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A Comparative Study of Kazakh and English Cosmonyms: Linguistic, Cultural, and Epistemological Insights

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ABSTRACT

This article presents a comparative analysis of cosmonyms in the Kazakh and English languages, focusing on the linguistic, cultural, and cosmological frameworks that inform the naming of celestial bodies. Drawing from a wide range of linguistic and cultural sources, the study illustrates how celestial terms—such as the Crowning Stars—encode distinct cosmological worldviews, spiritual beliefs, and historical contexts. The analysis is structured around the formation processes of cosmonyms: in Kazakh, where compounding is a dominant mechanism, and in English, where naming practices are shaped by Latin and Greek etymology, scientific rationalism, and mythological heritage. While English celestial nomenclature has largely become standardized internationally, Kazakh cosmonyms reflect a dynamic interplay of traditional knowledge, Soviet linguistic influence, and contemporary efforts to revive and preserve cultural identity. The

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findings demonstrate both the universality of humanity's fascination with the cosmos and the uniqueness of local traditions in articulating that fascination. By examining the convergence of scientific and cultural perspectives, the study emphasizes how cosmonyms serve as bridges between rational knowledge and symbolic imagination. Through this comparison, the article highlights the critical importance of recognizing cultural diversity in celestial naming practices and advocates for inclusive, multilingual approaches to space exploration. This research contributes to the fields of linguistic anthropology and cosmology, offering deeper insights into how language and culture mediate humanity's conceptualization of space. It also lays a foundation for further interdisciplinary exploration at the intersection of language, mythology, and science.

Keywords: Cosmonyms; Celestial Nomenclature; Linguistic Anthropology; Cultural Identity; Onomastics; Mythology

1. Introduction

Folk cosmonyms refer to conventional, culturally rooted names for celestial bodies and astronomical phenomena, created and preserved by local or indigenous communities. These names emerge from oral traditions and reflect a community's worldview, beliefs, and lived experiences, rather than being derived from scientific classification systems. Embedded within cultural narratives, spiritual practices, and environmental knowledge, folk cosmonyms serve as vital expressions of a community's relationship with the cosmos.

The cultural and linguistic significance of folk cosmonyms is substantial. Primarily, they function as repositories of traditional knowledge. By naming stars, planets, the moon, or other celestial events with culturally meaningful terms, communities transmit generations of observational astronomy through stories, metaphors, and symbolic language. As Antony Aveni^[1] emphasizes in *Skywatchers*, these names are crucial for understanding how non-Western societies historically interpreted the cosmos through their unique cultural frameworks.

Furthermore, folk cosmonyms play a critical role in preserving linguistic identity. Typically expressed in indigenous languages, these terminologies contribute to the ongoing retention and vitality of these languages. Naming is a profoundly powerful act that encapsulates how a people perceives and conceptualize their world, and that maintaining these terms is essential for upholding cultural identity and collective self-esteem^[2-5].

Beyond language and cognition, the process of folk cosmonymy reveals distinct modes of thought and symbolic systems. Different communities interpret celestial bodies in ways that align with their own values, cosmologies, and

relationships with the environment. For instance, among some Indigenous and First Nations groups in North America, the moon is understood not merely as an astronomical object but as a being possessing moral and ethical agency. Similarly, in Andean Quechua traditions, the Pleiades constellation, known as *Qollqa* (meaning "storehouse" in the Andean oral tradition), signals seasonal changes crucial to agricultural activities. These cosmological interpretations influence community behaviors, decision-making, and social structures, thereby playing a role in the perpetuation of cultural knowledge. As Clive Ruggles^[6] observes, such naming practices are far from arbitrary; they embody the ways in which people systematically organize their understanding of the sky within culturally meaningful frameworks.

Oral transmission is essential to the preservation of folk cosmonyms. These names are often embedded within songs, myths, and seasonal narratives, serving as mnemonic devices that encode and transmit knowledge across generations. Marie Battiste and James Youngblood Henderson^[7] emphasize that such transmission is critical for safeguarding both indigenous knowledge systems and cultural practices, particularly amid the pressures of globalization and assimilation.

Ultimately, folk cosmonyms are far more than quaint or poetic labels; they constitute integral elements of the cultural fabric, linking sky and earth, language and thought, myth and science. By challenging the dominance of Eurocentric astronomical systems, these indigenous naming traditions illuminate alternative, diverse ways of knowing the cosmos that are not merely different, but equally valid. Moreover, the study of these systems enriches our broader understanding of the myriad ways in which humanity engages with the sky.

The comparative analysis of cosmonyms in Kazakh and English represents a significant linguistic and cultural inves-

tigation that contributes both to onomastics and the broader domain of intercultural communication. In an era marked by international collaboration in space science and technology, studying cosmonymic systems across diverse languages offers valuable insights into the various ways human language communities conceptualize and engage with the universe. English, as the dominant global lingua franca of science and technology, maintains a well-established and internationally standardized cosmonymic system, which often subsumes new celestial names within the framework of Western traditions, thereby limiting alternative cultural meanings. In contrast, Kazakh cosmonyms reflect a rich and multifaceted discourse shaped by Turkic etymology, nomadic cosmology, and the legacy of Soviet scientific rhetoric^[8].

This comparative study pursues several key objectives. First, it investigates the semantic, etymological, and structural characteristics of cosmonyms in both languages, highlighting similarities and differences that illuminate deeper cultural and cognitive patterns. Second, it examines how languages adapt to advances in scientific knowledge—through processes of borrowing, adaptation, and neologism formation—with particular emphasis on the linguistic modernization occurring in post-Soviet Kazakhstan. Finally, the study addresses the challenges and significance of developing multilingual terminology related to space exploration within the context of international cooperation, where precise communication and cultural sensitivity are increasingly crucial.

This study on cosmonymy is guided by a set of inter-related research questions that investigate the intersection of language, worldview, and scientific discourse in the naming of celestial bodies. The inquiry is organized around the following core questions:

First, how do folk cosmonyms reflect cultural values and cosmological beliefs?

This question seeks to explore the ways in which traditional knowledge, mythology, and belief systems are embedded within the names assigned to celestial phenomena. In both Kazakh and English traditions, folk cosmonyms carry profound cultural significance, preserving collective memory, metaphysical conceptions, and empirical observations of the natural world. The study treats these names as linguistic artifacts that encode distinct cultural worldviews and ontological perspectives on the cosmos.

Second, what linguistic strategies are employed in the formation of celestial names?

This question focuses on the linguistic mechanisms and patterns involved in cosmonym creation. The analysis considers processes such as metaphor, compounding, borrowing, derivation, and calquing, revealing how each language system negotiates the coexistence of traditional naming practices with the demands of evolving scientific discourse.

Third, what are the similarities and differences between Kazakh and English cosmonymic traditions?

This comparative question examines the points of convergence and divergence between Kazakh and English naming systems. It takes into account historical, mythological, and scientific influences shaping each tradition, with particular attention to the effects of globalization, colonization, and technological advancement on celestial nomenclature—whether through indigenous cultural practices or externally introduced frameworks.

Together, these research questions provide a framework for understanding cosmonyms not merely as technical astronomical terminology, but as cultural expressions that reveal how communities perceive and engage with the cosmos. The juxtaposition of Kazakh and English traditions elucidates the diverse linguistic and conceptual strategies that societies employ to map the skies. Situated within the broader fields of cognitive linguistics and socio-terminology, this study aims to document and preserve the Kazakh scientific lexicon while contributing to cross-cultural linguistic research. Ultimately, this research advances comparative onomastics and supports efforts to localize and indigenize the scientific register in non-Western languages.

Onomastics, the study of proper nouns, provides a foundational theoretical framework for analyzing cosmonyms—names assigned to celestial bodies—as both linguistic and cultural constructs. Traditional Western onomastic scholarship has predominantly concentrated on the etymology and mythological origins of star names, planets, and constellations, particularly within Latin, Greek, and Arabic traditions^[9]. Many of these names have been transmitted across generations and often originate from mythological figures or deities, reflecting the enduring influence of classical European knowledge systems. This naming convention was subsequently formalized by institutions such as the International Astronomical Union (IAU), whose nomencla-

ture guidelines reflect a largely Eurocentric epistemological framework. Notably, despite Britain's prominent role in the history of astronomy, English celestial terminology has largely adopted Greco-Roman nomenclature. Furthermore, English-language cosmonyms tend to emphasize formalization and standardization to facilitate international recognition, frequently marginalizing colloquial or culturally diverse expressions^[10–13]. The persistence of Roman antiquity names—such as Venus, Jupiter, and Orion—underscores the sustained cultural significance of mythological heritage within the scientific lexicon.

Although cosmonymic research in non-Western languages such as Kazakh remains underrepresented within the global field of onomastics, the cultural importance of naming practices in Kazakh tradition has been well documented through regional linguistic and ethnographic studies^[14]. In Kazakh culture, the names assigned to celestial bodies are deeply embedded in traditional knowledge systems, environmental awareness, and ancestral memory. Among nomadic herders, stars and constellations often bear vivid and symbolic appellations such as “Autumn Tiger” or “Love Ox”. These names transcend mere poetic expression; they carry spiritual significance and fulfill practical roles by assisting in navigation and the tracking of seasonal cycles throughout nomadic journeys.

Ethnoastronomy and starlore are crucial for understanding how historical societies conceptualized the heavens. Krupp^[15], for instance, posits that the starry sky operates as a cultural map, encoding agricultural calendars, mythologies, and religious beliefs from diverse historical epochs within celestial phenomena. Thus, naming celestial bodies is not solely descriptive but also inherently symbolic and functional^[16–18].

Much of the Kazakh starlore, transmitted orally rather than recorded in writing, is intimately connected to cosmological conceptions and includes numerous cosmonyms with metaphysical or symbolic connotations. For example, certain stars are designated as *Üsh Aristan* (“Three Lions”) or *Temir Qazan* (“Iron Cauldron”), names which, beyond their literal form, represent analogical constructs drawn from other cultural domains. These naming practices often originate from the nomadic lifestyle, wherein celestial movements govern the timing and locations of migrations, seasonal transitions, and various social events^[8].

Although traditional English names like the “Plough” or the American “Big Dipper” persist alongside scientific terminology, they have largely been marginalized in formal astronomical usage. In contrast, folk cosmonyms in contemporary Kazakhstan continue to flourish alongside official astronomical nomenclature, creating a distinctive dual-layered system of celestial naming.

From a linguistic standpoint, the formation of cosmonymic terms involves a variety of processes, including metaphorization, compounding, semantic expansion, loan translations, and direct borrowing. English scientific terminology, meanwhile, tends to favor terms derived from classical roots—for example, the Latin “*astronomia*,” meaning “star-study”—resulting in a highly systematic and standardized vocabulary^[19].

The Turkic ancestors of the Kazakh people lived a profoundly nomadic lifestyle, traversing vast and often challenging steppe landscapes. Their survival was intimately tied to the rhythms of nature, which demanded a deep environmental awareness. Precise navigation of the open terrain, keen observation of seasonal changes, and accurate timing of key events—such as the birth of livestock, mating seasons, preparations for winter, and seasonal migrations to fresh pastures—were all essential. Failure to move at the correct time could have dire consequences, not only for the health of their herds but for the survival of the community itself.

This intimate connection with nature meant that nomadic peoples developed a natural attunement to the cycles of the earth and sky. They observed celestial bodies—the stars, sun, and moon—with great care, understanding these patterns as vital guides in their daily lives. Over generations, this practical necessity gave rise to a rich body of knowledge linking terrestrial life with celestial movements. The sky was not merely a passive backdrop but functioned as an indispensable map and calendar, helping to make sense of time and space, and ensuring that their activities and journeys remained aligned with the natural world^[20].

Today, the modern Kazakh language is actively expanding its scientific lexicon, including names for non-Chinese celestial bodies, through deliberate language policy and terminology development. Institutions such as the Terminology Commission of Kazakhstan play a crucial role in promoting indigenous naming structures while maintaining compliance with international standards. Kazakhstan's unique geopoliti-

cal and cultural position, shaped in large part by the presence of the Baikonur Cosmodrome—a key site in global space history—further influences this linguistic development. The spaceport has significantly contributed to shaping both Soviet and, subsequently, Kazakh national identities in relation to space exploration. This historical legacy is reflected not only in official policy and infrastructure but also in symbolic language. The figure of the Kazakh cosmonaut and terms related to space travel, such as “*zher serigi*” (“earth satellite”), have become important elements of national discourse.

2. Methodology

2.1. Research Design

This study employs a qualitative, comparative, and descriptive linguistic methodology to analyze and contrast the celestial naming systems (cosmonymy) of the Kazakh and English languages. The research adopts a cross-disciplinary approach, integrating onomastics, linguistics, and cultural analysis to examine how celestial bodies are named and what these names reveal about each culture's worldview.

The research followed three main stages:

- Data Collection—Gathering cosmonyms from both Kazakh and English sources.
- Linguistic Analysis—Examining the structure, meaning, and formation of the terms.
- Cultural Interpretation and Comparison—Interpreting the names within their cultural contexts and comparing across both languages.

Kazakh and English were chosen for their contrasting historical, typological, and epistemological profiles, which make them especially suitable for comparative study. Kazakh, as a Turkic, agglutinative language, preserves a rich corpus of oral ethnoastronomy embedded in nomadic pastoralism and Tengrian spirituality, while also reflecting Soviet-era and modern state-led terminological developments. English, as an Indo-European, analytical language, represents the dominant lingua franca of contemporary science and a standardized astronomical nomenclature rooted in Greco-Roman mythology. This pairing enables an exploration of how different linguistic structures and cultural-historical trajectories shape cosmic conceptualization.

2.2. Data Collection

Data for Kazakh cosmonyms were collected from:

Folk literature, epic poetry, and oral traditions, Academic dictionaries on Kazakh astronomy and ethnolinguistics, Terminological sources used in post-Soviet Kazakhstan, Media and educational materials referencing space-related terms.

English data were collected from: Historical texts and star-related mythology, Astronomical dictionaries and scientific publications, Folkloric expressions related to celestial names.

From the larger pool of identified terms, representative examples were chosen to illustrate the most salient semantic categories (e.g., mythological, descriptive, functional), structural patterns (e.g., compounding, borrowing, metaphorization), and cultural-symbolic functions. Examples were selected to ensure coverage of both folk and institutional naming traditions, while avoiding over-representation of rare or idiosyncratic terms. Where multiple variants existed, the most widely attested form was used, with variants noted where culturally relevant.

2.3. Data Analysis

The analysis examined the etymology and origins of each term, identifying whether the names derived from Turkic, Arabic, Greek, Latin, or other linguistic sources. Semantic typology was grouped, where terms based on themes like mythology, nature, or scientific function determined. Cultural symbolism like exploring the cultural, spiritual, and symbolic meanings associated with the names was studied. Borrowing and neologism formation was analyzed, noting how foreign influence and modernization have shaped naming practices.

A parallel comparison model was used to identify both similarities and differences between Kazakh and English cosmonyms. Each term was analyzed according to source and cultural motivation, thematic and symbolic meaning, degree of standardization or institutional influence, use in scientific versus folk contexts.

2.4. Limitations

The study also acknowledges certain limitations like incomplete documentation of some oral Kazakh cosmonyms,

standardized usage in English possibly narrowing cultural variation, Translational challenges between two structurally and culturally different languages.

All materials used in the study were publicly available. Care was taken to approach Kazakh cultural sources respectfully and thoughtfully.

3. Results and Discussion

A comparison of Kazakh and English cosmonyms has shown certain differences and similarities between the Turkic and Indo-European worlds in describing and classifying objects of the outer space. They consist of the following three main (overlapping) themes: semantic categories and reasons for naming; structural and linguistic processes; and the cultural and symbolic meanings of the universe.

One of the most noticeable outcomes of the research was the heterogeneity of semantic fields expressed by Kazakh and English cosmonyms. Both languages share and diverge in their use of terminology to refer to celestial objects, which is often related to cultural and historical influences.

Kazakh cosmonyms are deeply rooted in the pastoral, nomadic lifestyle and spiritual worldview shaped by Tengri-ism. Unlike the abstract or scientific names often found in Western traditions, Kazakh celestial names are typically descriptive and grounded in the natural environment, animals, and mythic imagery. Many of these names serve not only to identify celestial objects but also to reflect the values, beliefs, and survival needs of a people closely attuned to the land and sky. For example, *Üsh Aristan* (literally “Three Lions”) is a constellation that symbolizes strength and protection—qualities highly valued by nomadic herders. Similarly, *Qyzyl Qurmaq* (literally “Red Necklace”) is a poetic name given to a star formation that resembles a necklace, demonstrating how visual similarity and symbolic beauty are often blended in naming.

Beyond physical appearance, Kazakh cosmological narratives often carry ethical or spiritual meaning, where the realms of the miraculous, the human, nature, and myth intersect in the sky. One popular legend that illustrates this connection involves the constellation *Ürker* (the Pleiades). The story goes that one particularly harsh winter blanketed the earth in ice, causing widespread death among livestock. The survivors, struggling to endure until summer, believed

their suffering stemmed from *Ürker* having left the earth and ascended into the sky. In this tale, a horse and a cow are said to have discovered *Ürker* lying on the ground during a race. At that time, *Ürker* contained twelve stars. However, the cow accidentally stepped on six of them, leaving only six to rise into the heavens^[21]. This folkloric event is used to symbolically explain the division of the year into two equal parts: six months of winter and six months of summer. In this way, celestial lore is interwoven with seasonal rhythms, providing not just astronomical orientation but also a framework for understanding time and the natural cycles of Kazakh life.

Most English names for celestial bodies are rooted in Greek, Roman, and Latin mythology, historical figures, or geographic locations. For example, Orion is named after a hunter from Greek myth, Jupiter after a Roman god, and Andromeda after a mythological Greek princess. Some star and constellation names are more descriptive, such as asterisms like the Big Dipper or the Plough, which stem from folk traditions and are less common in formal scientific contexts. Overall, English cosmonyms tend to be more standardized and systematic, often reflecting visual or symbolic meanings attributed to stars and planets.

Adam Renwick^[22] explains that the distinction between stars, planets, and comets can be traced back to English dictionaries as early as Edward Phillips’ 1663 *New World of English Words*. At that time, the term “planet” was defined as a “wandering star,” with seven bodies named after major pagan deities: Saturn, Jupiter, Mars, Sol, Venus, Mercury, and Luna. Renwick notes that this early classification is problematic from a modern standpoint because it groups fundamentally different celestial bodies together, which weakens the logical clarity and predictive power of such categorization. With the acceptance of heliocentrism, the definition of a planet evolved to better fit scientific theory. Renwick cites Blount’s 1707 *Glossographia*, which describes planets as “erratic or wandering stars” distinguished from fixed stars by their changing positions. This work also marks one of the first clear distinctions between primary planets—Mercury, Venus, Earth, Mars, Jupiter, and Saturn—and secondary planets, which include the Moon and the moons orbiting Jupiter and Saturn. By the 1785 sixth edition of Johnson’s Dictionary, Renwick observes that the definition still acknowledges the term’s etymological origins but has shifted toward a more scientific understanding. Earth was now classified as a pri-

mary planet because it orbits the Sun like the other major planets, while the Moon was identified as a secondary planet, or satellite, due to its orbit around Earth.

In Kazakh, astronomical terms like “Kus Zholy” (Milky Way) and “Kuyryqy Zhuldyz” (Comet) have long been established traditional names. The term for planet in Kazakh corresponds to the English concept of a “wandering star” and is called “kydyrma zhuldiz.” Due to the structural differences between languages, the semantics—the way a term is understood—varies between Kazakh and English. Since Kazakh is an agglutinative language, words are often formed by adding affixes to root words. Therefore, Kazakh cosmonyms usually take the form of compound words or descriptive phrases. For example, “Zher Serigi” (“Earth’s Satellite”) and “Qyzyl Jol” (“Red Path”) are typical compound names composed of two roots plus simple affixes. These names often directly relate to either the function or characteristic of the celestial body. For instance, “Aq Jol” (“White Path”) refers to the Milky Way’s bright, streak-like appearance in the sky^[21].

As Bender^[23] emphasizes, understanding the origins of star names and the traditions surrounding them requires a thorough exploration of the mythologies from which they emerged. The Anglo-Saxon and Viking peoples, living beneath a night sky free from artificial light pollution, witnessed the stars in all their brilliance. Like cultures worldwide, they wove myths and stories around star patterns, constellations, and the Milky Way. Similar to earlier civilizations such as the Babylonians and Greeks, they observed that some stars did not remain fixed but wandered across the sky. Unfortunately, due to the passage of time and disruptions caused by Christian influences, much information about the specific names of individual stars in Anglo-Saxon or Viking traditions has been lost. The author referring to Grim (1883: 721) noted that the Goths knew of 344 stars moving east to west, very few records exist that list old Teutonic names for these stars. What remains are only a handful of surviving names of fixed stars and possibly the name of one wandering star (planet). Many of the known names today are partly speculative but grounded in educated research.

For the purposes of this focused study, the compilation of known star names excludes broader celestial groupings like constellations or the Milky Way, except where these overlap due to recording errors or symbolic usage.

However, some discussion of constellations and asterisms, such as the Pleiades—which were referred to simply as “the star” (stjarna) in singular form by early Icelandic sources (Magnussen, 1828)—is necessary to clarify connections with named individual stars. According to Bender^[23], Cleasby and Vigfusson explain that in Iceland, the Pleiades marked winter evenings, being called “the star,” while sailors referred to Polaris as the “load-star”.

Further complexity arises from Norse terms like *stjörnumark* (constellation) and *stjörnu-vegr* (“star way” or galaxy), which blur distinctions between constellations, asterisms, and single stars. Given these ambiguities and limited sources, it is difficult to separate these categories clearly. By delving deeper into ancient myths and applying informed conjecture, Bender seeks to shed light on the relationship between the Teutonic cosmos, its mythology, and its prominent named stars, offering valuable insights into this lost celestial heritage. From the preceding comparative study, it is clear that Kazakh and English cosmonyms each reveal a different cultural understanding of the universe. However, their respective native cultural, spiritual, and historical backgrounds lead them to convey this understanding in different ways.

As for Kazakh language, one of the key characteristics of its cosmonyms is their deep connection to spiritual beliefs and everyday rituals. In Kazakh culture, celestial bodies are not perceived merely as physical objects in the solar system; rather, they are seen as part of a larger cosmic order, often interpreted as divine manifestations or signs from the spiritual realm. This worldview reflects a rich tapestry of mythological and symbolic associations embedded in both oral literature and traditional astronomical knowledge.

Many stars and constellations serve not only symbolic but also practical functions, guiding seasonal migrations, regulating rituals, and structuring the agricultural and pastoral calendar of the nomadic Kazakh lifestyle. A vivid illustration of how myth and observation intertwine in Kazakh cosmology can be found in the legend of the Moon and the Sun. According to this tale, the Moon and the Sun were born as twin sisters, both of extraordinary beauty. The Moon, being slightly more beautiful, grew vain, which provoked the Sun’s jealousy. In a moment of anger, the Sun scratched the Moon’s face, leaving behind visible marks. These blemishes are said to be the result of that punishment. When the Moon appears late or begins to wane, it is believed she hides in

shame. As she moves closer to the Sun, she conceals her face; when she drifts away, she fully reveals herself, as if to tempt or intrigue her sister. This folktale serves as an allegorical explanation of the lunar phases, illustrating how traditional cosmological narratives employ metaphor and personification to interpret observable celestial phenomena. It highlights the richness of Kazakh ethnoastronomy, where science, spirituality, and storytelling are seamlessly woven together to form a coherent cultural understanding of the universe^[21].

In contrast, English cosmonyms often mirror scientific and mythological traditions rooted in early Greek and Roman culture. The names of planets, constellations, and stars are frequently drawn from these ancient myths: Venus (the Roman goddess of love), Apollo (the Greek god of the sun), and Orion (a legendary Greek hunter) are just a few examples. These names not only designate celestial bodies but also carry rich symbolic meaning shaped by myth. One powerful example of this mythological underpinning is the story of Uranus and Gaia, as described by Efstratios Theodosiou^[24]. The myth exemplifies the symbolic and cosmological thinking that influenced ancient naming systems. Uranus, the sky god, feared the rising strength of his children and, in response, imprisoned them within Tartarus, deep within the earth. Gaia, the Earth goddess, angered by Uranus' oppressive behavior and suffering from his relentless union, devised a plan for liberation. She fashioned a scythe from within herself and urged her children to rise against their father. Only Cronus, the youngest Titan, accepted the task and, during the night, castrated Uranus as he lay across Gaia, effectively ending his dominion and divine potency.

This act of cosmic rebellion had significant mythological consequences. From Uranus' spilled blood emerged powerful beings such as the Furies and Giants, while Aphrodite, the goddess of love and beauty, was born from the sea foam formed by Uranus' severed genitals. This myth not only links the birth of celestial beings and natural forces with cosmic violence but also introduces recurring themes of succession and divine inheritance, as Uranus curses Cronus to be overthrown by his own offspring. Gaia, central to many oaths and rituals in Homeric epics, embodies the divine Earth and continues to serve as a witness in solemn pledges, alongside Uranus and Styx. Her presence in heroic oaths and sacrificial rites (e.g., Menelaus invoking Gaia in *The Iliad*) underscores

the sacred relationship between the cosmos and divine law. According to Theodosiou, Gaia and Uranus are not only progenitors of the gods but also of humankind, as echoed in the Homeric Hymns, which refer to Gaia as “the mother of gods and of all people”. Artistically, Gaia is rarely shown in full human form; she is typically depicted emerging from the ground, symbolizing her embodiment of the earth itself. This partial representation reflects her divine identity as the literal soil and base of the world. The mythology surrounding Gaia and Uranus offers a vivid illustration of how ancient cosmologies understood the sky and earth not just as physical realms but as active, divine forces in a universe governed by mythic cycles of power and regeneration^[24].

The enduring influence of classical astronomy and mythology on English celestial naming practices is evident not only in language but also in art, architecture, and cultural symbolism throughout history. This historical reference to the incorporation of zodiacal figures into architectural design—such as churches, temples, and public buildings in both East and West—highlights the longstanding cultural and symbolic significance of celestial bodies in English and broader European traditions. The example of the octagonal zodiac designed by McKim, Mead, and White for the New York State Building at the 1893 World's Columbian Exposition illustrates how even in modern contexts, celestial imagery continued to serve not only decorative purposes but also to evoke a sense of cosmic order and beauty, rooted in classical and astrological heritage.

In English celestial nomenclature, many constellations and star signs derive from this Greco-Roman zodiac system. Names such as *Leo*, *Virgo*, and *Sagittarius*—still widely used in horoscopes and almanacs—originated from Latin and reflect mythological or symbolic meanings tied to the heavens. Although the scientific understanding of these constellations evolved over time—most notably with Hipparchos's redivision of the ecliptic into twelve equal 30° segments—these signs retained their traditional names in English, even after they no longer aligned precisely with their corresponding constellations due to the precession of the equinoxes.

Thus, English celestial terminology today remains a blend of scientific refinement and mythological inheritance, where the naming of heavenly bodies like planets, constellations, and zodiac signs reflects both astronomical advancements and deep cultural roots extending back to classical

antiquity^[9].

Both Kazakh and English traditions demonstrate a profound connection between celestial bodies and cultural identity, yet their approaches reflect distinct historical and spiritual frameworks. According to N. Mynzhan^[25], the Kazakh people had a solid knowledge of the main planets. This is evident in ancient poems and various legends that date back centuries. The names Kazakhs gave to stars often stem from their pastoral lifestyle. For instance, Kazakhs began their celestial map with the star *Temirqazyq* (the Pole Star). *Temirqazyq* served as an astronomical compass for Kazakhs traveling at night. The two stars near it were called *Aq Bozat* and *Kók Bozat* (White and Blue Horses). Meanwhile, the *Zheti Qaraqshy* (Seven Robbers)—a constellation also known as the Big Dipper—functioned as an astronomical clock for Kazakh herders. During the long autumn nights, they used it to change shifts. In winter, when the evening star *Sholpan* (the yellow star, Venus) rose, it was time to bring the sheep back to the pen. Mercury was known as *Tang Sholpan* (Morning Venus), or sometimes as *Kishi Sholpan* (Lesser Venus). Jupiter was called *Esek Kyrghan* (Donkey Killer), Mars was *Qyzyl Zhuldiz* (Red Star), Gemini was *Qol Zhuldiz* (Hand Star), and Sirius was *Sumbile*. The Kazakhs were very familiar with the nature, movements, and even positions of these celestial bodies. Special attention was given to the Orion constellation, which was known under various names such as *Arqar Zhuldiz* (Argali Star), *Ush Arqar* (Three Argali), *Tarazy* (Scales), and *Shider Zhuldiz* (Hobble Star). The appearance of *Tarazy* at the end of July was seen as a signal that the peak of summer heat had passed. Kazakh astronomers noted: “When Tarazy rises, mornings are cool, wheat and millet ripen”.

Kazakhs called the Sirius constellation *Sumbile*. The rising of *Sumbile* marked the end of summer and the retreat of flies and other pests that disturbed the livestock. The saying “*Sumbile tusa su suy*” (When *Sumbile* rises, water recedes) advised people to harvest their crops, gather firewood and water, and begin preparing for winter. Through their observation of the sky, the Kazakhs also had knowledge of the *Qus Zholy* (Milky Way), *Quiryqy Zhuldiz* (Comets), *Aqpa Zhuldiz* (Shooting Stars), and *Kempirqosaq* (Rainbow). The author also gives a brief account of how the Kazakh lunar calendar functioned. Kazakh astronomers closely observed the Moon’s movements to correctly calculate the months. A year was divided into twelve months, with each month broken

into three ten-day periods based on the Moon’s phases—its birth, full state, and waning.

Kazakhs marked the seasons according to the Sun’s position relative to the *Urker* (Pleiades). They referred to the astronomical months determined by the Sun as *zhuldiz* (star), echoing the twelve zodiac constellations and the Moon’s twelve phases. They identified the four cardinal directions based on the Sun’s position during the day—*kún shyǵys* (sunrise/east), *kún batys* (sunset/west), *óhtústik* (south), and *soltústik* (north). The *Mushel* (12-year animal cycle) calendar, dating back to ancient times, held great importance in Kazakh life. Time was often counted using this system. Each year was named after an animal: rat, ox, leopard, rabbit, dragon, snake, horse, sheep, monkey, rooster, dog, and pig. The new *Mushel* year began on March 22nd, celebrated during the *Nauryz* holiday.

While English celestial names and stories preserve the legacy of Greco-Roman mythology, symbolizing divine narratives and human-like gods, Kazakh celestial traditions emerge from a lived experience of nomadic pastoralism, blending spiritual cosmology with practical navigation and seasonal rhythms. Both systems reflect humanity’s timeless impulse to find meaning in the stars, yet each speaks through the lens of its unique cultural and environmental context.

Both languages share common themes in they personify the heavens and show an interest in cosmic order. However, Kazakh names are more likely to be rooted in practical, everyday life whereas English names reflect the inheritance of Western scientific rationalism along with classical mythology. One of the key findings of this research is the significant impact of scientific standardization on the naming conventions of celestial bodies, particularly in the context of global space exploration. Kazakhstan’s historical role as part of the Soviet Union during the space race era has had a lasting influence on the Kazakh astronomical lexicon. Many terms adopted during this period—such as *Kosmonavt* (“cosmonaut”), *Sputnik* (“satellite”), and *Orbita* (“orbit”)—reflect Soviet-era terminology and continue to be widely used. These terms are shared across multiple languages, including Russian, English, and Kazakh, illustrating the internationalization of space vocabulary.

In both Kazakh and English, numerous loanwords of Latin, Greek, or Russian origin have been assimilated into the language of astronomy and astronautics. Words such as

astronomia (astronomy), *galaktika* (galaxy), *kometa* (comet), *meteor*, *sputnik*, *kosmos*, and *raketa* (rocket) are widely recognized and used in similar or identical forms, showing how the global scientific community relies on a common lexicon that transcends linguistic boundaries. These shared terms contribute to effective international communication but also reflect the dominance of Western scientific paradigms and terminology. However, after gaining independence in 1991, Kazakhstan initiated efforts to reclaim and nationalize its scientific terminology, promoting the development of indigenous names for cosmic phenomena. For example, terms like *Zher Serigi* (“Earth’s satellite” for the Moon) and *Kuyryqty Zhuldiz* (“Tailed Star” for comet) emphasize the use of native linguistic structures and cultural symbolism. Unlike English—where classical and international terms are often absorbed into native usage with minimal alteration—Kazakh tends to preserve the original form of international loanwords while increasingly seeking to create native alternatives grounded in Kazakh etymology and worldview. At the

same time, the role of international institutions, especially the International Astronomical Union (IAU), has reinforced a highly standardized and Western-centric model of cosmic naming. Most official names for celestial bodies—planets, moons, constellations—derive from Latin or Greek mythology, leaving limited space for indigenous or non-Western naming systems in global discourse. This form of standardization, while beneficial for consistency, can inadvertently marginalize the cosmological perspectives and naming practices of cultures like the Kazakh, who approach the cosmos through a different epistemological and linguistic lens.

This comparative study of Kazakh and English cosmonames offers a revealing window into the distinct ways cultures interpret the cosmos, underscoring how language, belief systems, and practical needs shape celestial nomenclature. While both traditions seek to make sense of the sky and its phenomena, they diverge in their linguistic strategies, cultural contexts, and symbolic associations that can be seen from the following **Table 1**.

Table 1. Kazakh vs. English Cosmonyms.

Aspect	Kazakh Cosmonyms	English Cosmonyms
Linguistic Roots	Turkic origin; agglutinative structure	Indo-European origin; analytical structure
Semantic Categories	Descriptive, practical, mythologically inspired names (e.g., <i>Üsh Aristan</i> , <i>Zher Serigi</i>)	Mythological (Greek/Roman), historical, and scientific (e.g., Jupiter, Orion, Andromeda)
Naming Motivation	Grounded in pastoral life, spiritual beliefs, and nature observation	Rooted in classical mythology, later standardized by science
Use of Mythology	Tengrianist myths, personification of stars, stories from nomadic life (e.g., Moon and Sun myth)	Greco-Roman mythology (e.g., Uranus and Gaia), cosmological cycles, divine lineage
Functionality of Cosmonyms	Practical tools: navigation, agricultural cycles, calendars (e.g., <i>Temirqazyq</i> , <i>Sholpan</i>)	Symbolic/cultural references; less practical in modern usage
Structure/Form of Terms	Compound words and affixation; highly descriptive (e.g., <i>Aq Jol</i> – “White Path”)	Often single lexical units or Latin/Greek compounds (e.g., cosmonaut, planet, comet)
Traditional Knowledge Systems	Rich oral literature; use of constellations for seasonal changes, time, and rituals	Medieval to Enlightenment-era scholarly astronomy; loss of some indigenous Anglo-Saxon/Viking names
Calendar Systems	Lunar calendar, zodiac-like system (<i>zhuldiz</i>), 12-year <i>Mushel</i> animal cycle	Solar-based zodiac, rooted in Greco-Roman divisions (e.g., Leo, Virgo)
Symbolic Use of Stars	Embodied in legends and spirituality; seasonal markers (e.g., <i>Ürker</i> marks seasons)	Classical symbolism; less tied to seasonal or environmental observation
Modern Influence of Science	Soviet-era influence (e.g., <i>Kosmonavt</i> , <i>Sputnik</i>); recent nationalization of space vocabulary	Highly standardized via international scientific bodies (IAU); retains Latin/Greek terms
Preservation of Indigenous Terms	Strong revival efforts post-independence; integration into scientific terms	Indigenous star names largely lost (e.g., Anglo-Saxon, Viking), replaced by Greco-Roman terminology

Table 1. Cont.

Aspect	Kazakh Cosmonyms	English Cosmonyms
Examples of Cosmonyms	Kus Zholy (Milky Way), Kuyryqy Zhuldyz (Comet), Temirqazyq (Pole Star)	Milky Way, Comet, Polaris, Venus, Mars
Attitude Toward the Sky	Spiritual, sacred, interconnected with life and environment	Mythological, symbolic, or scientific view; less immediate connection with daily life
Global Standardization Impact	Tension between traditional and global naming; influenced by USSR, now shifting to nationalization	Dominated by Western scientific rationalism; IAU naming conventions largely unchallenged globally

One of the most striking contrasts lies in the cultural orientation of celestial naming. Kazakh cosmonyms are deeply embedded in a lived, terrestrial experience shaped by nomadic pastoralism, Tengrian spirituality, and oral storytelling traditions. Celestial objects in Kazakh are not merely astronomical entities but are integral to the ecological, temporal, and moral fabric of life. Names such as *Temirqazyq* (Pole Star), *Üsh Aristan* (Three Lions), and *Zheti Qaraqshy* (Seven Robbers) not only label stars but also encode cultural memory, survival knowledge, and ethical values.

By contrast, English cosmonyms have been strongly influenced by classical mythology and scientific rationalism, especially from the Renaissance onward. Celestial names often derive from Greco-Roman deities (e.g., *Venus*, *Mars*, *Jupiter*) or mythological heroes (*Orion*, *Andromeda*), reflecting an anthropomorphic cosmology rooted in the literary canon of antiquity. Over time, these names became embedded within scientific discourse, particularly through institutional standardization by bodies like the International Astronomical Union. As such, English celestial naming today reflects a hybrid of historical myth and contemporary science, less embedded in everyday practical use than in abstract, symbolic meaning.

Linguistically, the two languages employ different mechanisms of word formation and categorization. English cosmonyms, drawing heavily from Latin and Greek, tend to be monolexic or use classical affixes that denote scientific taxonomies. In contrast, Kazakh—an agglutinative language—forms cosmonyms via compounding and suffixation, resulting in more descriptive and syntactically transparent terms. This can be seen in phrases like *Zher Serigi* (“Earth’s Satellite”) or *Kuyryqy Zhuldyz* (“Comet”/“Tailed Star”), which clearly indicate the physical or functional attributes of the object.

The role of myth in both systems reveals further con-

trast. English cosmonyms preserve a mythological heritage that often personifies celestial bodies as divine figures engaged in cosmic narratives. The myth of *Uranus and Gaia*, for example, illustrates cosmological cycles of creation and destruction, power and succession. These stories, while rich in symbolism, are somewhat disconnected from daily life and are largely retained as literary or scholarly references. In Kazakh tradition, however, myths like the tale of the *Pleiades* (*Ürker*)—where a cosmic event explains seasonal changes—continue to serve pedagogical and ritual functions, linking sky phenomena to timekeeping, agriculture, and moral lessons.

This brings into focus a key insight: Kazakh cosmology integrates astronomical observation with cultural utility, whereas English cosmology (in its modern form) tends to prioritize symbolic and scientific abstraction. In Kazakh tradition, observing the rise of *Sumbile* (Sirius) or the position of *Tarazy* (Orion) is not only a celestial event but a guide for preparing for seasonal transitions, harvesting, or migrating livestock. Such knowledge is not just observational but participatory—a direct engagement with the universe as a dynamic, living entity.

Another crucial area of discussion is the impact of scientific standardization and global astronomy. English, through its close alignment with Western scientific institutions, plays a dominant role in international space nomenclature. Latin and Greek-derived names dominate official star and planet names. This globalized system, while offering consistency, often marginalizes non-Western naming traditions. Kazakh, influenced by Soviet-era Russian terminology, initially adopted many foreign terms (e.g., *Kosmonavt*, *Sputnik*), but there is now a concerted effort to reclaim indigenous naming rights by promoting Kazakh-rooted terms and expressions. However, this movement faces challenges due to the overwhelming influence of international scientific conventions.

The divergence between Kazakh and English cosmonyms illustrates how language encodes cultural knowledge of the cosmos. Kazakh names preserve an intimate, practical, and spiritual relationship with the sky, reflecting a worldview where celestial bodies are part of a shared natural and mythical order. English names, shaped by mythological inheritance and scientific evolution, reflect a more compartmentalized cosmology—divine in origin, empirical in practice. Both traditions, however, affirm humanity’s enduring quest to understand the universe through the lens of language, culture, and story.

4. Conclusions

This study looked at how language, culture, and our understanding of the universe are connected by comparing Kazakh and English names for celestial bodies. By examining how stars and planets are named in both languages, we have seen how different cultures think about and relate to the cosmos. We also found some shared themes in how people across cultures try to make sense of the sky.

Kazakh cosmonyms are closely tied to traditional nomadic life, spiritual beliefs, and folk stories. These names are often descriptive and rich in meaning, reflecting how Kazakhs lived in harmony with nature and used the sky to guide their daily lives. On the other hand, English cosmonyms mostly come from ancient Greek and Roman mythology. Over time, these myth-based names became part of scientific language, especially through global organizations like the International Astronomical Union. English names tend to be more abstract and formal, with less connection to everyday life and more focus on scientific classification.

This comparison also shows how global science has influenced both naming systems. English plays a major role in international astronomy, and many names used today follow Western traditions. In Kazakhstan, Soviet-era Russian terms once dominated, but there is now a growing effort to use more Kazakh-based names that reflect the country’s own culture and history.

Overall, this research shows that naming celestial bodies is not just about science or language—it is also about culture and how people understand their place in the universe. As space exploration becomes more international, it is important to recognize and respect the many ways different

cultures see and name the stars. Including a wider range of naming traditions can make space science more inclusive and meaningful for everyone.

In short, cosmonymy is where science, language, and culture meet. The names we give to stars and planets tell stories about who we are and how we have related to the sky throughout history. By appreciating both Kazakh and English traditions, we can build a deeper, richer understanding of the universe—one that includes voices from all around the world.

Author Contributions

Conceptualization, M.S. and M.A.; methodology, A.N.; software, K.B.; validation, S.Y. and M.A.; formal analysis, K.K.; investigation, M.S.; resources, A.N.; data curation, K.B.; writing—original draft preparation, M.S.; writing—review and editing, S.Y.; visualization, M.A.; supervision, M.S.; project administration, A.N.; funding acquisition, M.S. All authors have read and agreed to the published version of the manuscript.

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