies in its ability to reveal both what is common across languages and the range of possible variation, helping to distinguish true universals from mere tendencies or areal features. A critical aspect of typological research is the selection of an appropriate language sample. Early typological studies often suffered from sampling bias, relying heavily on well-documented European and Asian languages while underrepresenting Africa, the Americas, Oceania, and Papua New Guinea, which together contain the majority of the world's linguistic diversity. Modern typology addresses this problem through stratified sampling, ensuring representation from all major geographical regions and language families. The World Atlas of Language Structures (WALS), for instance, provides data on over 2,500 languages across 192 structural features, creating a robust foundation for identifying cross-linguistic patterns. The methodology of typological comparison involves several steps. First, researchers identify a semantic domain of interest, such as color terms, kinship terminology, or spatial relations. They then develop a framework for analyzing this domain across languages, often creating a questionnaire or set of concepts to be investigated. Data is gathered from grammars, dictionaries, and scholarly descriptions of the target languages, or through direct consultation with native speakers when possible. The collected data is then analyzed to identify patterns, such as implicational universals or statistical tendencies. For example, in their seminal work on color terminology, Berlin and Kay developed a standardized set of color chips to elicit basic color terms from speakers of twenty languages, later expanding their study to over one hundred languages. This methodological rigor allowed them to identify the now-famous implicational universals of color term evolution, demonstrating that languages add basic color terms in a constrained sequence rather than randomly. Similarly, in the domain of kinship terminology, typological studies have revealed that while the specific systems vary enormously, all languages make distinctions based on generation, gender, and lineage, with more complex systems building upon these fundamental distinctions. The contributions of typological approaches to the study of semantic universals are substantial. This methodology has provided the primary evidence for most proposed semantic universals, from the basic color term sequence to patterns in numeral systems, spatial reference frames, and emotional expression. Typology has also been crucial in identifying the limits of linguistic variation,

showing that despite surface diversity, languages operate within constrained parameters when it comes to semantic structure. However, typological approaches also have limitations. They rely heavily on the availability and quality of linguistic descriptions, which can vary dramatically across languages. Furthermore, typology is better suited to identifying patterns in lexical and grammatical semantics than in more subtle aspects of meaning, such as connotation, pragmatic usage, or cultural associations. Despite these limitations, linguistic typology remains the cornerstone of research on semantic universals, providing the broad cross-linguistic perspective necessary to distinguish what is universal from what is culturally specific.

While typological comparison reveals patterns across languages, experimental methods and psychological testing allow researchers to probe the cognitive foundations of semantic universals more directly. These approaches bring the tools of cognitive psychology, psycholinguistics, and neuroscience to bear on questions about universal aspects of meaning. Experimental methods can investigate not just whether languages express certain concepts, but how those concepts are processed, acquired, and represented in the mind. One powerful experimental approach is semantic priming, which measures how exposure to one concept affects the processing of a related concept. For instance, researchers might present participants with a word like “doctor” followed by a target like “nurse” (semantically related) or “bread” (unrelated) and measure reaction times to recognize or pronounce the target. Faster responses to related targets indicate semantic association. When conducted across languages, this method can reveal whether conceptual relationships are universal or language-specific. Studies using this technique have found that while some semantic associations are culturally variable (like the relationship between “tea” and “biscuit” in British English versus “tea” and “dim sum” in Cantonese), others appear to be universal, such as the association between body parts and their functions (e.g., “eye” and “see”) or between natural phenomena and their effects (e.g., “fire” and “hot”). Another experimental method is category learning, where participants are taught artificial categories and their learning patterns are examined. Eleanor Rosch’s pioneering work on prototype theory used this approach to demonstrate that both Americans and the Dani people of New Guinea learned categories with prototypical structure more easily than categories with classical (necessary and sufficient) definitions, suggesting that prototype-based categorization is a universal cognitive strategy. More recently, researchers have used artificial language learning paradigms to investigate whether adults and children have biases to acquire certain semantic structures over others. For example, studies have shown that learners are predisposed to map words to whole objects rather than parts or properties, a bias that may explain the universal prevalence of basic-level object terms in natural languages. Developmental experiments have been particularly valuable for identifying semantic universals. By comparing language acquisition across different cultures, researchers can determine whether certain aspects of semantic development are universal. For instance, studies of children’s early vocabularies across diverse language communities have found remarkable similarities in the first words acquired: nouns referring to concrete objects, especially those that are manipulable and frequently encountered in the child’s environment. Similarly, the emergence of spatial terms follows a predictable sequence across languages, with terms for containment (“in”) and support (“on”) typically appearing before terms for other spatial relationships. This developmental trajectory suggests universal cognitive biases in how children conceptualize space. Neuroimaging techniques have added another dimension to experimental approaches to semantic universals. Functional magnetic resonance imaging (fMRI) and



event-related potentials (ERPs) allow researchers to observe brain activity associated with semantic processing. When people from different linguistic backgrounds process the same concepts, similar patterns of neural activation suggest universal semantic representations. For example, studies have found that concrete concepts like “hammer” or “apple” activate sensory-motor areas of the brain regardless of the language being used, suggesting that semantic representations are grounded in universal perceptual and motor experiences. While experimental methods provide powerful insights into the cognitive reality of semantic universals, they also face challenges. Cross-cultural experiments must be carefully designed to avoid introducing cultural biases in the stimuli or procedures. Furthermore, experiments typically investigate semantic processing in controlled laboratory settings, which may not fully reflect how meaning is used in natural communication. Despite these limitations, experimental methods complement typological approaches by providing evidence for the psychological reality of proposed semantic universals and revealing the cognitive mechanisms that underlie them.

The digital revolution has transformed research on semantic universals through the rise of corpus linguistics and computational approaches. These methodologies leverage large collections of natural language data (corpora) and sophisticated computational algorithms to identify patterns in language use at a scale previously unimaginable. Corpus-based approaches to semantic universals analyze how meaning is actually expressed in authentic communication across multiple languages, revealing patterns that might not be apparent from grammatical descriptions or experimental studies alone. A major advantage of corpus linguistics is its ability to analyze frequency, collocation, and distributional patterns – aspects of meaning that are central to how concepts are used and understood but difficult to study through other methods. For instance, by examining large corpora of English, Chinese, and Spanish, researchers can determine whether the same concepts tend to be used metaphorically in similar ways across these languages, providing evidence for universal conceptual metaphors. One computational approach that has proven particularly valuable for studying semantic universals is distributional semantics, which analyzes the contexts in which words appear to represent their meanings as vectors in a high-dimensional space. By comparing the semantic spaces of different languages, researchers can identify which aspects of meaning structure are universal and which are language-specific. For example, a study comparing distributional models of English, Japanese, and Spanish found that while the specific coordinates of words in semantic space differed across languages, the overall structure – the relative distances between related concepts – showed remarkable similarities, suggesting universal cognitive organization of semantic domains. Another computational method is cross-lingual word embedding alignment, which creates vector representations of words in different languages that occupy the same semantic space. When words from different languages cluster together in these aligned spaces, it suggests conceptual similarity. For instance, the alignment might show that words for “water” across languages form a tight cluster, as do words for “fire,” but the distance between these clusters is consistent across languages, reflecting a universal conceptual distinction between these natural elements. Large multilingual corpora have been crucial for these computational approaches. Projects like the Parallel Corpus, which contains texts translated into multiple languages, allow researchers to examine how the same meanings are expressed across languages. For example, by analyzing how concepts like “freedom,” “justice,” or “love” are translated across hundreds of language pairs, researchers can identify which aspects of these complex concepts are universal and which



are culturally specific. The rise of the internet and digital communication has created vast amounts of multilingual text data, from Wikipedia articles in over 300 languages to social media posts and product reviews. These resources provide unprecedented opportunities for studying semantic universals through computational analysis. For instance, by analyzing emoji usage across different language communities on Twitter, researchers have found remarkable similarities in how facial expressions are mapped to emotional concepts, suggesting universal associations between expressions and emotions. Machine translation systems, powered by neural networks, have also become an unexpected source of insights into semantic universals. These systems learn to map between languages by discovering shared semantic representations, and the structure of these representations can reveal universal patterns. For example, the attention mechanisms in neural machine translation models often focus on similar semantic elements across languages when translating sentences, indicating which aspects of meaning are most salient and thus potentially universal. While corpus linguistics and computational approaches offer powerful tools for studying semantic universals at scale, they also have limitations. These methods are heavily dependent on the availability and quality of digital texts, which overrepresent major languages and formal registers while underrepresenting minority languages and spoken discourse. Furthermore, computational models can identify statistical patterns but may not capture the full richness of meaning, including pragmatic nuances, cultural connotations, and context-dependent interpretations. Despite these challenges, corpus-based and computational approaches have revolutionized the study of semantic universals, providing empirical data at a scale that complements and extends the insights from typological and experimental methods.

While typological databases, experiments, and computational analyses provide valuable insights into semantic universals, there is no substitute for direct fieldwork and documentation of languages, especially those that are endangered or previously undescribed. Field linguistics involves living among speakers of a language, learning to communicate with them, and systematically documenting their linguistic and cultural knowledge. This methodology is essential for several reasons. First, many of the world's languages remain inadequately documented, and claims about semantic universals based only on well-studied languages may be premature. Second, fieldwork allows linguists to investigate semantic domains in their natural cultural context, revealing how meaning is embedded in and shaped by local practices, beliefs, and environments. Finally, the documentation of endangered languages is urgent, as languages are disappearing at an alarming rate – it is estimated that by the end of this century, half of the world's approximately 7,000 languages may no longer be spoken, taking with them unique semantic systems and insights into human cognition. Semantic fieldwork requires specialized methodologies that go beyond simply eliciting word lists. Linguists use a variety of techniques to explore how speakers categorize and conceptualize different domains. One common approach is stimulus-based elicitation, where researchers present carefully designed stimuli – pictures, objects, videos, or scenarios – and ask speakers to describe them. For instance, to study spatial language, a linguist might show a series of images depicting different spatial relationships (e.g., a cup on a table, a cup in a bowl, a cup hanging from a hook) and record how speakers describe these relationships. By comparing these descriptions across languages, researchers can identify universal patterns in how space is conceptualized. The Max Planck Institute for Psycholinguistics has developed extensive sets of stimuli for investigating semantic domains like motion events, cutting and breaking events, and body part

terminology, which have been used with dozens of languages around the world. Another important fieldwork methodology is ethnographic semantic analysis, which involves observing how language is used in natural contexts and interviewing speakers about their cultural concepts and beliefs. This approach is particularly valuable for understanding abstract semantic domains like emotion, morality, or social relationships, which are deeply embedded in cultural practices. For instance, by participating in community events and conversations, a field linguist can observe how emotions are expressed and discussed in context, revealing which emotional concepts are salient and how they are conceptualized in relation to local values and practices. The documentation of endangered languages has made crucial contributions to our understanding of semantic universals. Many of these languages represent independent lineages that have evolved in isolation for millennia, offering unique windows into human semantic capacities. For example, the documentation of Australian Aboriginal languages has revealed complex systems of cardinal direction terms that are used even at small scales, challenging the assumption that egocentric spatial reference frames (like left/right) are universal. Similarly, research on Mayan languages has uncovered unique numeral systems that combine vigesimal (base-20) and elements, providing insights into the cognitive basis of numerical cognition. The documentation of languages in the Amazon basin has revealed sophisticated systems for classifying plants and animals based on ecological relationships, expanding our understanding of how humans categorize the natural world. Fieldwork on semantic universals also presents unique challenges and ethical considerations. Linguists must develop genuine relationships with communities, often learning the local language through immersion before they can effectively document semantic systems. This process requires significant time, patience, and cultural sensitivity. Furthermore, researchers must navigate complex ethical issues, including obtaining informed consent, respecting cultural protocols around knowledge sharing, and ensuring that the community benefits from the research. Many linguists now collaborate with community members to create dictionaries, grammars, and educational materials that serve both scientific and local purposes. The documentation of semantic systems also requires specialized techniques for recording and analyzing meaning. Unlike phonology or syntax, which can be recorded through direct elicitation, semantic knowledge is often implicit and must be inferred from how language is used in context. Field linguists use a variety of techniques to uncover this implicit knowledge, including analyzing texts, recording conversations, conducting semantic interviews, and using experimental tasks adapted for field settings. Despite these challenges, fieldwork remains an irreplaceable methodology for studying semantic universals, providing rich, contextualized data that complements the more abstract patterns revealed by typological, experimental, and computational approaches.

Despite the sophisticated methodologies available for studying semantic universals, establishing true universals faces significant challenges that researchers must carefully navigate. These challenges range from practical limitations of data collection to theoretical questions about the nature of universality itself. One fundamental challenge is the problem of insufficient language sampling. With over 7,000 languages currently spoken and many more historically documented, it is impossible to achieve complete coverage in empirical studies. Most research on semantic universals relies on samples of a few hundred languages at most, often with uneven representation across geographic regions and language families. This sampling bias can lead to premature claims of universality when a pattern is found in well-studied languages but may not hold in un-

derrepresented ones. For example, early claims about universals in color terminology were based primarily on Indo-European and major African and Asian languages, and it was only when researchers began studying languages in Papua New Guinea and the Amazon that more complex patterns emerged. To address this problem, modern typologists use stratified sampling techniques to ensure representation from all major linguistic areas, but the challenge of achieving truly comprehensive coverage remains. Another significant challenge is the influence of language contact and areal features. Languages that have been in contact for long periods often borrow semantic patterns from each other, creating similarities that reflect historical relationships rather than universal cognitive principles. For instance, the presence of similar kinship terminology systems across languages in Southeast Asia may result from centuries of cultural contact rather than independent emergence or cognitive universals. Distinguishing between areal features and true universals requires careful historical analysis and comparison with genetically isolated languages. The problem of distinguishing cultural from linguistic universals presents another methodological challenge. Many apparent semantic universals may in fact reflect universal aspects of human experience rather than universal linguistic structures. For instance, the widespread presence of terms for “water” across languages reflects the universal biological need for water rather than a linguistic universal per se. Similarly, the universal presence of kinship terms reflects the universal social structure of human families rather than a specifically linguistic pattern. Disentangling these cultural and experiential universals from purely linguistic ones requires careful theoretical analysis and comparison across domains with different cultural salience. Methodological critiques of universals research have also raised important questions about how universals are defined and verified. Some researchers argue that claims about semantic universals are often based on vague or inconsistent criteria, with different studies using different standards for what counts as a universal. Others point out that many proposed universals are actually statistical tendencies that allow for exceptions, raising questions about whether they should be considered universals at all. Furthermore, the problem of translation equivalence – determining whether concepts in different languages are truly equivalent or merely similar – presents a fundamental challenge for cross-linguistic semantic comparison. For example, when comparing emotion terms across languages, how do we determine whether “anger” in English is equivalent to “ira” in Spanish or “□□” in Chinese, given that these concepts may have different cultural connotations and behavioral manifestations?

## 1.7 Core Semantic Domains with Universal Properties

For example, when comparing emotion terms across languages, how do we determine whether “anger” in English is equivalent to “ira” in Spanish or “□□” in Chinese, given that these concepts may have different cultural connotations and behavioral manifestations. These methodological challenges notwithstanding, certain semantic domains have emerged as particularly fruitful for investigating universal properties, revealing patterns that persist across linguistic and cultural boundaries. Among the most extensively studied and debated of these domains is that of color categorization, which has provided remarkable insights into the interplay between perception, cognition, and language in shaping universal patterns of meaning.

Color terms and universal patterns of color categorization represent one of the most compelling cases of semantic universals discovered through cross-linguistic research. The groundbreaking work of Brent Berlin

and Paul Kay, published in their 1969 book “Basic Color Terms: Their Universality and Evolution,” revolutionized our understanding of how languages categorize the color spectrum. Prior to their research, the dominant view, influenced by linguistic relativism, held that color categories were arbitrarily determined by each language, with speakers of different languages perceiving and categorizing colors in fundamentally different ways. Berlin and Kay challenged this perspective through systematic investigation of color term systems in twenty languages, later expanding their study to over one hundred languages. Their research revealed a striking pattern: while languages vary enormously in the number of basic color terms they possess, ranging from two to eleven or more, these terms are not randomly distributed across the color spectrum. Instead, they follow a remarkably constrained evolutionary sequence that appears to be universal across human languages. Languages with only two basic color terms invariably distinguish between dark/cool colors (roughly encompassing what English speakers would call black, blue, green, and purple) and light/warm colors (covering white, yellow, orange, and red). If a language has three color terms, the third term is always for red. With four terms, the fourth will be either green or yellow. With five terms, both green and yellow will be present. The sequence continues predictably: blue is added next, followed by brown, and then purple, pink, orange, and gray in various orders, up to a maximum of eleven basic color terms in languages like English and Russian. This implicational sequence – if a language has a term for color X, it will also have terms for all colors that appear earlier in the sequence – represents one of the most robust semantic universals ever documented.

The significance of Berlin and Kay’s discovery extended far beyond the specific domain of color, challenging prevailing assumptions about linguistic relativity and suggesting powerful constraints on how languages can evolve. Their methodology was as important as their findings. To ensure comparability across languages, they developed a standardized array of 320 color chips, representing the full gamut of human color perception, which they used to elicit color terms from native speakers. They defined “basic color terms” according to specific criteria: they must be single words (not phrases like “light blue”), their meaning must not include the meaning of other color terms (excluding terms like “scarlet” if “red” is already present), they must have broad application across objects (excluding terms like “blonde” that apply only to hair), and they must be psychologically salient for speakers (readily recalled and used). This methodological rigor allowed Berlin and Kay to move beyond impressionistic comparisons to establish empirical patterns with unprecedented precision. Their findings suggested that color categorization, rather than being arbitrarily determined by culture, is strongly constrained by universal aspects of human perception and cognition. The focal points of color categories – the most representative examples of each color – were found to be remarkably consistent across languages, even when the boundaries between categories differed. For instance, the “best example” of red was perceived similarly by speakers of languages with only three color terms and those with eleven, suggesting that perceptual salience plays a crucial role in determining how color categories develop.

The evolutionary sequence proposed by Berlin and Kay generated both excitement and controversy, prompting numerous follow-up studies that both confirmed and refined their original findings. One of the most fascinating extensions of their work was the World Color Survey, conducted by the researchers and their colleagues between 1976 and 1980, which systematically documented color term systems in 110 non-industrialized languages from around the world. This massive undertaking provided strong support for the universality of

the evolutionary sequence while revealing additional nuances in how languages categorize color. For example, the survey found that while the sequence of adding color terms was generally consistent, there was some variation in the order of adding the later terms (purple, pink, orange, gray), suggesting that once languages have developed terms for the six primary colors (black, white, red, green, yellow, blue), further differentiation may be more influenced by cultural and environmental factors. The survey also documented interesting exceptions and variations that enriched our understanding of color categorization. For instance, some languages in Papua New Guinea were found to have basic color terms that did not fit neatly into the evolutionary sequence, suggesting that contact and borrowing could sometimes accelerate or alter the normal developmental pattern.

Subsequent research has both challenged and refined Berlin and Kay's original hypothesis, leading to a more sophisticated understanding of color term universals. One of the most significant challenges came from the work of Eleanor Rosch (then Eleanor Heider), who conducted detailed studies of the Dani people of New Guinea. The Dani language has only two basic color terms: "mili" (roughly corresponding to dark, cool colors) and "mola" (roughly light, warm colors). Rosch found that despite having only these two terms, Dani speakers could learn and remember "focal" colors (the most representative examples of each color category) more easily than non-focal colors, suggesting that perceptual salience exists even in the absence of linguistic categories. This finding supported the idea that universal aspects of color perception might precede and constrain linguistic categorization. However, Rosch also found that Dani speakers had difficulty distinguishing between colors that fell into the same broad category in their language, suggesting that language does influence color perception to some degree. These findings contributed to the development of a more nuanced view that acknowledges both universal perceptual constraints and language-specific influences on color cognition.

Further refinements to the Berlin-Kay hypothesis have come from studies of languages with complex color term systems that don't neatly fit the original eleven-term model. Russian, for instance, has two basic terms for what English speakers call blue: "goluboy" for light blue and "siniy" for dark blue. These terms are not merely modifiers but represent distinct basic color categories, requiring Russian speakers to make a distinction that English speakers do not. Similarly, Hungarian has two basic terms for red: "piros" and "vörös," which are used in different contexts and are not interchangeable. These findings suggest that while the evolutionary sequence identified by Berlin and Kay represents a strong tendency, languages can develop additional distinctions beyond the basic eleven, particularly in regions of the color spectrum that are perceptually salient or culturally important. Another refinement came from the recognition that the evolutionary sequence might not be as rigid as originally proposed. While languages generally add color terms in the sequence identified by Berlin and Kay, there are documented cases where languages have developed terms for colors earlier in the sequence without having all the preceding terms. For example, some languages have been found to have a basic term for blue without having distinct terms for both green and yellow, contrary to the original hypothesis. These exceptions have led researchers to view the evolutionary sequence as a strong statistical tendency rather than an absolute implicational universal.

The cognitive and perceptual foundations of color term universals have been the subject of extensive research, shedding light on why this particular semantic domain exhibits such robust cross-linguistic patterns.

A crucial factor appears to be the neurophysiology of human color vision. Humans have three types of cone cells in their retinas, with peak sensitivities in the short (blue), medium (green), and long (red-yellow) wavelengths of light. This trichromatic vision creates natural “fault lines” in the color spectrum, with certain regions being more perceptually distinct than others. The opponent-process theory of color vision, developed by Ewald Hering, further explains why certain color contrasts are universally salient. According to this theory, color perception is mediated by three opponent channels: red versus green, blue versus yellow, and black versus white. These opponent processes create natural perceptual categories that may form the basis for universal color term systems. The universality of the focal colors identified by Berlin and Kay – the most representative examples of each color category – can be explained by the physiology of human vision. These focal colors correspond to wavelengths that maximally stimulate specific combinations of cone cells, making them perceptually more salient and memorable than other colors. For instance, the focal red that is consistently recognized across languages corresponds to a wavelength that strongly stimulates the long-wavelength cones while minimally stimulating the medium and short-wavelength cones.

Cross-linguistic studies have provided compelling evidence for the universal salience of certain color categories even when languages have different numbers of basic terms. In one classic study, Paul Kay and Willett Kempton compared English speakers (who have separate terms for blue and green) with Tarahumara speakers (whose language uses a single term, “*siyóname*,” for both colors). They found that English speakers were faster at discriminating between colors that crossed the blue-green boundary than colors that fell within the same category, while Tarahumara speakers showed no such difference. This finding suggested that language influences color perception at the categorical boundary. However, when participants were tested with a short delay that prevented verbal coding, both groups showed similar performance, indicating that the perceptual advantage for focal colors exists independently of language. More recent studies using brain imaging techniques have provided additional evidence for both universal and language-specific aspects of color processing. For instance, studies using functional magnetic resonance imaging (fMRI) have found that color categories in the left hemisphere of the brain are influenced by language, while color perception in the right hemisphere is more directly tied to perceptual experience. These findings support a nuanced view that acknowledges both universal perceptual constraints and language-specific influences on color cognition.

The role of environment and culture in shaping color term systems, while constrained by universal perceptual factors, has also been an important area of investigation. Researchers have explored how environmental factors like the prevalence of certain colors in the natural landscape might influence color vocabulary. For example, the Himba people of Namibia, who live in an environment with distinctive red soil and green vegetation, have been found to have a color term system that makes finer distinctions within the red and green regions of the spectrum than English does, while having fewer terms for blue and purple. This finding suggests that environmental salience can influence how languages elaborate their color vocabularies within the constraints set by universal perceptual factors. Cultural practices and technologies have also been shown to influence color terminology. The development of dyeing technologies, for instance, has been correlated with the emergence of more differentiated color term systems in several cultures. Similarly, the importance of certain colors in ritual, symbolism, or social differentiation can lead to the elaboration of color categories in specific regions of the spectrum. For example, many languages have developed specialized terms for



the colors of horses or cattle, reflecting the cultural importance of these animals. These findings do not contradict the existence of universal patterns in color categorization but rather illustrate how cultures can elaborate their color vocabularies in different ways within the framework provided by universal perceptual and cognitive constraints.

The study of color term universals has also contributed to broader theoretical debates about the relationship between language, thought, and reality. The findings from this research domain have been particularly relevant to the linguistic relativity hypothesis, which proposes that the structure of a language influences the cognition of its speakers. Color categorization provides an ideal test case for this hypothesis because color perception can be studied objectively through physiological and psychological measures, allowing researchers to distinguish between linguistic and perceptual influences. The evidence from color term research suggests a complex relationship between language and cognition that might be described as “weak relativity within universal constraints.” On one hand, there is strong evidence for universal aspects of color perception and categorization that exist independently of language, supporting the idea of shared cognitive and perceptual foundations across all humans. On the other hand, there is also evidence that language can influence color cognition in subtle but measurable ways, particularly at category boundaries and in memory tasks. This nuanced view has helped move the debate beyond the simplistic dichotomy of universalism versus relativism toward a more sophisticated understanding of how language and cognition interact.

Current understanding of color term universals incorporates the insights from several decades of research while acknowledging the complexity of the relationship between perception, cognition, and language. Modern approaches to color categorization recognize the existence of strong universal tendencies in how languages develop color terms, as identified by Berlin and Kay, while also acknowledging the role of environmental, cultural, and historical factors in shaping specific color vocabularies. The evolutionary sequence of color term development is now viewed as a strong statistical tendency rather than an absolute implicational universal, with documented exceptions that help refine our understanding of the constraints and flexibility in color categorization. The role of perceptual salience in determining focal colors is well-established, supported by both cross-linguistic studies and neurophysiological research. At the same time, the influence of language on color perception, particularly at categorical boundaries, has been demonstrated through carefully controlled experiments. This balanced view represents a significant advance over earlier positions that either overstated the arbitrariness of color categories or underestimated the influence of language on cognition.

The study of color term universals continues to be an active area of research, with new methodologies and theoretical approaches expanding our understanding of this fascinating semantic domain. Recent advances in computational linguistics have allowed researchers to analyze massive multilingual corpora to study how color terms are used in context, revealing patterns of semantic extension and metaphor that were not apparent from earlier elicitation-based studies. Cross-cultural developmental research has examined how children acquire color terms in different languages, providing insights into the interaction between innate perceptual biases and linguistic input in shaping color cognition. Neuroscientific approaches have begun to map the brain regions involved in color perception and naming, shedding light on the cognitive architecture that supports both universal and language-specific aspects of color categorization. These ongoing investigations promise to further refine our understanding of color term universals and their implications for theories of



semantic universals more broadly.

The remarkable patterns discovered in color categorization across languages offer compelling evidence for the existence of semantic universals while illustrating the complex interplay between universal cognitive and perceptual constraints and language-specific cultural influences. The color domain demonstrates how linguistic categories, while variable across cultures, are not arbitrarily constructed but are shaped by shared aspects of human biology and experience. This case study provides a model for investigating universals in other semantic domains, suggesting that similar patterns of constrained variation might be found in areas ranging from spatial relations to emotion terminology. The study of color terms has thus not only revealed important truths about how humans categorize the visual world but has also provided methodological and theoretical insights that continue to inform the broader search for semantic universals across all domains of human language and cognition.