# TRANSLATING SCIENCE FOR THE PUBLIC: SIMPLIFICATION VS. ACCURACY IN POPULAR SCIENTIFIC TEXTS

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**Annotation:** *This article explores the inherent tension between simplification and accuracy in the translation of popular scientific texts. With the growing demand for science communication aimed at lay audiences, translators must skillfully balance scientific precision with accessibility. Drawing upon examples from National Geographic, BBC Science, and Scientific American, this paper identifies common translation strategies, highlights potential pitfalls of oversimplification, and investigates cognitive and cultural factors influencing comprehension. The study argues for a pragmatic, audience-aware approach that prioritizes conceptual clarity without compromising scientific integrity.*

**Keywords**: *popular science, simplification, accuracy, science communication, scientific translation, lay audiences, cognitive load*

**Annotatsiya:** *Ushbu maqola ommabop ilmiy matnlarni tarjima qilishda yuzaga keladigan soddalashtirish va aniqlik o'rtasidagi ziddiyatni tahlil qiladi. Keng jamoatchilikka mo'ljallangan ilmiy materiallarga bo'lgan talab ortib borayotgan bir paytda, tarjimonlar ilmiy aniqlikni saqlagan holda matnni ommaga tushunarli qilib yetkazish zaruratiga duch kelishmoqda. National Geographic, BBC Science va Scientific American manbalari misolida maqolada soddalashtirish strategiyalari, haddan tashqari soddalashtirishning salbiy oqibatlari hamda tushunishga ta'sir qiluvchi kognitiv va madaniy omillar ko'rib chiqiladi. Tadqiqot ilmiy mazmunga ziyon yetkazmasdan, omma uchun tushunarli tarjimani ta'minlaydigan, auditoriyaga yo'naltirilgan yondashuv zarurligini asoslaydi.*

**Kalit so'zlar:** *ommabop ilmiy matnlar, soddalashtirish, aniqlik, ilmiy kommunikatsiya, ilmiy tarjima, auditoriyaga mos yondashuv, kognitiv yuklama*

**Аннотация:** *Данная статья исследует противоречие между*

*упрощением и точностью при переводе популярных научных текстов. В условиях растущего спроса на научную информацию для широкой публики переводчики сталкиваются с необходимостью сохранить научную точность и одновременно обеспечить доступность изложения. На примерах из National Geographic, BBC Science и Scientific American анализируются стратегии перевода, риски чрезмерного упрощения, а также когнитивные и культурные факторы, влияющие на восприятие. Исследование подчеркивает важность прагматичного и ориентированного на аудиторию подхода, который обеспечивает концептуальную ясность без ущерба для научной достоверности.*

*__Ключевые слова__: популярная наука, упрощение, точность, научная коммуникация, научный перевод, целевая аудитория, когнитивная нагрузк*

Scientific knowledge is no longer confined to academic journals and laboratory settings. As public interest in science grows, media outlets increasingly publish popular science content designed to inform and engage non-specialist audiences. However, translating such texts presents a fundamental dilemma: how to maintain **scientific accuracy** while ensuring **clarity and readability** for a general audience?

Popular science translation sits at the intersection of **science communication** and **public education**, demanding that translators navigate linguistic, cognitive, and cultural complexities. As highlighted by Gotti (2005), translators must "restructure technical discourse without distorting its epistemic content" [1, p. 83].

**Theoretical Foundations**

Popular scientific translation differs significantly from the translation of academic or peer-reviewed scientific articles. Its primary goal is **didactic**—to make science understandable and relevant for the general public. Therefore, translation strategies often involve:

- **Lexical simplification**

- **Conceptual reframing**
- **Omission or paraphrasing of technical details**
- **Use of analogies and metaphors**

These strategies align with **audience design theory** (Bell, 1984) and **cognitive load theory** (Sweller, 1998), which stress the importance of reducing mental processing for effective communication.

### Core Challenges in Translating Popular Scientific Texts

### Simplification vs. Oversimplification

While simplification is essential, excessive generalization may result in loss of meaning or scientific inaccuracy. *Example*: A *Scientific American* article on CRISPR technology describes it as "a genetic scissor." In translation, calling it "a tool to cut DNA" simplifies the concept but may omit crucial molecular mechanisms.

### Terminology and Neologisms

Translators often face unstandardized or newly coined terms. Popular science sources frequently introduce metaphorical or casual alternatives to formal scientific jargon. *Example*: *BBC Science* refers to "junk DNA" instead of "non-coding DNA." Directly translating "junk" may mislead the audience if not contextually explained.

### Cultural Framing and Analogies

Many science texts rely on culture-specific analogies, metaphors, or humor. These must be adapted or recontextualized to resonate with the target audience.

*Example*: A *National Geographic* article compares data transmission to a "postal service." Such metaphors may require replacement in cultures with different postal systems or technology references.

### Cognitive Load and Sentence Structure

Popular science texts use shorter sentences, active voice, and visual descriptions to reduce **cognitive effort**. Translators must preserve this simplicity while retaining conceptual depth. *Example*: Instead of translating "Scientists analyzed the photoreceptive behavior of cephalopods," a simplified form might be:

"Scientists studied how squids react to light."

**Translation Strategies: Best Practices**

| Challenge | Recommended Strategy |
|---|---|
| Technical term with no L2 equivalent | Use explanatory glosses or define within text |
| Metaphor with no cross-cultural match | Replace with a culturally familiar analogy |
| Excessive complexity | Segment information into smaller, digestible units |
| Humor or idiom loss | Substitute with functionally equivalent cultural expression |
| Neologism | Combine transcription with explanation (e.g., "epigenetics (gen faoliyatini boshqarish ilmi)") |

**5. Case Studies from Science Media**

**Case 1: National Geographic (2021)**An article on climate change refers to "Earth's fever" as a metaphor for global warming. In the Uzbek translation, the literal metaphor was preserved, but footnotes were added for clarification.

**Case 2: BBC Science (2023)**A podcast discussed black hole entropy using the analogy of "cosmic garbage bins." In translation, this analogy was replaced with a more neutral term: "space regions where matter disappears," based on audience surveys.

**Case 3: Scientific American (2022)**An article on the human microbiome translated the term "gut flora" as "ichak o'simliklari" — leading to conceptual confusion. The revised version used "foydali mikroorganizmlar" to increase clarity.

Translating popular science for general audiences involves a delicate balancing act between **simplification and precision**. While accessibility is crucial, translators must not sacrifice the **integrity of scientific content**. This requires a flexible, reader-oriented approach that integrates linguistic clarity, cultural adaptation, and cognitive awareness.

In an age of misinformation and scientific skepticism, the translator plays a

vital role in shaping **science literacy**. Therefore, training in **science communication principles**, **terminology management**, and **intercultural competence** is essential for those working in this field.

Analyzing materials from *National Geographic*, *BBC Science*, and *Scientific American* reveals that successful translations rely on **audience-aware strategies** that adapt terminology, structure, and examples to align with the cognitive and cultural expectations of the reader. This involves not only linguistic rephrasing but also **conceptual reframing**, where ideas are reorganized to preserve scientific integrity without overwhelming the reader.

The cognitive theory of multimedia learning and principles of scientific discourse translation suggest that **translators must act as communicators**, not just language converters. They must mediate between expert-level discourse and lay understanding, carefully filtering information to retain core meaning while enhancing accessibility.

Moreover, the study emphasizes the need for interdisciplinary collaboration. Translators should work closely with scientists, editors, and science communicators to ensure that the end product is both **faithful and functional**. In this way, scientific translation becomes a tool for democratizing knowledge, fostering scientific literacy, and bridging the gap between academia and society.

Future research should focus on developing standardized models and frameworks for evaluating simplification quality in translation, as well as expanding training for translators in popular science and science communication. As the boundary between science and society becomes increasingly mediated through translation, the translator's role becomes not only technical, but profoundly epistemological and ethical.

## REFERENCES

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