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From *Veronal* to *Quviviq*: A Lexicological Analysis of Trade Names for Prescription Sleeping Pills from 1903 to 2022

Pascaline Faure
Sorbonne University, Paris, FRANCE

ans-names.pitt.edu
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Abstract

Since the 19th century and the Industrial Revolution, insomnia has become a major public health issue. Attracted by the financial potential, the pharmaceutical industry quickly turned its attention to this emerging market. However, in a competitive market, pharmaceutical manufacturers had to create distinct product identities. One determining factor when creating an identity is trade name choice. This study investigates changes in trade names for insomnia medicines, from *Veronal* in 1903 to *Quviviq*, the latest drug launched in 2022. The lexicological analysis reveals that names have shifted from associative to abstract names. While older trade names had symbolic meaning, newer names were found to place the emphasis on phonetically pleasing onomastic patterns.

Keywords: onomastics, trade names, sleeping pills, history of medicine, pharmaceutical industry

1. Introduction: A Brief History of Insomnia

Throughout history, people have attempted to treat insomnia using alcohol, plants, or synthetic products. However, it was not until the end of the 19th century that insomnia was considered a medical problem; and in 1908, it became the subject of an article in *the Lancet*[1]. Historian Roger Ekirch (2006) explains that before the industrial era, sleep consisted of two phases. The initial phase took place before midnight and was followed by a period of wakefulness lasting several hours. During this time, people attended to personal business, which could not be attended to during daytime. The following second sleep phase lasted until the early daylight hours when daily agricultural activities would begin.

The Industrial Revolution was marked by artificial lighting and productivity. These inventions changed sleep patterns, enabling people to go to bed later. Thus, the nocturnal awakening phase disappeared. People started seeing nocturnal awakening as problematic because it affected their ability to work during the day.

Insomnia is now recognized as a public health problem, affecting around 30% of adults in the US occasionally and nearly 10% chronically (Mendelson 2018). The diagnosis of insomnia is often based on self-reported data. Yet, polysomnography data reveals that patients typically underestimate how much time they spend asleep. But whether real or perceived, insomnia causes problems (e.g., stress, concentration deficit, memory loss, anxiety, depression) that can negatively impact people's lives.

The pharmaceutical industry promptly addressed the problem by offering a variety of compounds to aid sleep. Indeed, the global insomnia market is proving to be lucrative. According to Allied Market Research®,[2] in 2020, its profits were estimated at $4.3 billion, with a projection of $6.3 billion for 2030.

This article examines major trends in developing trade names for prescription medicines indicated for the treatment of insomnia. The research covers the main classes of hypnotic drugs, from the discovery of barbital with *Veronal* in 1903 to benzodiazepines, Z-drugs, and orexin receptor antagonists, the latest of which, *Quviviq*, was launched in 2022. In this study, the trade names are analyzed to highlight the matrices. These matrices are compared to those identified in previous research (Faure 2014, 2018a, 2018b, 2022, 2023). This study explores whether marketers view hypnotic drugs similarly to other drug classes.

2. Background, Objective, Theoretical Frameworks, and Methodology

2.1 A Drug's Name

According to Stephanie Dutchen (2009), a drug usually has at least four names during its lifespan. The IUPAC (International Union of Pure and Applied Chemistry) gives it a chemical name on the basis of its molecular structure when it is first discovered. As this chemical name is complex, the drug is frequently assigned a code name. Once the molecule enters the clinical research phase, it is given an International Nonproprietary Name (INN) or a USAN (US Adopted Name) in the United States, in agreement with the World Health Organization (WHO). This name, also known as the generic name, is composed of stems (prefixes, infixes, or suffixes) that

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represent its chemical composition and class. When the manufacturer requests marketing authorization, the drug is given a trade name. Once the patent expires (after 20 years), the manufacturer or a generic company may also rename the drug.

For example, the trade name of the hypnotic drug *Rozerem* (2005) is believed to be made from *roze*, the phonetic transcription of "rose", and *REM* for "Rapid Eye Movement". However, the drug's chemical name is *S)-N-[2-(1,6,7,8-tetrahydro-2H-indeno-[5,4-b]furan-8-yl)ethyl]propionamide*; its code name is *TAK-375*; and its generic name is *Ramelteon*. The abbreviation TAK stands for Takeda Pharmaceuticals. The USAN generic name stem *melteon* indicates that this molecule is a melatonin receptor agonist. Melatonin is a chronobiotic neurohormone secreted by the pineal gland at night.

2.2 Trade Names

A trade name is the primary product identifier and plays an essential role in its marketing success or failure (Room 1982; Keller et al. 1998; Blackett & Robins 2001; Lowrey et al. 2007). Concerning brand names, Richard Klink writes:

> Selecting a trade name for a new product is often considered the focal point of introductory marketing programs. An effective brand name can enhance awareness and create a favorable image for the product. (2000, 5)

According to Rebecca Robins (2001), trade names are created from a naming spectrum that ranges from descriptive to associative to abstract. A descriptive name clearly describes the nature of the hypnotic drug. An example is *ProSom* which is composed of the prefix *pro-* 'that promotes', and the first three letters of the Latin *somnus* 'sleep'. An associative name describes a part or all of the product's characteristics. For instance, *Stilnox* is composed of the Latin word *nox* 'night', which places the drug among sleeping pills. An abstract name is composed of an appealing sequence of letters or sounds but is not connected with the product or scientific meaning (e.g., *Quviviq*).

Once a name is chosen, the Medication Error Prevention and Analysis Division (DMEPA), part of the Food and Drug Administration (FDA), must approve the name. This approval process ensures that the name is safe and cannot be confused with that of an existing drug (Aronson 1995). The trade name must be unique and preferred over that of other similar products to avoid life-threatening confusion. The FDA rejects approximately 40% of new drug names, so manufacturers work with medical communication agencies to create names, which can cost between $250,000 and $500,000 per name (Nordrum 2015). Over 20,000 prescription drugs are approved for marketing in the US market today, and the FDA authorizes an average of 40 new names per year (FDA 2023).

2.3 Trade Name Development and Phonosemantics

Over the years, pharmaceutical companies have resorted to different strategies to name their new products. In the late 1960s, Rabindra Kanungo (1968) demonstrated that consumers preferred trade names that included product information. However, the limited number of signifying morphemes that can be used can lead to the creation of trade names that are too close to one another (Klink 2001). Therefore, in the late 1990s, pharmaceutical companies started using unusual letters to make their names stand out more. Concerning unusual letters, Rob Stepney reports that:

> Of 1436 products added to the BNF [British National Formulary] between 1986 and 2005, more than a fifth had names that began with z or x or contained a prominent x or z within them. In 1986, only 19 branded drugs began with one of these letters. Over the next two decades, the number of brands beginning with a z increased by more than 400% (to 63) and those beginning with an x increased by 130% (to 16). In the same period, the overall content of the BNF grew by only 80%. (2010, 1)

On the matter of Z and X, Amit and Ankit Gangwal add the following:

> These letters are popular because they look better in print, make sounds people like saying and are associated with innovation. Moreover, this flamboyant and swashbuckling letter X is associated with science fiction, high tech, computers, and automobiles. (2011, 3)

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One reason that drug marketers use phonosemantics is to link sound and meaning (Colino 2023). This practice has a major advantage of being understandable in many languages, which is useful for the pharmaceutical industry, as Shrum points out:

> One particular product category that tends almost entirely toward the use of fictitious brand names is medication trade names (e.g., Avistin, Taxol, both cancer medications), and in fact there is some evidence that phonetic symbolism may be related to the development of brand names in that category. (2012, 278)

Gregory Abel and Lewis Glinert (2008) found that the names of 60 commonly used chemotherapeutic drugs in oncology were selected for the phonosemantic value of consonant sounds. Indeed, among the trade names studied, a high frequency of unvoiced consonants /p/, /t/, /k/, /f/, and /s/ was observed. These consonants may be associated with lightness, smallness, and rapidity. Choosing unvoiced consonants was considered a strategy to make chemotherapy more bearable for patients. As Abel and Glinert concluded: "Trade names possessed an increased frequency of voiceless consonants, which psycholinguistic literature has shown to be associated with the concepts of lighter, smaller, and faster, and in the cancer context might be translated into 'more tolerable'" (2008, 1866).

In a study conducted in 2018 (Faure 2018a, 2018b), it was observed that in the late 1990s, "Italian-sounding" endings became very popular among drug names. This popularity is probably explained by the sense of quality and refinement attached to Italian products like luxury cars and clothes. Among these names, some were real word names that pertained to the semantic field of music, like *Lyrica*, a medication that is used to treat epilepsy.

Another study (Faure 2014) reported a naming strategy in which a part of a word—often imaginary—was used and preceded by a letter. The letter "Q" (e.g., *Qsymia,* a drug used to treat obesity) and the letter "X" (e.g., *Xgeva*, a drug prescribed to treat bone metastases) were frequently used.

More recently, Faure (2022) reported an increased name length among FDA-approved drugs between 2016 and 2021. This study found the number of names with four or more syllables increased from 10% in 2010 to 15% in 2015 and 20% in 2021. Drug names are lengthened to make them seem more unique and speed up the approval process (Tirrell et al. 2015). Examples include *Tecfidera* which is used to treat multiple sclerosis; *Jentadueto*, an antidiabetic; and *Orladeyo* which doctors may prescribe to treat patients with hereditary angioedema. Faure (2022) also observed that more names ended with the [ɪ] sound whether written /ee/, /i/, or /y/ (e.g., *Ponvory*, a prescription for multiple sclerosis) often associated with a velar [vɪ] (e.g., *Lybalvi* for schizophrenia), a strategy that was found to be widely used for other types of products.

2.4 Insomnia

Sleep is a biological necessity for life (Shepard et al. 2005). Recent sleep deprivation studies have confirmed the relationship between inadequate sleep and a wide range of disorders, such as hypertension, obesity, and type-2 diabetes, cardiovascular disease, impaired immune functioning, mood disorders, neurodegeneration, and dementia (Worley 2018).

The *International Classification of Sleep Disorders*, the key reference work for the diagnosis of sleep disorders, defines insomnia as "difficulty in either initiating sleep, maintaining sleep continuity, or poor sleep quality" (AASM 2023). These symptoms may occur despite adequate opportunity for sleep and can result in daytime dysfunction (Dopheide 2020). Insomnia is considered chronic when "sleep disturbances occur at least three times a week and have been present for the last 3 months" (Sateia 2014).

In a study conducted by Earl Ford et al. in the US (2015), the authors report that the prevalence of insomnia has been increasing significantly over the last decade in most demographic groups. Identifying a precise trigger, cause, or even directionality of the multiple components underlying chronic insomnia, however, has proven difficult, if not impossible (Reimann et al. 2010). However, there is evidence that insomnia is more common in older adults and in people with anxiety, depression, substance use disorders, and certain medical conditions, such as cancer or chronic pain, and may accompany the use of certain medications such as blood pressure drugs, corticosteroids, and antidepressants (Krystal et al. 2021).

2.5 Objective and Theoretical Frameworks of the Present Study

This study continues previous research exploring trade name development in the pharmaceutical industry (Faure 2014, 2018a, 2018b, 2023). The objective was to determine whether trade name choice had evolved, and whether this evolution had followed that which had been observed in other drug classes. The corpus consisted

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of two sources: for pre-benzodiazepine sleeping pills, Ellingwood Finley's work (1915) was used. For benzodiazepine and post-benzodiazepine sleeping pills, the FDA's approved drug list was used.

For the linguistic analysis, the Conceptual Metaphor Theory by George Lakoff and Mark Johnson (2003 [1980]) was applied. Cognitive Trope Theory by Charles Forceville (2019) was used for trade names that were made from tropes other than metaphors and metonymies. Concerning morphological matrices per se, the typology proposed by Jean Tournier (2004) was employed. For the phonosemantic analysis, the work of Richard Klink (2000, 2001) and Tina Lowrey and L.J. Shrum (2007, 2012) was utilized.

Concerning the history of hypnotic drug names, two articles were seminal: 1) a Francisco López-Muñoz et al. (2005) publication on barbiturates; and 2.) an article about benzodiazepines by Jeannette Wick (2013). Also, influential in the research design was *Understanding Sleeping Pills* by Wallace Mendelson (2022), which mentioned the latest molecules used in treating insomnia, such as Z-drugs and DORAs.

2.6 Methodology

A lexical analysis of hypnotic drugs was conducted and contextualized according to their historical and scientific backgrounds. The aim of the lexical analysis was to determine the possible meaning(s) of the drug names investigated and whether these names followed known naming trends (e.g., Italianization) (Faure 2014, 2018a, 2018b, 2022, 2023).

Information on the origin of the trade names of the older drugs (e.g., barbiturates and benzodiazepines) was gathered from previously described source works; and that information was cross-checked with other references. Concerning the more recent molecules (e.g., Z-drugs and DORAs), the pharmaceutical manufacturers were contacted but few disclosed their trade secrets. For deciphering the names' possible meanings, the researcher's knowledge of English, German, French, Italian, Spanish, Portuguese, Greek, and Latin was useful as was the investigator's knowledge of medicine and pharmacology as a multilingual medical linguist.

3. Lexicological Analysis

3.1 Barbiturates

Barbituric acid was synthesized from urea and malonic acid, derived from apples, by the German chemist Adolf von Baeyer (1835–1917) in 1864 (López-Muñoz et al. 2005). The origin of the name *barbiturate* remains controversial, as A. von Baeyer never explained his choice. According to Jie Jack Li (2006), however, A. von Baeyer named the compound after his girlfriend, ***Barb****ara*. Li adds that the name may also have been inspired by the patron saint of the artillerymen with whom A. von Baeyer used to have lunch. According to US American chemist Louis Frederick Fieser (1944), *barb* could be either a translation of the German *Schlüsselbart*, literally 'the bit of a key'. Fieser explained his theory by pointing out that A. von Baeyer considered barbituric acid to be the key that paved the way for a series of derivatives.

Nevertheless, it was almost 40 years before the first barbiturate was developed. In 1902, the two German chemists, Emil Fischer (1852–1919) and Josef von Mering (1849–1908), discovered diethyl-barbituric acid. E. Fischer named their discovery *Barbital*[3] which was formed by affixing the German drug name *Barbiturat* with the suffix *-al*, which German chemists used to designate barbiturates, a priori because of chloral. In 1904, the German pharmaceutical company Bayer, for which E. Fischer and J. von Mering worked, sold *Barbital* under the trade name *Veronal*. J. von Mering named *Veronal* after the city of Verona, which he had found peaceful. J. von Mering also coined *Luminal* (1912) based on the Latin term "lumen", meaning 'light' (Scholtyseck et al. 2018).

At the end of the First World War, US laboratories took over the right to market German products, including barbiturates, via the Trading with The Enemy Act (Cozanitis 2004). Soon after, most major pharmaceutical companies marketed their own barbiturate. In 1823, Abbott Laboratories launched *Neonal*, the name of which was derived from the Greek term "neos" 'new'; Schering-Plough Corporation marketed *Medinal*, forming the name from *medi* for "medicine"; and Eli Lilly Company manufactured *Amytal* that got its name from combining *am(yl)* + *-o-* + *-tal* for "barbital". In France, phenobarbital was marketed by Rhône-Poulenc under the trade name *Gardénal* which is a combination of *garder* 'keep' and *-nal*. The decision to use the suffix *-nal* in the name was motivated by the desire to make an onomastic connection between *Véro****nal*** and the new 1926 product.[4]

During the 20th century, no fewer than 2,500 barbiturates were synthesized, 50 of which were used in human medicine (López-Muñoz et al. 2005). The sheer number of products forced manufacturers to find a

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distinctive name. However, many manufacturers chose to name their products after the chemical compound(s) and retain the suffix *-al* as a class identifier. Examples include the name *Nembutal* which was formed by combining the chemical symbol for sodium "**N**a", a principle component of the drug; the stem "but", from the compound *5-ethyl-5-1-methyl**but**yl barbiturate*; and the suffix **-al**. Two other examples are *Seconal* which was derived from **Secon**(dary) Allyl and **-al**; and *Mebaral*, from **Me**thylpheno**bar**bit**al**.

In 1955, the United States sold almost four billion barbiturate tablets as sleeping aids, and one in seven US Americans used them regularly (Li 2006). Unfortunately, barbiturates were suspected to be responsible for several cases of overdose and death. In New York City alone, between 1957 and 1963, 8,469 overdoses and 1,165 deaths were reported (López-Muñoz et al. 2005). Deemed too dangerous, they were gradually replaced by benzodiazepines.

3.2 Benzodiazepines

Benzodiazepines (BZDs) are a class of chemical compounds consisting of a diazepine ring fused with a benzene ring. BZDs act on neurotransmitters in the central nervous system, increasing neurons' inhibitory activity to induce sedation. Their history dates back to 1955. Synthesized by Hoffmann-La Roche[5] chemist Leo Sternbach, the first BZD, chlordiazepoxide, was abandoned and then rediscovered in 1957 by one of his students, Earl Reader. Clinical trials evidenced the molecule's sedative properties, and the company filed a patent in 1958, launching the first drug in 1960 under the trade name *Librium*. The name *Librium* is formed from the Latin terms "liber" 'free' and "libra" 'balance', and the suffix *-ium*, which designates a chemical element. Together the name suggests that the product frees the patient from insomnia and rebalances their sleep (Wick 2013). A huge commercial success, Librium® was followed by Valium® in 1963.

Valium® became a commercial success[6] thanks in no small measure to intense, direct marketing aimed at doctors. The campaign was orchestrated by Arthur Sackler, a psychiatrist and an adman, whose pharmaceutical company, Purdue Pharma, is believed to be in large measure responsible for the ongoing opioid crisis in the United States with its notorious painkiller OxyContin®. Valium® was primarily intended for housewives suffering from what A. Sackler dubbed "psychic tension", a mental illness created specifically to sell the drug (Keefe 2021).

The name *Valium* comes from the Latin term "valere" meaning 'to be strong' (Dronsfield and Ellis 2008). The initial letter "V", which is often used by doctors as a nickname for the drug, was chosen to symbolize both victory and life (Room 1982). This association was used in the naming of other drugs such as *Vicodin*, *Vioxx,* and *Viagra* (Faure 2014). In addition, its Latin-sounding suffix *-ium* gives it a scientific edge (Room 1982). Its two-syllable name is easy to pronounce and memorize. From a phonosemantic point of view, as a labio-dental voiced fricative, the [v] sound is perceived as both more feminine and faster (Klink 2000), two important properties for a sleeping pill that is aimed at women and supposed to induce sleep quickly.

Valium® quickly became a social phenomenon. For example, it inspired the best-selling novel *Valley of the Dolls* by US author Jacqueline Susann (2016). First published in 1966, the book tells the story of three young women whose dreams of true love and success end in alcohol and tranquillizers. The title is a direct reference to the drug itself. Homophony also inspired one of the street names used for Valium®:*Vallies*.[7] In much the same way, the nickname *Doll* was originally derived from *Dolophine*, the trade name for methadone, a synthetic opioid painkiller. Over time, for some users, this name became a coverterm for all tranquilizers.

The British band "The Rolling Stones" even dedicated a song to Valium® which they entitled *Mother's Little Helper* (Babiuk and Prevost 2013). The lyrics dealt with housewives who, in order to face "the drag of getting old" and "get through [their] busy day", turn to "a yellow pill". Many celebrities of the 1970s were regular consumers of Valium®. It was found, for example, in large quantities in Elvis Presley's blood after his death in 1977.[8] Although highly addictive, Valium®, under its generic name *diazepam*, is now on the WHO's list of essential medicines.

Flurazepam was the first BZD specifically sold as a hypnotic. It was patented by Roche in 1968 and approved by the FDA in 1970 under the trade name *Dalmane*. The name *Dalmane* was formed from the Illyrian[9] word "delme" meaning 'sheep', and refers to the cultural link between counting sheep to fall asleep. Roche SAS duly confirmed the etymology in a personal email on March 22, 2023. Within two years, Dalmane® became the most prescribed sleeping pill in the US (Mendelson 2018).

From 1960 onwards, the number of BZDs on the market multiplied. Manufacturers abandoned the *-ium* suffix and selected increasingly symbolic names. Thus, among the BZDs prescribed to treat insomnia, the FDA approved *Restoril* (1969), the name of which may have been taken from the verbs "to restore" and/or "to rest", suggesting that the drug will restore sleep. The name *Halcion* (1982) is a homophone of "halcyon", an adjective meaning 'calm, peaceful' which appears in the phrase "halcyon days"[10]. Through association, the name may be associated with the promise a bright future. A similar naming process might also have been used for *Doral* (1985). Although not a barbiturate, the drug is used to treat insomnia and its name appears to have been formed

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from the first three letters of the Latin verb "dormire" meaning 'to sleep' and the suffix "-al". All these names fall into the category of what Rebecca Robins (2001) calls "associative" and appear to be designed to communicate the emotional benefits of the products. Although BZDs are far less dangerous than barbiturates, they are highly addictive and, when used over a long period of time, have been held responsible for the onset of Alzheimer's disease, prompting scientists to find an alternative as early as the 1980s (Billioti de Gage et al. 2012).

3.3 Z-Drugs

The "Z-drug class" is so called because the names of the three molecules that make it up begin with the letter "Z": zopiclone, zolpidem, and zaleplon (Gunja 2013). The letter "Z" may have been chosen not only because "imida**z**ole" is at the basis of each, but also because of its onomatopoeic value. Indeed, the sound [z] is associated with the notion of sleep in many cultures. For example, in comic strips, "Zzz" indicates the sound of snoring. Unlike BZDs, which can be prescribed for anxiety or epilepsy, or as muscle relaxants, Z-drugs are indicated only for insomnia.

While Z-drugs inhibit GABA receptors, they have a different molecular structure than BZDs. Z-drugs selectively target GABA alpha-1 receptors. This means Z-drugs have fewer side-effects such as daytime drowsiness or memory impairment. They are also less addictive, making them a good alternative to BZDs (Lader 1997). Zopiclone is the oldest of these molecules, manufactured by the French pharmaceutical company Sepracor in 1985, and marketed in France in 1988 by Rhône-Poulenc, which became Aventis in 1999. Zopiclone was never marketed in the US (Brandt and Leong 2017). However, its stereoisomer, eszopiclone, was granted marketing authorization under the trade name *Lunesta* in 2004.

Zolpidem was synthesized in 1988 by the French company Synthélabo, which later merged with Sanofi (Morris 1992). In 1992, it was approved by the FDA and was marketed under the trade name *Ambien*. A lower-dose version is sold under the trade name *Intermezzo*. In 2009, the FDA approved its sublingual version under the trade name *Edluar*. Zaleplon, the third Z-drug, obtained its US marketing authorization in 1999 under the trade name *Sonata*.

From the 1990s onwards, with the market entry into Romance-speaking countries, manufacturers began using names with Spanish references. An excellent example is *Ambien*, which is composed of the letters "AM" which may stand for "morning" and *bien* which is the Spanish word for 'good' (Pharmacy Times 2015). Alternatively, the name may also be related to the word "ambient", which designates a soaring musical genre or evokes softness and well-being when associated with other words (e.g., ambient light).

Spanish is not the only Romance language that companies may use when developing names for their new products aimed at the international market. One manufacturer used Portuguese to develop the drug name *Edluar*, which is formed from "ED" in *Meda*, the company name; and the Portuguese term "luar" meaning 'moon'. Notably, the Meda laboratory pulled its initial trade name for this product in the US American market, *Sublinox*. Presumably, this first name was formed by combining "subli-" from "sublime" and the Latin term "nox" for 'night'. It is unclear why this name was rejected for the USA. However, *Sublinox* was approved for use on the Canadian market.

In the 2000s, Italian-sounding names flourished under the influence of a more general marketing strategy involving the car and food industries. This Italianization phenomenon may have been to capitalize on Italy's renowned reputation for producing high-quality, refined products, as well as to facilitate market entry into Romance-language regions. This hypothesis was supported in a previous study (Faure 2014) in which an increase in drug trade names ending with the vowel "a" and an alveolar fricative [s] or [z] was reported. Examples include *Portrazza* (2015), an anticancer drug; *Afrezza* (2014), an insulin; *Giapreza* (2017), a drug against hypertension; and *Veltassa* (2015), an antihyperkalemic prescription. This vowel-ending is also found in the Z-drug name *Lunesta* (2004), which is said to be composed of Latin word "luna" for 'moon' and the letter string "est" from "r**est**ore"—an apt name for a product that promises to restore sleep (Colino 2023).

Many investigations have attested Italianization as naming strategy for prescriptions. Interestingly, many drug trade names have reportedly been borrowed from the lexical field of music (Faure 2018b) such as *Cymbalta* (2004), an antidepressant, whose name is a blend of "cymbal" and "alta"; *Lyrica* (2007); *Concerta* (2008) for attention deficit hyperactivity disorder; the immunomodulator named *Aubagio* (2012) which appears to be a blend of "aubade" and "adagio"; and *Quartette* (2013), a contraceptive pill. The name of the Z-drug *Sonata* (1999) is an additional example of how Italian words are used to create drug names. Another drug name that exemplifies this strategy is *Intermezzo* (2011). Used as a hypnotic, the name of this Z-drug effectively combines the Italian loanword meaning "interlude"— a reference to the lexical field of music— with the above-mentioned "double Z".

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3.4 DORAs

DORA stands for "Dual Orexin Receptor Antagonist". Orexins A and B, also known as "hypocretins", are two neuropeptides involved in the regulation of the sleep-wake cycle. The orexin system is very active during wakefulness, and not very active during sleep, particularly REM sleep. As a result, antagonists that prevent the receptors from interacting with orexins have been tested as treatments for insomnia. Highly effective, these new treatments look promising, with fewer side-effects on alertness, balance, memory, and dependence (Murphy et al. 2017).

The first DORA is suvorexant. Manufactured by Merck, it received its marketing authorization in 2014 under the trade name *Belsomra,* which appears to be made up of the Latin terms "**bel**(la)" for 'beauty' and "**som**(nus)" for 'sleep'. Thus, the name *Belsomra* may evoke not only images of the Sleeping Beauty fairy tale, but also the notion of "beauty sleep".[11] The name appears to be both associative (a good night's sleep) and emotive (beauty). Moreover, all the marketing used to promote the drug commercially[12] is aimed at women (Servitje 2020). In 2019, belsomra® was followed by lemborexant under the trade name *Dayvigo*. *Dayvigo* may well be derived from a combination of "day" and "vigo" for "vigor" which together evoke images of having a lively day after a good quality sleep.[13]

Among Italian-sounding trade names authorized from 2014 onwards, a sharp increase in the frequency of the final vowel "-o" was observed. Examples of drug names that used this pattern include *Natesto* (2014), a testosterone-based nasal gel; *Bavencio* (2017) and *Opdivo* (2014), two anticancer drugs; and *Xtoro* (2014), an antibiotic; or *Dayvigo* (2019).

The latest DORA is daridorexant marketed under the trade name *Quviviq* since 2022 (Roch et al. 2021). This name appears to be a composite of [Q + *viv*+ *iq*,] where the second element may have been taken from the Latin term "vivus" 'living' and a final syllable that evokes energy and dynamism (Guiraud 1986). Together, these elements form a name which may suggest that, thanks to the quality sleep the drug provides, the patient can look forward to having a dynamic day.

The name *Quviviq* also reflects the growing popularity of the syllable *vi*. Indeed, since 2015, an increase in the use of the [ɪ] sound in final position whether written /i/ or /ee/ has been noted (Faure 2018a). This trend has been particularly associated with a velar, especially placed in initial position as in *Victoza*, an anti-diabetic; *Victrelis*, an antiviral; *Viibryd*, an antidepressant; *Vijoice*, an anticancer agent; *Viberzi*, an antidiarrheal; or *Vyleesi*, indicated for the treatment of hypoactive sexual desire disorder. The latter drug, nicknamed the "female Viagra", is named after *Khaleesi*, the heroine of *Game of Thrones*, of which the company's CEO is a fan. Ashley Tolley, the Creative Director of the branding institute BrandSymbol, confirmed the origin of the name in a personal email on October 14, 2019. The prefix *vy-* pronounced here [vaɪ] is supposed to recall the name *Viagra*, while modernizing it by replacing the letter I with the letter Y. From a phonosemantic point of view, the [ɪ/i] sound is perceived as faster (Klink 2000)— an important attribute for a hypnotic like *Quviviq*.

The use of the sound [vɪ] is not unique to the pharmaceutical industry, and is found in many languages. Examples include *Vi*, the new name of *Vodafone* (a British telecommunications group); *Vyv* (a group of French health insurance companies); *Veepee*, the new name of *Vente-privee.com* (a French destocking specialist); *Vy* (a Norwegian railway company) (Faure 2022). The way in which a drug name is pronounced is not the only consideration. The arrangement of the letters themselves may also carry meaning. Consider, for example, the name *Quv**iv**iq,* where the letters "i" and "v" appear adjacent to one another. Together, the letters form the Roman numeral "IV" which may well signify the drug's "schedule IV" classification and thereby possibly indicate the drug's minimal risk of abuse and dependence. The name is almost a palindrome which potentially casts the sleep-wake/day-night cycle as a continuum, rather than an opposition.

Over the past ten years, the pharmaceutical industry has exhibited a tendency toward using an imaginary word preceded by a consonant, a "peripheral, unconventional morphology" (Fèvre-Pernet and Roche 2005). This sets the molecule apart from a classic linear letter string (Nordrum 2015). This tendency is accompanied by a marked preference for the letter "Q" as in, for example, *Qbrelis* (2016), an antihypertensive; *Qdolo* (2020), an analgesic; *Qtern* (2017), an antidiabetic, sometimes followed by the letter U as in *Qudexy* (2014), an antiepileptic drug; *Qulipta* (2021), an antimigraine; or *Qutenza* (2009), an analgesic. Apart from the visual appeal associated with the letter Q, which draws the eye to its center (Room 1982: 193), in marketing, the letter Q is thought to evoke the notion of "quality" (e.g., Q-score for "Quality score", Q&Q for "Quality and Quantity", QC for "Quality Control"). In addition, this unusual consonant structure has the advantage of enabling names with two or three audible syllables to be combined, whilst retaining the short, written form—an asset for prescribers.

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4. Summary and Conclusion

This diachronic lexicological study of prescription hypnotic drug trade names has highlighted an evolution. It has shown that some of the early hypnotics had names that carried particular values and imagery (e.g., *Veronal*). The findings demonstrate that despite the fact that hypnotics have always occupied a special place in the pharmacopoeia, the names developed for them have historically been associated with common segments to facilitate the identification of the products (e.g., the suffixes - *al* for barbiturates and -*ium* for benzodiazepines). Moreover, in the late 1960s, pharmaceutical companies began using names that communicated the emotional benefits of their products (e.g., *Restoril*). From the 1990s, Italian-sounding names were increasingly generated by borrowing words from music (e.g., *Sonata*). During this time, abstract drug names meant to sound good and look good in print (e.g., *Quviviq*) also become quite popular.

The names for prescription hypnotics have been designed to attract the consumer's attention in a highly competitive market, which has recently been challenged by the emergence of non-pharmacological competitors (connected watches, headbands, masks, pillows, and mattresses). To meet that goal, names that are composed of a "Q + imaginary word" structure have been used to name sleeping drugs. In addition, drug names employing the [vɪ] sound, which has proven so popular in other industrial sectors, have also become a popular naming strategy in the modern pharmaceutical industry.

This investigation is not without its limitations. Many naming agencies were reluctant to disclose their onomastic trade secrets. Therefore, some of the linguistic analyses in this study are based on inferences and require confirmation. In addition, it is recommended that subsequent research examine whether and how drug names influence consumer choices, both inside and outside of the US. Further, while the present study focused on the trade names of prescriptions used to treat insomnia, future research could examine the trade names of medications used to treat other public health issues such as diabetes. As this investigation demonstrates, there are many fascinating questions which have yet to be addressed.

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AI Disclosure Statement

No AI Tools or Technology were used to conduct the research or write this article.

Notes

[1] "Sleep and Sleeplessness" by the British physician Alexander Morison.

[2] See: https://www.alliedmarketresearch.com/insomnia-market Accessed 28 November 2024.

[3] In the UK, it was called *barbitone* [*barbituric* + *-one*]. The suffix was used in chemistry to indicate that the compound is a derivative.

[4] See: https://www.cnrtl.fr/etymologie/gardénal Accessed 28 November 2024.

[5] Founded in 1896 by Swiss businessman Fritz Hoffmann-La Roche, the company originally specialized in making vitamins.

[6] Between 1969 and 1982, Valium was the best-selling medicine in the US. (Junkes et al. 2024).

[7] For Valium's street names, see https://www.arkbh.com/benzodiazepines/valium/street-names/

[8] The exact list of the 10 drugs found during the autopsy is accessible at https://fherehab.com/learning/elvis-presley-drugs-led-to-overdose.

[9] A group of dead Indo-European languages that were spoken in an area corresponding to the present Balkans.

[10] In Greek mythology, the term designates a fortnight of calm weather during the winter solstice.

[11] According to the Oxford English Dictionary, the first documented use of the term "beauty sleep" was in 1828 by the author Charles White in his book *Herbert Milton*: "[The party] was attended principally by married women, who, if they had daughters out, generally took this opportunity of sending them to seek beauty sleep in bed before ten o'clock".

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[12] See: https://www.youtube.com/watch?v=_kMzVNnv78w Accessed 28 November 2024.

[13] The Dayvigo® logo features a semicircle which could simultaneously stand for both the crescent shaped moon, a symbol of the night, as well as the yellow-orange colored sun, a symbol of the day. The word "go" may represent forward movement. Where the choice of color is concerned, the logo shifts from violet, which often symbolizes dreams and meditation, to luminous orange, which often represents dynamism and energy (Pastoureau 2005).

References

Abel, Gregory, and Lewis Glinert. 2008. "Chemotherapy as Language: Sound Symbolism in Cancer Medication Names". Social Science & Medicine, no. 66: 1,863–1,869. https://doi.org/10.1016/j.socscimed.2007.12.016

AASM (American Academy of Sleep Medicine). 2023. International Classification of Sleep Disorders – Third Edition, Text Revision.

Aronson, Jeffrey. 1995. "Confusion Over Similar Drug Names. Problems and Solutions". Drug Safety no. 12: 155–60. https://doi.org.10.2165/00002018-199512030-00001. PMID: 7619327.

Babiuk, Andy, and Greg Prevost. 2013. *Rolling Stones Gear: All the Stones' Instruments from Stage to Studio*. Milwaukee, Wisconsin: Backbeat Books.

Billioti de Gage, Sophie, Bernard Bégaud, Fabienne Bazin, Hélène Verdoux, et al. 2012. "Benzodiazepine Use and Risk of Dementia: Prospective Population Based Study". BMJ no. 345:e6231 https://doi.org/10.1136/bmj.e6231

Blackett, Tom, and Rebecca Robins. 2001. *Brand Medicine, the Role of Branding in the Pharmaceutical Industry*. New York: Palgrave.

Brandt, Jaden, and Christine Leong. 2017. "Benzodiazepines and Z-Drugs: An Updated Review of Major Adverse Outcomes Reported on in Epidemiologic Research". *Drugs in Research & Development* 17, no. 4: 493–507. https://doi.org/10.1136/bmj.e6231. PMID: 28865038; PMCID: PMC5694420.

Colino, Stacey. 2023. "How drugmakers come up with evocative brand names like Viagra and Lunesta". National Geographic. Accessed 12 September 2023. https://www.nationalgeographic.com/premium/article/drugmakers-brand-names-viagra-lunesta

Cozanitis, Dimitri. 2004. "One Hundred Years of Barbiturates and their Saint". *Journal of the Royal Society of Medicine*, no. 97: 594–598. https://www.doi.org.10.1258/jrsm.97.12.594

Dopheide, Julie. 2020. "Insomnia Overview: Epidemiology, Pathophysiology, Diagnosis and Monitoring, and Nonpharmacologic Therapy". *American Journal of Managed Care* no. 26: S76-S84. Accessed 21 September 2023. https://doi.org/10.37765/ajmc.2020.42769.

Ekirch, Roger. 2006. *At Day's Close: A History of Nighttime*. London: Weidenfeld & Nicolson.

Dronsfield, Alan, and Pete Ellis. 2008. "Librium and Valium – Anxious Times". *Education in Chemistry*. Accessed 12 September 2023. https://edu.rsc.org/feature/librium-and-valium-anxious-times/2020182.article.

Dutchen, Stephanie. 2009. "A Drug by Any Other Name". *Scope*. Accessed 21 September 2023. http://classic.scopeweb.mit.edu/articles/a-drug-by-any-other-name/

Faure, Pascaline. 2014. ""Du sildénafil citrate au Viagra® ou l'art délicat de nommer les médicaments." [From Sildenafil Citrate to Viagra® or The Delicate Art of Naming Drugs]. *Terminology* 20, no. 1: 74-91. doi: 10.1075/term.20.1.04fau.

Faure, Pascaline. 2018a. "La néologie commerciale : l'exemple des noms de médicaments." [Commercial onomastics: The example of drug names]. *Les Cahiers de Lexicologie* no. 113: 129–144. doi: 10.15122/isbn.978-2-406-08791-5.p.0129.

Faure, Pascaline. 2018b. "Natesto®. What Else? New Trends in Drug Naming." *Names: A Journal of Onomastics* 66, no. 2: 65–74. doi: 10.1080/00277738.2017.1415532

Faure, Pascaline. 2022. "Le marketing des médicaments ou l'art de transformer les bien-portants en malades: analyse multimodale des noms et des logos de dix médicaments de marque sur ordonnance." [Drug Marketing Or The Art of Turning the Healthy Into The Sick: A Multimodal Analysis of the Names And Logos Of Ten Branded Prescription Drugs]. ELAD-SILDA. doi: 10.35562/elad-silda.1182.

Faure, Pascaline. 2023. "From fluoxetine to Prozac®: How the pharmaceutical industry builds brand identity for their prescription drugs through naming." In *Names, Naming and the Law*. Edited by Iman Nick. 140-156. London: Routledge.

FDA. 2023. *FDA at a Glance*. Accessed 21 September 2023. https://www.fda.gov/about-fda/economics-staff/fda-glance

Fieser, Louis Frederik. 1944. *Organic Chemistry*. Lexington: D.C. Heath and Company.

Finley, Ellingwood. 1915. *The American Materia Medica, Therapeutics and Pharmacognosy*. Harvard.

Forceville, Charles. 2019. "Developments in multimodal metaphor studies: A response to Górska, Coëgnarts, Porto & Romano, and Muelas-Gil". *Current Approaches to Metaphor Analysis in Discourse, Applications of Cognitive Linguistics*. Edited by Ignasi Navarro i Ferrando, 367–378. Berlin: De Gruyter Mouton.

Ford, Earl, Timothy Cunningham, Wayne Giles, and Janet Croft. "Trends in Insomnia and Excessive Daytime Sleepiness Among US Adults from 2002 to 2012". Sleep Medicine no. 16: 372–378. http://www.doi.org.10.1016/j.sleep.2014.12.008

Gangwal, Amit, and Ankit Gangwal. 2011. "Naming of Drug Molecules and Pharmaceutical Brands". *Journal of Current Pharmaceutical Research* 7, no. 1: 1–5. Accessed 25 September 2023. https://lawpunditsglobal.com/media/uploads/2013/10/Branding-of-Pharma-Products.pdf

Giraud, Pierre. 1986. *Structures étymologiques du lexique français* [Etymological Structures of the French Lexicon]. Paris: Payot.

Gunja, Naren. 2013. "The Clinical and Forensic Toxicology of Z-drugs". *Journal of Medical Toxicology* no. 9: 155–162. Accessed 25 September 2023.https://doi.org/10.1007/s13181-013-0292-0

Junkes Larissa, Mauro V. Mendlowicz, Richard Shader, Antonio E. Nardi, 2024. "Leo Sternbach and the benzodiazepines 60 years on: A revolutionary treatment for anxietydisorders". *Pharmacological Research* 207: 107310. Accessed 28 November 2024. https://doi.org/10.1016/j.phrs.2024.107310.

Kanungo, Rabindra. 1968. "Retention of Affective Material". Journal of Personality and Social Psychology, no. 8: 63–68. doi: 10.1037/h0032790

Keefe, Patrick. 2021. *Empire of Pain: The Secret History of the Sackler Dynasty*. London: Picador.

Keller, Kevin, Susan Heckler, and Michael Houston. 1998. "The effects of brand name suggestiveness on advertising recall". *Journal of Marketing*, no. 62: 48–57. https://doi.org.10.2307/1251802

Klink, Richard. 2001. "Creating meaningful new brand names: A study of semantics and sound symbolism". Journal of Marketing Theory and Practice, no. 9: 27–34. https://doi.org.10.1080/10696679.2001.11501889

Klink, Richard. 2000. "Creating brand names with meaning: The use of sound symbolism". *Marketing Letters,* no. 11: 5–20. https://doi.org.10.1023/A:1008184423824

Krystal, Andrew, Liza Ashbrook, and Aric Prather. 2021. "What Is Insomnia?" *Journal of American Medical Association* no. 326: 2444. https://doi.org.10.1001/jama.2021.19283

Lader, Malcom. 1997. "Zopiclone: Is There Any Dependence and Abuse Potential?". *Journal of Neurology* no. 244 (Suppl 1): S18–S22. Accessed 30 September 2023. https://doi.org/10.1007/BF03160567

Lakoff, George, and Mark Johnson. 2003. Metaphors we live by. Chicago: The University of Chicago Press. First published 1980 by The University of Chicago Press.

Li, Jie Jack. 2006. *Laughing Gas, Viagra, and Lipitor: The Human Stories Behind the Drugs We Use*. New York: Oxford University Press.

López-Muñoz, Francisco, Ronaldo Ucha-Udabe, and Cecilio Alamo. 2005. "The History of Barbiturates A Century After Their Clinical Introduction". *Neuropsychiatric Disease and Treatment*, no. 1: 329–343. PMID: 18568113.

Lowrey, Tina, and L. J. Shrum. 2007. "Phonetic symbolism and brand name preference". *Journal of Consumer Research*, no. 34: 406–414. https://www.doi.org.10.1086/518530

Mendelson, Wallace. 2022. *Understanding Sleeping Pills*. Independently Publisher). Originally published in 2018 by Independent Publisher.

Morris, Steven. 1992. "Searle Wins Ok To Sell Sleep Aid". *Chicago Tribune*. Accessed 30 September 2023. https://www.chicagotribune.com/news/ct-xpm-1992-12-22-9204260442-story.html.

Murphy, Patricia, Margaret Moline, David Mayleben, Russell Rosenberg, Gary Zammit, Kate Pinner, Shobha Dhadda, Quan Hong, Luigi Giorgi, and Andrew Satlin. 2017. "Lemborexant, A Dual Orexin Receptor Antagonist (DORA) for the Treatment of Insomnia Disorder: Results From a Bayesian, Adaptive, Randomized, Double-Blind, Placebo-Controlled Study". *Journal of Clinical Sleep Medicine* no. 15: 1289–1299. http://www.doi.org.10.5664/jcsm.6800. PMID: 29065953; PMCID: PMC5656478.

Pastoureau, Michel. 2005. *Le Petit Livre des Couleurs* [The Little Book of Colors]. Paris: Panama.

Pharmacy Times. 2015. "15 Rx Drug Name Origins". Accessed 30 September 2023. https://www.pharmacytimes.com/view/15-rx-drug-name-origins

Robins, Rebecca. 2001. "Pharmaceutical brand name development". *Brand Medicine: The Role of Branding in the Pharmaceutical Industry*. Edited by Tom Blackett and Rebecca Robins, 151–162. New York: Palgrave.

Roch, Catherine, Georgio Bergamini, Michel Steiner, and Martine Clozel. 2021. "Nonclinical Pharmacology of Daridorexant: A New Dual Orexin Receptor Antagonist for the Treatment of Insomnia". *Psychopharmacology* no. 238:2693-2708. http://www.doi.org.10.1007/s00213-021-05954-0. Epub 2021 Aug 20. PMID: 34415378; PMCID: PMC8455402.

Room, Adrian. 1982. *Dictionary of Trade Name Origins*. London: Routledge and Kegan Paul Ltd.

Sateia, Michael. 2014. *International Classification of Sleep Disorders - Third Edition: Highlights and Modifications. Chest* no. 146: 1387–1394. https://www.doi.org.10.1378/chest.14-0970

Scholtyseck, Joachim, Carsten Burhop, Michael Kißener, and Hermann Schäfer. 2018. *Merck: From a Pharmacy to a Global Corporation*. Munich: C.H. Beck.

Servitje, Lorenzo. 2020. "Selling the de-pharmaceuticalization of insomnia". *The Routledge Companion to Health Humanities*. Edited by Paul Crawford, Brian Brown and Andrea Charise, 134–147. London: Routledge.

Shepard, John, et al. 2005. "History of the development of sleep medicine in the United States". *Journal of Clinical Sleep Medicine* no. 1: 61–82. Accessed 21 September 2023. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2413168/

Shrum, L.J., Tina Lowrey, David Luna, David Lerman, and Min Liu. 2012. "Sound symbolism effects across languages: Implications for global brand names". Internal Journal of Research in Marketing, no. 29: 275–279. https://www.doi.org.10.1016/j.ijresmar.2012.03.002

Stepney, Rob. 2010. "A Dose by Any Other Name Would Not Sell as Sweet". *BMJ* no. 341: c6895 https://doi.org/10.1136/bmj.c6895

Susann, Jacqueline. 2016. *Valley of the Dolls*. New York: Grove Press. Originally published in 1966 by Warner.

Tirrell, Meg, Eric Chemi, and Mark Fahey. 2015. "What's in a Name? For Drugs, a Lot of Zs and Xs". CNBC. Accessed 30 September 2023.
https://www.cnbc.com/2015/04/09/whats-in-a-name-for-drugs-a-lot-of-zs-and-xs.html

Tournier, Jean. 2004. *Précis de lexicologie anglaise* [Manual of English Lexicology]. Paris: Ellipses.

Wick, Jeannette. 2013. "The history of benzodiazepines". *The Consultant Pharmacist: The Journal of the American Society of Consultant Pharmacists*, no. 28: 538–48. https://doi.org.10.4140/TCP.n.2013.538

Worley, Susan. 2018. "The Extraordinary Importance of Sleep: The Detrimental Effects of Inadequate Sleep on Health and Public Safety Drive an Explosion of Sleep Research". *Pharmacy and Therapeutics* 43, no. 12: 758–763. PMID: 30559589; PMCID: PMC6281147.

Notes on Contributor

Pascale Faure holds an MA in English Linguistics; an MA in French for medical purposes; a PhD in English for medical purposes; and a French "Habilitation". She also studied medicine. She is the Head of the Medical English Department at Sorbonne University's Faculty of Health and Medicine. Her research focuses on medical terminology, and more precisely on the comparison of conceptual tropes in English and French. In her research, she also explores the naming of ancient and novel viruses. Most of her recent work deals with the naming of prescription drugs from a multimodal perspective.

Correspondence to: Pascaline Faure, Sorbonne University, Faculty of Health and Medicine, 27 rue Chaligny, 75012 Paris, France. Email: Pascaline.faure@sorbonne-universite.fr

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