



We're entering a housing bubble, while leaving our pandemic bubble: Changing meanings of bubble in relation to the outbreak of COVID-19*

Ji-in Kang · Iksoo Kwon*****
(Hankuk University of Foreign Studies)

Kang, Ji-in and Iksoo Kwon. 2023. *We're entering a housing bubble, while leaving our pandemic bubble: Changing meanings of bubble in relation to the outbreak of COVID-19.* Linguistic Research 40(3): 561-586. Motivated by Charteris-Black's (2021) observations on changing meanings of COVID-19-related linguistic expressions, this study shows that the polysemous lexical item *bubble*'s extended uses are significantly accounted for by COVID-era usages. A total of 4,119 tokens of *bubble*-compounds ($X + bubble$ and $bubble + X$) were identified in the Coronavirus Corpus. The major categories of *bubble*-compounds' uses are the prototypical sense (Prototypical), those referring to the ephemeral nature of bubbles (EPHEMERALITY), and those evoking an enclosed space with boundaries (ENCLOSURE). The study argues that the changing meanings of *bubble*-compounds are metaphorically motivated (Lakoff 2006[1993]) and shows how conceptual motivation helps obtain the intended construal. The tokens classified in the ENCLOSURE category constitute more than two-thirds of the total dataset (68.41%), and the instances all refer to the concept of pandemic-era social restrictions. Based on the distribution, the study demonstrates that the radial network of the polysemous lexeme *bubble* has been expanding, motivated by real-world experiences via conceptual metaphor and image-schematic construal. The discussion also touches on different reification patterns of the semantic properties of *bubble*'s counterparts in three non-Indo-European languages, Korean, Japanese, and Thai, where different patterns of form and meaning pairings are accounted for in construing the concepts of EPHEMERALITY and ENCLOSURE. This crosslinguistic comparison provides an outstanding illustration of how the meanings covered by a single lexical item in one language can be carved up in different but still conceptually motivated ways in other languages. (Hankuk University of Foreign Studies)

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** First author

*** Corresponding author

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1. Introduction

Routinized human experiences provide conceptual motivation for changes in language use. Language uses are thus subject not only to living conditions such as weather, but also to any significant change in our lives, such as the advent of new technologies and the spread of new diseases. This study zooms in on the outbreak of COVID-19 as the cause of significant changes in human experiences, and their consequences in English. More specifically, the study reports that certain extended uses of the polysemous lexical item *bubble* have occurred with increasing frequency in the COVID era and that pandemic-related experiences account for this change. It analyzes *bubble*'s meaning extensions within the theoretical framework of conceptual metaphors and metonymies (Lakoff and Johnson 1980, 1999). In particular, the study discusses regularities of the conceptual motivation behind the changing uses of this lexeme by comparing the uses before and after the outbreak.

The lexical item in focus, *bubble*, prototypically refers to a “thin membrane of liquid enclosing a volume of air or another gas” (*Oxford English Dictionary*)¹ as in *air bubbles*, *soap bubbles*, and so on. It has other meanings as well, which extend from this prototypical one, and some of its recent extensions in temporal proximity to the outbreak of COVID-19 are illustrated in (1).²

- (1) a. The last big jump in sales came almost a decade ago, after the economic downturn from 2007 to 2009 when the U.S. housing *bubble* burst.
- b. Some in the film industry have continued to work by relying on a quarantine *bubble* plan that keeps everyone involved together and isolated for the entire duration of a production.

In (1a), the word *bubble* refers to an unstable, and hence undesirable, state of economic

1 https://www.oed.com/search?searchType=dictionary&q=bubble&_searchBtn=Search

2 All the data discussed in this paper are attested uses from the Coronavirus Corpus (<https://www.english-corpora.org/corona/>, accessed on Oct. 2, 2022).

activity in the domain of the U.S. housing market, in which housing became overvalued. Fraudulent activities regarding the housing market were based on overestimations of the size and scale of the market and its activity, creating a “bubble,” which eventually triggered a sudden fall in market values that had widespread economic consequences; that is, the “bubble burst.” Although this use of *bubble* seems distant from the original sense of a thin membrane surrounding a pocket of gas, the construal is, in fact, a conceptual extension of the original sense: Just as a soap or water bubble cannot last long due to the fragility of the membrane, the heightened housing market based on overblown estimates of value turned out to be a fragile, non-durable creation.

On the other hand, the meaning in (1b) is different. Here, *bubble* refers to a safe space, not necessarily or at least not only physical, but definitely conceptual: a selected set of people who are presumed to be free of COVID-19 infection and who socialize and/or work only with each other. This use of *bubble* evokes an isolated space or an enclosed container; the space’s conceptual boundaries fend off those “outside” of it in order to maintain the safety of those “inside” of it. Hence, the boundaries of this enclosure need not be physical, as their significance is to distinguish the people on the inside from those on the outside. Yet given that the defining factor is COVID-19, whose transmission is airborne, physical space is relevant. The inferential patterns evoked are as follows: Those who stay inside the bubble can remain disease-free if they are in contact only with each other; those who are outside the bubble might be in contact with anybody, and therefore might be exposed to the disease and are potential hosts who could spread it; therefore, those who are inside the bubble and those who are outside of it do not have contact with each other. These semantic extensions have implications that affect people’s courses of action. Regarding the meaning conveyed by (1a), investors who fear an economic bubble act cautiously to avoid financial misjudgments and fraudulent deals; for (1b), the members of a bubble must be cleared of the disease and be vigilant about keeping others out of it.

The fact that the lexeme *bubble* is polysemous is neither surprising nor the main focus of this study, as its use is frequent enough to account for multiple meanings. For example, the idiomatic expression burst one’s *bubble* means to make someone suddenly realize that something they believed is not really true. It is noteworthy that the meanings that form *bubble*’s polysemous semantic network, including the idiomatic ones, are centered around two semantic properties: EPHEMERALITY and ENCLOSURE (as discussed in more detail in Section 2). Based on these observations, this study collects

attested data from the Coronavirus Corpus to see the semantic distributions of the lexeme *bubble* specifically after the outbreak of COVID-19. It is hypothesized that uses with the meaning ENCLOSURE are more frequent after than before the outbreak. By confirming this hypothesis, this case study of changing meanings of *bubble* in the era of COVID-19 argues that language use is motivated by underlying conceptualizations shaped by language users' embodied experiences of the world.

This study proceeds as follows: Section 2 provides a brief summary of cognitive semantic research that focuses on semantic extensions of polysemous forms during the COVID-19 pandemic era by means of cognitive mechanisms such as conceptual metonymy and metaphor. It also briefly elaborates on the multiple senses of *bubble*. Section 3 describes the data, which comprise collocation patterns of *bubble* with content lexemes, collected from the Coronavirus Corpus by looking for the possible compound patterns $X + \textit{bubble}$ and $\textit{bubble} + X$. Based on the major semantic properties of *bubble* before and after the outbreak of COVID-19, sorted out in Section 3, the study provides a detailed analysis of the further extended construals of EPHEMERALITY and ENCLOSURE in Section 4. The section also elaborates on the semantic relationship between the two meanings. Section 5 discusses the theoretical implications of the frequency data of the *bubble* compounds. It further demonstrates that the two semantic properties covered by *bubble* in English may be reified in different but still conceptually motivated ways in other languages, specifically Korean, Japanese, and Thai. Section 6 concludes the overall discussion.

2. Background

2.1 Previous cognitive semantic research on semantic changes during the pandemic era

Since Lakoff and Johnson's (1980) pioneering research unveiling how conceptual metaphors underlie human conceptualizations and language use, conceptual metaphor research has been conducted across several languages (for overviews, see Sullivan 2017 and Tay 2014, *inter alia*). This section does not attempt to enumerate all the outstanding previous works on the topic in general or even on topics related to COVID-19's effects on language and discourse (e.g., Asif et al. 2021; Lei et al. 2021; Páez and Pérez 2020,

inter alia). Rather, it takes a narrow scope to briefly review cognitive semantic approaches to recent semantic extensions due to the significant changes in our everyday lives caused by COVID-19.

Regarding the changing meanings of COVID-19-related linguistic expressions, Charteris-Black (2021) pioneered research in this area with his study of figurative language based on metaphorical uses of terms including *bubble*, but also *cocoons*, *protective ring*, and *Petri dish*. Nevertheless, the current study rests on a basic assumption that differs from what Charteris-Black's seems to be. While he criticizes some uses for "inadequacies" due to a "loosely defined rhetorical objective" (Charteris-Black 2021: 183-184), this study observes that the changed uses of *bubble* were not intentionally planned, and thus cannot be subject to such criticism. Rather, this paper takes the position that semantic shifts reflect language users' conceptualizations as they naturally arise to fulfill their local communicative purposes in the given circumstances. For this reason, conceptualization patterns can be explained in terms of cognitive mechanisms such as conceptual metaphor and metonymy (Lakoff and Johnson 1999, *inter alia*).

In another previous study on the novel usage of linguistic expressions pertaining to COVID-19, Pannain and di Pace (2022) focused on the polysemy of the Italian lexeme *Covid(-19)*, using newspaper data. Given that the impact of the COVID-19 pandemic on our everyday lives has been so significant, and that the pandemic has accordingly influenced how we perceive reality, they proposed the "COVID frame," a package of concepts that are related to our shared knowledge about the pandemic. Pannain and di Pace argued that *Covid(-19)* in Italian has been construed as an animate entity or as a volitional agent (e.g., *Il Covid-19 è un nemico più che preparato alle tecniche di guerra* 'Covid-19 is an enemy that is overly skilled in warfare techniques') via the ENEMY metaphor. Their work demonstrates the role of metaphor and metonymy in the semantic shift they describe, and they present a simple ontological mapping between the domain of ANIMATE ENTITY and that of COVID-19. The study shows that *Covid(-19)* conveys a broad range of senses based on different conceptual elements within the covid frame, although it does not offer a detailed account of inference patterns between the source and target domains, nor does it consider the conceptual mechanism that motivates the metonymic shift of *Covid(-19)*. The current study aims not only to explore the semantic distribution of the lexeme *bubble* as used after the outbreak of COVID-19, but also to clarify how cognitive mechanisms help conceptualize the multiple senses of *bubble* by analyzing metaphoric systems and metonymic relations between the senses.

2.2 *Bubble* as a polysemous semantic category

This section discusses the meaning distributions of the lexical item *bubble* in English as a stepping stone to the main focus of the paper, which is the analysis of the recent semantic extensions of *bubble*. According to the *Oxford English Dictionary*, the original sense of *bubble* is a “thin membrane of liquid enclosing a volume of air or another gas” as in *John likes to watch bubbles rising in champagne*. Everyday experience with such bubbles indicates that they have the two following major properties: first, a boundary that demarcates the inside from the outside; second, an ephemeral nature, as they are very vulnerable to external impact—much more so than other containers that have solid boundaries. Therefore, image schematic knowledge of *bubble* consists of the following semantic properties: ENCLOSURE and EPHEMERALITY. This study argues that these semantic properties are the key to understanding the semantic extensions of the lexical item *bubble*, which are illustrated in the examples in (2), both from *Merriam-Webster* :

- (2) a. She'd added a little cartoon bubble that said, “Beep-Beepy-Beep-Beep!”
 b. Countless people complain that Facebook employees are increasingly living in a bubble.

The meanings of *bubble* in (2) are different from the original sense. In (2a), the word indicates a graphic convention of using an enclosed, two-dimensional shape (e.g., a circle) in which cartoon characters' thoughts or speech are written; this usage occurs in a spatial domain, specifically a textual domain. The meaning of *bubble* in (2b) is also concerned with the spatial domain, suggesting a bounded region where a certain group of people interact with each other; the space evoked, however, is more conceptual than physical, as it refers to the exclusive nature of the group and their interaction, but not necessarily of a physical space where the interaction takes place. (One of the recent uses, as in *quarantine bubble*, is semantically adjacent to this use, which will be elaborated in Section 4.) Despite all these semantic differences, the two uses are conceptually related. Both in (2a) and (2b), for example, the boundary of the bubble differentiates in-group entities from out-group ones in terms of some quality. In (2a), the location of the symbols (i.e., writing) inside the bubble signifies that they indicate the internal state of the protagonist; symbols outside the bubble do not. In (2b), the statement intends to indicate that those who belong to the Facebook employee bubble share something—e.g., lifestyles,

values, purposes—that other people who do not belong to the bubble do not share.

The generalization is as follows: Cognizers understand the states of the given entities in terms of their location. For example, in the cartoon narrative, the writing is understood to be in the state of being the protagonist's thoughts (i.e., the target domain) due to its location in the bounded area in the textual space (i.e., source domain). The semantic property ENCLOSURE evokes the domain of space, which provides a source domain for the metaphorical construal STATES ARE LOCATIONS, or, more specifically, STATES ARE BOUNDED REGIONS (Lakoff 2006[1993]: 204; e.g., *I'm in trouble, We're in a close relationship*, etc.). Considering that ENCLOSURE is one of the salient semantic properties required to understand the concept of BUBBLE, the grouping of the meanings of *bubble* centered around ENCLOSURE in (2) is not surprising.

The meanings of *bubble* in (3) are construed based on the other main semantic property of bubbles, EPHEMERALITY, of which primary knowledge is obtained from our everyday experiences.

- (3) a. I hate to burst your bubble high school seniors, but, for most of you, the dreaded cafeteria food isn't going to get any better.
- b. With Wall Street otherwise limping along, the health-care industry is making investment bankers feel better than they have since the tech bubble burst.
- c. The two teams are still on the bubble for the playoffs.

A *bubble* such as a soap bubble bursts easily as it is vulnerable to external force; once it bursts, the shape that it formed does not exist anymore. *Bubble* in (3a) indicates the high school seniors' wish. A wish usually entails that a certain state of affairs does not yet exist or has not yet occurred; if the wish comes true, then that state of affairs holds in the real world, but if the wish does not come true, the state does not hold. *Bubble* in (3b) indicates the state of the overestimated value of the technological industry (i.e., an abstract entity; target domain) via ABSTRACT ENTITIES ARE PHYSICAL ENTITIES (specifically, a BUBBLE). In this metaphorical mapping, the following epistemic correspondence can be construed: The more overestimated it is, the bigger the bubble becomes. Meanwhile, (3c) depicts a situation where no one is sure which of the two teams will advance to the playoffs; in other words, the status of the teams regarding their advancement is not final, and hence, either of them might be at risk of falling out

of the competition. This study argues that the undesirability of being *on the bubble* comes from the metaphor ORGANIZATION IS A PHYSICAL STRUCTURE, where a firm foundation is desirable for any physical structure. If an organization such as a team is *on firm ground*, the team is *stable* and has a *strong foothold*; but if a team is *on a not-so-firm foundation* such as a *bubble*, the team is not *stable* and is in an undesirable condition.

The generalization that can be drawn from the examples in (3) is centered around the semantic property EPHEMERALITY: Cognizers understand abstract ideas such as wishing and overestimation, and organizations such as sports teams, in terms of physical entities. In these cases, the abstract entities are construed in terms of a bubble, which is a particularly fragile kind of physical entity. This fragility and non-durativity is the key to understanding the metaphorical extensions mentioned above: In (3a), the students' wished-for state of affairs is not going to come into existence; and in (3b), the overestimation of value is not going to last. In (3c), even though a different metaphorical system is involved, it is again the non-durativity that evokes the undesirability, which is construed based on the ephemeral property of the bubble.

Now, with the background knowledge of *bubble*'s semantic network as discussed so far, let us investigate some of its further extended meanings.

3. Data collection

To investigate attested uses of the lexeme *bubble* produced after the outbreak of COVID-19, this study obtained collocation patterns of *bubble* from the Coronavirus Corpus³ (accessed on Oct. 2, 2022). It employs collocation patterns because collocates reveal contexts, which enable the meanings of *bubble* to be categorized. The search results were limited to U.S. data containing collocations with two distinct content words including *bubble*. The two collocation patterns are one in which *bubble* is preceded by another word (*X + bubble*) and another where the word *bubble* comes first (*bubble + X*). Because the focus of this study is to see the semantic distribution of *bubble*, the following patterns with function words were excluded from the search results:

3 The Coronavirus Corpus contains approximately 1.5 billion words from 20 English-speaking nations, spanning from January 2020 to December 2022, which encompasses the timeframe of the COVID-19 pandemic. The source materials for the Coronavirus Corpus consist primarily of online newspaper content, including reader comments on articles.

- Sequences of *bubble* and a punctuation mark (e.g., *bubble ?*)
- Collocations that include determiners (e.g., *the bubble, a bubble*), conjunctions (e.g., *bubble and*), prepositions (e.g., *of bubble, with bubble*), or auxiliary verbs (e.g., *bubble would*)

Excluding the above data, this study examines the top 10 types of collocation patterns based on their frequencies in 3,013 tokens of X + *bubble* and 1,106 tokens of *bubble* + X patterns. Table 1 summarizes the types of collocation patterns and their frequencies, sorted into semantic categories.

Table 1. Overall dataset of collocation patterns

		<i>X + bubble</i>		<i>bubble + X</i>	
original sense of <i>bubble</i>				bubble tea	159
				bubble wrap	129
				bubble bath	67
pandemic bubble	travel bubble	711		bubble environment	222
	NBA bubble	638		bubble format	84
	Orlando bubble	369		bubble concept	75
	social bubble	232		bubble plan	65
	support bubble	213		bubble life	52
	quarantine bubble	151			
	playoff bubble	116			
economic bubble	housing bubble	254			
	dot-com bubble	218			
others	little bubble	111		bubble burst	194
				bubble teams	59
subtotal		3,013		1,106	
total				4,119	

As shown in Table 1, a total of 4,119 tokens of *bubble*-compounds were collected. The numbers next to each type represent their frequencies in the corpus results. The leftmost column indicates the type of meaning that each compound conveys. In the X + *bubble* group, the majority of collocation patterns were compounds that refer to a safe space and/or community where individuals agree to limit their social interactions to in-group members during the pandemic (pandemic bubble), as in (4), which shows examples of the two most frequent X + *bubble* patterns.

- (4) a. South Korea is talking with Singapore about opening its first “travel

bubble” in July, which would allow vaccinated travelers on direct flights to bypass quarantine.

- b. Kyle has been a Lakers beat reporter since 2018, and was one of a few reporters inside the NBA bubble in 2020.

The term travel *bubble* in (4a) refers to an extended concept of a safe space being coordinated by the two partner countries with similar situations of COVID-19 infection rates. They were arranging a system to allow people to travel for leisure without an obligatory quarantine in the expanded safe community. The *NBA bubble* in (4b) refers to a COVID-safe place where players, coaches, and team/league personnel of the National Basketball Association (NBA) stayed together to continue to practice and play while undergoing frequent COVID-19 testing and avoiding contact with other people. In both cases, only individuals who were considered to be free of COVID-19 infection were supposed to be in the designated restricted area, within which they could be in physical contact or proximity with one another, with no COVID-related safety restrictions. The restricted space is called a bubble, and the people inside are distinguished from those outside. Note the lack of tokens of the X + *bubble* pattern that convey the original sense of bubble (as in *air bubble*) in the dataset, although a few tokens of the *little bubble* compound, classified as “others,” were used this way (e.g., a bubble bath). However, other *little bubble* compounds had various other referents (e.g., an illusion), and most described a pandemic bubble, as in (4a) and (4b) (for details, see Table 3 in Section 5).

The *bubble* + X pattern appeared with less than half of the frequency of the X + *bubble* pattern. Nevertheless, the most common situation described by the *bubble* + X pattern was again a pandemic bubble (498 tokens). Unlike the X + *bubble* pattern, there is no unique *bubble* + X pattern that expresses an unstable and undesirable economic state (as in *economic bubble*). However, the *bubble burst* compound, also classified as “others,” expresses multiple meanings depending on the context, and *bubble burst* as an economic term accounts for the majority of the meanings conveyed by *bubble burst* (168 out of 194 tokens). (5) and (6) are examples of *bubble environment* and *bubble burst*, which are the two most common types of the *bubble* + X pattern.

- (5) After the win, George said he had been struggling with his mental health while in the coronavirus-induced *bubble environment* created by the NBA.
- (6) a. Ever since the famous tech *bubble burst* in 2000, investors have been

cautious around tech stocks, fearing excessive valuations and high betas that inevitably resulted.

- b. The *bubbles* being created are hoping to keep everyone healthy but if one infected person gets into the *bubble* you will likely see some spread and therefore the *bubble burst*.

Bubble environment in example (5) indicates the same pandemic bubble that the NBA bubble in (4b) depicts (i.e., a COVID-safe space set up for players to practice and proceed with the scheduled games). Indeed, the other types of the *bubble + X* pattern that describe the pandemic bubble (*bubble format*, *bubble concept*, and *bubble plan*) all refer to the identical situation: the NBA bubble.

Meanwhile, examples (6a) and (6b) include *bubble burst*, which requires a specific context to clarify its exact meaning. In (6a), on the one hand, the *bubble* refers to an unstable economic state in the domain of stock markets. The burst of the economic bubble portrays a situation where significantly high market prices (in this example, the value of tech stocks) abruptly drop in value. On the other hand, *bubble burst* in (6b) describes a different situation, where the same meaning of a pandemic bubble as in (4) and (5) is construed; its burst indicates a situation in which the established COVID-safe space has been compromised as the in-group members have (uncontrolled) contact with those outside (for details, see Section 4.2).

4. Data analysis

This section provides qualitative analyses of focal examples selected from the Coronavirus Corpus in terms of conceptual metaphor and metonymy. It aims to explain how the concept BUBBLE is conceptualized based on the two semantic properties of EPHEMERALITY and ENCLOSURE. The first sub-section accounts for the metaphorical system that motivates the EPHEMERALITY construal of *bubble*; the second sub-section deals with *bubble* when the major semantic property is ENCLOSURE. It analyzes cross-domain mappings that underlie the construal of tokens of the ENCLOSURE category and compares different metaphorical systems between the two semantic properties.

4.1 EPHEMERALITY category

As mentioned in Section 2.2, one of the primary pieces of knowledge about the concept BUBBLE that can be acquired from our everyday experiences is ephemerality. Given that the prototypical sense of *bubble* is a thin layer of liquid surrounding some gas, the vulnerability of the membrane to external force serves as a salient property of a bubble. Among the multiple senses of *bubble* introduced in Section 2.2, “unattainable ideas or hopes” (as in *burst your bubble*) and “an unstable and unrealistic state of market value” (e.g., *tech bubble*) are centered around the ephemeral property via ABSTRACT ENTITIES ARE PHYSICAL ENTITIES metaphor. In the data collected from the Coronavirus Corpus, the types of *bubble*-compounds classified in the EPHEMERALITY category include *housing bubble*, *dot-com bubble*, and *bubble teams*, of which the first two types constitute the majority of tokens in the category. Example (7a) involves a case of *housing bubble*.

- (7) a. Banks and other financial institutions were the villains of the last crisis, accused of inflating the housing bubble. This time around, they were eager to look like the good guys.
- b. That’s pretty remarkable because the market for new homes could very well have tanked during the coronavirus recession the way it did when demand collapsed as the first U.S. housing bubble began deflating in 2005-2006.

(7a) was excerpted from an online article reporting on the impact of the COVID-19 pandemic on the U.S. economy, which compared the government’s response to the socio-economic crises caused by the pandemic and by the 2008 global recession. Though there is no single entity that is cited as the main cause of the previous global financial crisis, the journalist describes how banks and other institutions worsened the 2008 recession through the predatory selling of mortgage loans, which is expressed as “inflating the housing bubble.” As mentioned, a housing bubble indicates a state of overestimated real estate market values. Considering that economic value is not a tangible entity with a visible external shape, the ABSTRACT ENTITIES ARE PHYSICAL ENTITIES metaphor is involved in its conceptualization. Furthermore, the situation in which the price of real estate rises to the extent that it deviates from current economic

indicators is depicted as *inflating*. This is a case of the SIGNIFICANCE IS SIZE metaphor, in that the significance of the price is understood as the size of a *bubble*. Table 2 shows the mappings of metaphors involved in this example.

Table 2. Mappings of ABSTRACT ENTITIES ARE PHYSICAL ENTITIES

<u>Source: PHYSICAL ENTITY (bubble)</u>	<u>Target: ABSTRACT ENTITY (price)</u>
bubble	market value
size of bubble	price
- deflated bubble	- decreased price
- inflated bubble	- increased price

Considering the mappings shown in Table 2, the following epistemic correspondence can be inferred: The more over-assessed the real estate price is, the bigger the size of the bubble becomes; this correspondence is confirmed in (7a), where the continuous increase in house prices is construed as a bubble becoming inflated. The opposite scenario, in which a decrease in prices is understood as a smaller size of bubble, is shown in (7b), which was obtained from another online newspaper reporting on U.S. housing market trends. The writer of (7b) says that U.S. house prices, at the time of writing, had not plunged as much as had been expected, considering the massive economic restrictions during the pandemic. Then he compares the housing market trend during the pandemic with that of 2005-2006, when the price of real estate started to plummet after reaching a peak in early 2005.⁴ In (7b), the decline of house prices is understood as *deflating*, suggesting the inference pattern that the more reduced the price is, the smaller the size of the bubble. A further elaboration of this conceptualization is illustrated in (8).

(8) Hurricane Katrina hit New Orleans in the summer of 2005, killing over 1,800 Americans and displacing hundreds of thousands more. And then, in 2008, the housing bubble burst.

(8) was extracted from a news transcript where a broadcast journalist talks about

⁴ According to a house market price graph provided by the writer of (7b), U.S. house prices reached their peak in 2005 and then started to fall. The decline continued, hitting a low point in 2008 before rebounding in 2009. (<https://seekingalpha.com/article/4355560-u-s-new-home-market-showing-surprising-resiliency>, accessed on Nov. 11, 2022)

major crises that former U.S. presidents faced. She is talking here about George Bush, whose administration saw the 9/11 attacks, Hurricane Katrina, and the housing crash of 2008. The speaker describes the situation in which housing prices fell below the economic indicators as a bubble bursting. According to the aforementioned inference pattern regarding size, a decline in price can be expressed as a bubble getting smaller—deflating—but (8) involves the verb *burst*, which seems unrelated to the concept of SIZE. However, this is still an expression that reflects the conceptual scale for the size of a bubble for the following reason: The minimum value of the size scale is null, i.e., the bubble's coming into null existence by being popped. In the source domain of BUBBLE (an instance of PHYSICAL ENTITY), when a bubble bursts, the membrane surrounding the gas disappears. In terms of the target domain PRICE (an instance of ABSTRACT ENTITY), the percentage by which prices decrease varies depending on time, and a greater decline in price corresponds to the extreme of being small on a scale of size in the PHYSICAL ENTITY domain. Comparing (7b) and (8), in 2005–2006, when the real estate price was just beginning to fall, its decline was expressed as deflating. On the other hand, the crash of housing prices in 2008, when real estate prices hit the lowest point, was construed as *bursting*. The different verbs reflect how the scale of bubble size is involved in conceptualizing market prices as a bubble.

4.2 ENCLOSURE category

Another conceptual property that motivates the polysemous semantic network of *bubble* is ENCLOSURE. While the instances of *bubble*-compounds in the EPHEMERALITY category are not limited to a single type of meaning, those in the ENCLOSURE category all refer to the pandemic bubble. That is, a majority of *bubble*-compounds from the Coronavirus Corpus are based on the semantic property of ENCLOSURE, all of which are new expressions that emerged after the outbreak of the COVID-19 pandemic. As mentioned in Section 2.2, the semantic property of ENCLOSURE is construed as being in the domain of SPACE because to enclose something is to surround something by means of physical barriers in a physical space.

The concept of SPACE evoked by ENCLOSURE makes a good source domain for the conceptual metaphor STATES ARE BOUNDED REGIONS. Instances classified into the ENCLOSURE category are thus cases whose meanings have been extended from a

prototypical sense of *bubble* via the STATES ARE BOUNDED REGIONS metaphor. Take a look at the examples in (9) that contain *bubble*-compounds with semantic properties based on ENCLOSURE:

- (9) a. Testing is a good idea if it is available, and Newman suggests the ideal time for it is five to seven days after your last exposure to someone outside of your quarantine bubble.
- b. All those in a support bubble will be able to act as if they live in the same household, meaning they can spend time together inside each others' homes and do not need to stay two meters apart.

In (9a), a writer gives directions on how to minimize infection risk to enjoy the holiday season in the middle of the COVID-19 pandemic. The writer delivers a medical expert's message that if one has been exposed to another person who has not been cleared of COVID-19, then one should be tested within a week. *Quarantine bubble* in general refers to a group of individuals who agree to interact with one another without having to practice preventive measures such as wearing a mask or social distancing. The person who is not a group member is described as "outside of your quarantine bubble" in (9a). (9b) is from an article reporting statements by former British Prime Minister Boris Johnson during a daily briefing on adjustments to the lockdown measures to stop the spread of COVID-19. *Support bubble* here is an extended version of a quarantine bubble that consists of at least two households so that those living alone are given a chance to have close physical contact with others. While (9a) focuses on those "outside" the bubble, (9b) focuses on those "inside" the bubble.

In examples (9a) and (9b), *bubble* instantiates the source domain BOUNDED REGIONS of the STATES ARE BOUNDED REGIONS metaphor, where states of individuals ontologically correspond to locations, either inside or outside a bounded region: If a person is inside the bounded region, it means that he or she is *in* the state of being cleared of COVID-19; if a person is outside, it means that he or she is not in a state of being cleared of the disease. These cross-domain mappings yield the following inferential patterns regarding the source domain BUBBLE as an instance of a bounded region: If one is inside a bounded region of a bubble, then s/he is a member of the group; if one is outside a bubble, s/he is not a member of the group; since those outside the bounded region of a bubble cannot cross the boundary, the outsiders cannot have any

physical contact with the insiders; if the boundary of a bubble collapses, outsiders can contact the insiders. Note that the support bubble comprised of multiple households in (9b), which makes it possible for in-group members to spend time in each other's houses, does not consist of multiple bubbles. Different households constitute a single support bubble, which suggests that it is not a physical area where people interact with one another, but a collectively created conceptual space whose area may grow or shrink depending on how big the occupant group is.

It is also noteworthy that the metaphor system of the pandemic bubble is different from that of the economic bubble. The pandemic bubble is construed as a container that encloses individuals or larger units to prevent the members of the bubble from becoming infected with the virus by blocking physical contact with nonmembers; in contrast, the economic bubble is itself conceptualized as a distinct visible object that can be inflated or deflated. Due to the different conceptual structures of BUBBLE, the change in the size of the bubble in the pandemic context corresponds to different situations compared to that of the economic bubble (e.g., as in (7a) and (7b)). Take a look at example (10) that deals with the size of a social bubble:

- (10) As more adults get vaccinated, case counts, test positivity rates and hospitalizations should continue to fall. As they do, you may feel more confident about expanding your *social bubble*, since it will be increasingly unlikely that anyone in your circle was exposed to the virus.

The writer of (10) introduces guidelines for parents to arrange playdates for their children while minimizing the risk of infection. At the time of writing (March 18, 2021), kids younger than sixteen were not authorized to get a vaccine in the U.S., which is the reason the writer encourages parents to get fully vaccinated and thereby immunized against COVID-19 to protect their children. Parents who have been vaccinated may come into contact with more people from other households, which is described as *expanding your social bubble*. Here, the expansion of a social bubble portrays the situation in which the number of fully vaccinated people permitted to enter a bubble to socialize with one another increases. Considering that the conceptual entity BUBBLE is an instance of the source domain BOUNDED REGIONS, to expand a bubble indicates an enlarged area demarcated by an extended boundary. The situation that is described by the expression *expanding your social bubble* in (10), however, does not correspond to an expanded area

in the source domain; rather, it is connected to the individuals inside the bounded region. This gap between the source and the target domains can be resolved by the conceptual metonymy PLACE FOR PEOPLE in which a bounded region stands for people accommodated by the region in the source domain. Once one understands that the size of a bounded region metonymically refers to the number of individuals in the region, it logically follows that the larger area of the bounded region of the source domain corresponds to the increased number of group members of the target domain. Naturally, the reversed inferential pattern also holds: A decreased or minimal number of in-group members is conceptualized as a smaller bubble as in *Please, wear a mask, socially distance and keep your social bubble small*.⁵

Meanwhile, one of the miscellaneous types of *bubble*-compounds is *bubble burst*, which cannot be generalized as having only one semantic property due to its versatile senses. On the one hand, example (8) in Section 4.1 illustrates the use of *bubble burst* in the economic context, which was analyzed by means of the metaphor SIGNIFICANCE IS SIZE, where *bubble burst* is construed as an extreme of being small on a scale of size in its source domain of PHYSICAL ENTITY. On the other, the construal of the pandemic bubble relies on the STATES ARE BOUNDED REGIONS metaphor, and accordingly, *bubble burst* in the pandemic context is conceptualized differently from an economic bubble's burst, as shown in the examples in (11).

- (11) a. The bubbles being created are hoping to keep everyone healthy but if one infected person gets into the bubble you will likely see some spread and therefore the bubble burst.
- b. In the clubhouse after the Cardinals' season came to a quiet end in San Diego, their bubble burst and players about to scatter for the winter, manager Mike Shildt spoke to the group about what they overcame, what they achieved in a season potholed with challenges...

(11a) was excerpted from an article in which medical experts talk about the bio-secure areas that the NBA and National Hockey League (NHL) created to protect their players from COVID-19 infection during the playing season. The speaker expresses his concern that if an infected person comes into the bio-secure area, those inside the area might have

5 <https://www.chicagotribune.com/opinion/letters/ct-letters-vp-111920-20201118-n2i7g7uore43ncsxyjtvvwacy-story.html>

physical contact with the infector, and the virus could start spreading within it. The speaker describes the situation of the breach and of the virus spreading inside the isolated area as *bubble burst*.

In the source domain of STATES ARE BOUNDED REGIONS metaphor, a boundary segregates people within a bounded region from those outside. When the outsiders trespass across the boundary, the insiders come to belong to the same location as the outsiders. In the corresponding target domain of STATES, people are separated from those who are not cleared of COVID-19 by only interacting with members of a bubble and prohibiting physical contact with others. When a person who might have been infected by the virus interacts with anyone in the bubble, the members of the bubble could be in the same state as those infected. Then, the bubble, which is supposed to separate people from those potentially infected, becomes worthless, and this situation corresponds to the collapse of the boundary of the region in the source domain, which is described as *bubble burst*. Focusing on BUBBLE as an instance of the source domain, when a bubble pops due to an external force, its boundary (i.e., a thin membrane of liquid) disappears. The external force that nullifies the boundary in the source domain is mapped onto an outsider's trespassing into the bio-secure area. Logically, the resulting state of insiders and outsiders being in the same location in the source domain corresponds to the situation in the target domain that the states of the members and of the nonmembers of the group are not differentiated, thereby allowing the virus to rampage through the in-group members.

The example of (11b) is about the St. Louis Cardinals baseball team after their 2020 season came to a close. Just like the NBA and the NHL, Major League Baseball (MLB) teams employed COVID-safe spaces in 2020.⁶ The writer of (11b) says that after the Cardinals' season ended, their bubble burst. Different properties of a bubble as an instance of the source domain BOUNDED REGIONS are profiled in examples (11a) and (11b). *Bubble burst* in (11a) implies that an infected person could breach a given social bubble and spread the virus among the in-group members. In contrast, *bubble burst* in (11b) does not allude to potential infections among the players. Instead, it refers to a situation in which the rules establishing the safe space are lifted; thus, the players are freed from their imposed bubble. In this case, the disappearance of the boundary (i.e., the burst of a bubble) corresponds to the removal of the protection that has barred the

⁶ <https://www.sportingnews.com/us/mlb/news/mlb-playoff-bubble-rules-locations-schedule/ekz3xsh112t6143xmuq2bd92v>

in-group members from exposing themselves to nonmembers. In (11a), the focus is on the fragility of the bubble, whereas (11b) mainly evokes the non-durative nature of the bubble.

5. Discussion

This section reviews the frequency data of the *bubble* compounds and discusses the theoretical implications of the findings. It further demonstrates the plausibility of the two semantic properties EPHEMERALITY and ENCLOSURE, by illustrating that what is covered by *bubble* in English may be reified in a different, but still conceptually motivated, way in other languages, such as Korean.

5.1 Semantic distribution of *bubble* in the COVID-19 era

The *bubble*-compounds, including all 20 types of both X + *bubble* and *bubble* + X compounds, could be sorted into three categories depending on which semantic property is most salient in the construal (as discussed in Section 2.2): the prototypical sense of bubble as a thin membrane of liquid enclosing a volume of air or another gas (Prototypical), the ephemeral nature of bubbles (EPHEMERALITY), and the image of an enclosed container with boundaries (ENCLOSURE). Table 3 shows the distribution of compounds among the three categories.

Table 3. Semantic categories of *bubble*-compounds

prototypical	EPHEMERALITY	ENCLOSURE
bubble tea (159)	housing bubble (254)	travel bubble (711)
bubble wrap (129)	dot-com bubble (218)	NBA bubble (638)
bubble bath (67)	bubble burst (168)	Orlando bubble (369)
little bubble (1)	bubble teams (59)	social bubble (232)
	little bubble (1)	bubble environment (222)
		support bubble (213)
		quarantine bubble (151)
		playoff bubble (116)
		little bubble (109)
		bubble format (84)
		bubble concept (75)

		bubble plan (65)
		bubble life (52)
		bubble burst (26)
total: 356 (8.64%)	total: 700 (16.99%)	total: 3,063 (74.36%)
TOTAL		4,119

Each of the types has multiple instances with different meanings due to the polysemous nature of *bubble*, although in almost every case, the tokens' meanings fall clearly into one of the semantic categories: Prototypical, EPHEMERALITY, or ENCLOSURE. It is noteworthy that the tokens classified into the ENCLOSURE category constitute more than two-thirds of the total dataset (74.36%). The types of collocation patterns of *bubble* in the ENCLOSURE category all refer to the pandemic bubble. Considering that the Coronavirus Corpus mostly contains texts from newspapers reporting on coronavirus-related situations, the high proportion of the sense of ENCLOSURE seems natural, as it is vital in understanding the concept of a coronavirus-safe space. Overall, the distribution shown in the table suggests that EPHEMERALITY and ENCLOSURE, which this study considers the major semantic properties of *bubble*, are at the center of the semantic expansion of *bubble*.

5.2 Different reifications of EPHEMERALITY and ENCLOSURE in other languages

For cognitive linguists, a “language imposes its own conceptual grid upon our world of experience” (Radden and Dirven 2007: 6). In this view, it is unsurprising if the world experience of what the construal of *bubble* conjures up is differently reified across languages. In fact, an investigation of the corresponding expression(s) and concept(s) in another language would help confirm that the semantic properties are conceptually plausible, if its reification pattern is conceptually motivated as well. This sub-section briefly considers relevant expressions in Korean, Japanese, and Thai, which belong to genealogically different language families from English.

The Korean lexical items *kephwum* and *pepul* are both conceptually adjacent to what the lexical item *bubble* would cover in English. *pepul* is an English loanword derived from *bubble*. Its use is illustrated in (12).⁷

⁷ In Korean, there is another lexical item, *pangwul*, that has the prototypical sense, as in *pinwu pangwul* ‘soap bubble’ or *han pangwul-uy ttam* ‘drop of sweat’ (lit. one BUBBLE-Gen sweat).

- (12) *keki-n* *yeycen-ey* *pwutongsan* *pepul* *theci-ko*
 there-Top before-Loc real.estate BUBBLE be.burst-Conn
na-se *cipkaps* *an* *olu-canha*
 happen-Caus house.price Neg rise-UFP

Lit. “After the real estate bubble burst, house prices didn’t go up there.”⁸

In (12), *pepul* is collocated with *pwutongsan* ‘real.estate’ to refer to the state of the overestimated value of real estate in a certain area. In this metaphorically extended use, *pepul* is employed to indicate exactly what *bubble* means in the tech *bubble* in (3b): The greater the overestimation, the bigger the bubble. On the other hand, *kephwum* is the default corresponding lexical item in Korean, as in *pinwu kephwum* ‘soap bubble’ and *maykcwu kephwum* ‘beer bubble’ (meaning the head of foam on a beer), although it frequently carries the meaning of undesirability associated with EPHEMERALITY. In fact, *kephwum* could be interchangeably used with *pepul* in (12) without any significant change in the construal.

Although the two lexical items are interchangeable in some contexts, the example in (13) nevertheless indicates clearly that the use of *kephwum* can contrast with that of *pepul*:

- (13) *wanpyekha-n* *pepul* *pangyek?* *onthong* *kephwum*
 perfect-Rltvzr BUBBLE quarantine entirely BUBBLE
maynyuel!
 manual

Lit. “(Is this) a perfect quarantine bubble? (It’s) entirely a bubble manual!”
 “Do you call this an impeccable example of quarantine bubble? All I can see is people who are violating the COVID-19 protocols in the manual!”⁹

In (13), *pepul* is equivalent to *bubble* in the compound *pepul pangyek* ‘bubble quarantine’, that is, an enclosure that must be maintained to be functional and that, in this context, is to be desired. In contrast, *kephwum* in *kephwum maynyuel* ‘bubble manual’ refers metonymically to the undesirable state—fragile, ineffective, or

8 <https://n.news.naver.com/article/020/0003457151?sid=104>, accessed on Oct. 26, 2022

9 <https://www.seoul.co.kr/news/newsView.php?id=20210723025030>, accessed on Oct. 18, 2022

non-functioning—of the policy outlined in a pandemic protocol manual, according to the writer. The construal of the utterance in (13) thus indicates that *pepul* is conceptually related to ENCLOSURE, and *kephwum* to EPHEMERALITY (for more details on the distributions of the Korean lexical items *kephwum* and *pepul*, see Kang et al. To appear).

Japanese has a corresponding English loanword, *baburu* (バブル; Dr. Chang hak Moon, p.c., Feb. 2023). *Baburu*, however, tends to be concerned with the conceptual territories of both ENCLOSURE and EPHEMERALITY. For example, as shown in (12') and (13'), the Japanese translations of (12) and (13), it is used in *baburu kakuri* ‘quarantine bubble’ (lit. bubble-quarantine; バブル隔離), and also in *hudousan baburu* ‘real-estate bubble’ (lit. real.estate-bubble; 不動産バブル). The Japanese lexical item *awa* (泡 ‘bubble’, as in water *bubble*) would not appear in either of these contexts (i.e., ??*awa kakuri*, ??*hudousan awa*).

- | | | | | | |
|-------|----------------------|----------------------|-----------------|------------------------|---|
| (12') | <i>koko-wa</i> | <i>icen-no</i> | <i>hudousan</i> | <i>baburu</i> | |
| | there-Top | before-Loc | real.estate | BUBBLE | |
| | <i>hazike-tekara</i> | <i>zyutaku</i> | <i>kakaku</i> | <i>agar-anai-darou</i> | |
| | be.burst-Conn | happen-Caus | house.price | rise-Neg-UFP | |
| (13') | <i>kanpeki-na</i> | <i>baburu</i> | <i>boueki?</i> | <i>zenbu</i> | <i>huzyubunna</i> <i>manyuaru!</i> |
| | perfect-Rltvzr | BUBBLE | quarantine | entirely | BUBBLE manual |

In (13'), *baburu* in the first clause makes sense with the meaning of ENCLOSURE. Note, however, that *huzyubunna* ‘insufficient’ (不十分なマニユアル) is employed in the second clause, in lieu of *baburu* or *awa*. A language consultant says that neither *baburu* nor *awa* would work in the context of EPHEMERALITY, so that a periphrastic modifier would be required. In summary, the original Japanese lexeme *awa* does not seem to cover either of the conceptual territories of ENCLOSURE or EPHEMERALITY, although the loanword *baburu* seems to be concerned with both to some extent.

Another pattern of form-meaning pairing occurs in Thai. While Thai also has a corresponding English loanword, *bapbeon* (บับเบอญ), it is rarely used except to refer to bubble wrap. Rather, the Thai lexeme *fong* (ฟอง) is used for the prototypical sense, as in *fong-nam* ‘water bubble’ (lit. bubble-water; ฟองน้ำ), as well as to refer to sponges (Dr. Kyungeun Park, p.c., Feb. 2023), and it is also found in the context of ephemerality. For example, when the compound *fong-sabu* ‘soap bubble’ (lit. bubble-soap) is collocated with *setakit* ‘economy’ (เศรษฐกิจ), it means ‘bubble economy’. Regarding the context of

ENCLOSURE, *fong* is not found; and for concepts related to quarantine, alternative words such as *klum* ‘group’ (กลุ่ม) are used. (12") and (13") are Thai translations of (12) and (13).

- (12") *thi-nan lang fong-sabu asangha taek*
 there-Top after BUBBLE-soap real.estate burst
khraokon laeo rakha-ban mai khuen ngai
 before then price.house Neg rise UFP
- (13") *matrakan bapbeon?? thi sombunbaep ching rue?*
 action BUBBLE RP perfect real INT
Khu-mue fong-akat luan luan!
 manual BUBBLE-air entirely

As pointed out, the use of *fong-sabu* in the economic context is motivated by the concept of EPHEMERALITY and contributes to the construal of the overestimated state of real estate in (12"). In (13"), however, the loanword *bapbeon* in the first clause would not work, according to the language consultant, unless further stipulations were given, for example, in parentheses. In the following clause, *fong-akat* ‘air bubble’ would be construed as being unorganized, which indicates that the function of *fong* may be extended in the domain of EPHEMERALITY.

All in all, the semantic properties of EPHEMERALITY and ENCLOSURE, which are covered by a single lexical item in English, are indeed differently carved up, with different numbers of lexical items, in other languages. The different reifications in Korean, Japanese, and Thai are summarized in Table 4.

Table 4. Language-specific lexical categorization

Concept	EPHEMERALITY	ENCLOSURE
English	<i>bubble</i>	
Korean	<i>kephwum</i> (거품)	<i>pepul</i> (버블)
Japanese	<i>baburu</i> (バブル)	
Thai	<i>fong</i> (ฟอง)	<i>bapbeon</i> (บับเบิ)

In English, the lexical item *bubble* covers both of the concepts EPHEMERALITY and

ENCLOSURE as in *tech bubble* and *bubble quarantine*, respectively. In Korean, however, the original lexical item *kephwum* never covers the concept of ENCLOSURE; its meaning is specialized to encode ephemerality, as in *kephwum maynyuel* ‘nonsensical manual’ (lit. bubble manual). Meanwhile, the English loanword *pepul* is more likely to be conceptually extended to indicate EPHEMERALITYS, as in *pwutongsan pepul* ‘real-estate bubble’. Japanese demonstrates a similar pattern to English, where the English loanword *baburu* can indicate both concepts, as in *hudousan baburu* ‘real.estate-bubble’ and *baburu boueki* ‘bubble quarantine’. Lastly, in Thai, the distinction between the uses of *fong* and those of *bapbeon* seems to coincide with the conceptual boundary between EPHEMERALITY (e.g., *fong-sabu asangha*, lit. bubble real.estate) and ENCLOSURE (e.g., *bapbeon* ‘bubble wrap’).

6. Conclusion

This study has investigated how the polysemous lexical item *bubble* has been used in different ways during the COVID-19 pandemic by analyzing attested examples from the Coronavirus Corpus. The study collected over four thousand examples of compounds that include *bubble* and found that the *bubble*-compounds are used in three different ways, to describe a typical bubble (Prototypical), the ephemeral nature of a bubble (EPHEMERALITY), and an enclosed space with boundaries (ENCLOSURE). The study argues that these multiple senses are motivated by conceptual metaphors and that they are significantly correlated with the outbreak of COVID-19. The high proportion of instances of *bubble* classified in the ENCLOSURE category supports the idea that real-world experiences motivate changes in meaning. Based on the semantic distribution of the corpus data, the study demonstrated the expansion of the radial network of the polysemous lexeme *bubble* through conceptual metaphor and image-schematic construal. Additionally, the study showed how the semantic properties of EPHEMERALITY and ENCLOSURE that underlie the multiple senses of *bubble* in English are reified differently in non-Indo-European languages such as Korean, Japanese, and Thai. This highlights that the semantic properties that the lexeme *bubble* can cover vary across different languages, but they are still distributed in a conceptually motivated way by language users.

Abbreviations: Example glossing follows the Leipzig Glossing Rules with additional glosses listed as follows: Caus: Causative; Conn: Connective; INT: Interrogative; Loc: Locative; Neg: Negativizer; Top: Topic; Rltvzr: Relativizer; RP: Relative Pronoun; UFP: Utterance Final Particle

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Ji-in Kang

Ph.D. Student

Department of English Linguistics
Hankuk University of Foreign Studies
107 Imun-ro, Dongdaemun-gu,
Seoul 02450, Korea
E-mail: river82123@naver.com

Iksoo Kwon

Professor

Department of English Linguistics and Language Technology
Hankuk University of Foreign Studies
107 Imun-ro, Dongdaemun-gu,
Seoul 02450, Korea
E-mail: kwoniks@hufs.ac.kr

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