

# Generics and Conceptualizations

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## ABSTRACT

Generics have been studied vigorously over the past few decades, mostly by formal linguists and philosophers. As is well known, there are two representative formal approaches toward generics: majority-based and normalcy-based approaches. Both approaches have been met with criticism but continue to undergo revisions. In contrast, Leslie (2007a, 2007b; 2008; 2012; 2017) proposes a cognition-based approach arguing against the majority- and normalcy-based approaches. She proposes that generics express our most primitive and fundamental generalizations and are non-quantificational. Thus, the main purpose of this paper is to propose genericity as a semantic, pragmatic, and even cognitive phenomenon, arguing that generics should be accounted for through cognitive conceptualizations. It will also be proposed that the generic operator is a quasi-universal quantifier, in contrast to both the formal and cognitive approaches. This position will be supported by experimental results.

**Keywords:** generics, exceptions, majority/normalcy/cognition-based views, cognitive conceptualizations, quasi-universal quantifier

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## 1. Introduction

Generics have been studied vigorously over the past few decades, mostly by formal linguists and philosophers. On one hand, a majority-based theory argues that a generic is true if, and only if, a majority of the members of the kind satisfy the predicate with exceptions. On the other hand, a normalcy-based theory argues that it is true if, and only if, all normal members of the kind satisfy the predicate. According to the majority approach, for example in (1), non-violent tigers such as newborn cubs or sick tigers could exist, but these are minor exceptions that do not falsify the generic. A majority of ferocious tigers still exist, thus satisfying the predicate. On the other hand, the normality approach would argue that all normal tigers other than abnormal tigers, such as newborn and sick tigers, satisfy the generic.

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(1) Tigers are ferocious.

Against these two well-known theories of generics, Leslie (2007a, b; 2008; 2012; 2017) proposes a cognition-based approach arguing that generics express our most primitive and fundamental generalizations and that they are non-quantificational. According to Leslie, the following generalizations could be made with just a few members of the kind possessing the predicate property. That is, she argues that the generic operator Gen cannot be a quantifier which represents a specific consistent quantification.

- (2) a. Mosquitoes carry the West Nile Virus.  
b. Sharks attack bathers.  
c. Pitbulls maul children.  
d. Tigers eat people.

Claveau & Girard (2018) also propose that one important class of scientific generalizations, the so-called *ceteris paribus* laws, are, in fact, generics. They further propose that a recent cognitive approach like Leslie's (2007b, 2008, 2012) could well account for scientific generalizations. Focusing their discussion on economics as an example of sciences, they argue that their analysis could be exportable to a behavioral science field like sociology, but not to basic sciences like molecular biology or fundamental physics.

In this context, the main purpose of this paper is to show that genericity is a cognitive and pragmatic, as well as a semantic, phenomenon. We will argue that generics can fully be accounted for by neither a majority- nor a normalcy-based approach, and that they should instead be accounted for using cognitive conceptualizations. It will also be proposed that the generic operator is a quasi-universal quantifier, an assertion that will be supported by experimental results. This paper is organized as follows: in the next section, the majority-, normalcy-, and Leslie's cognition-based approaches regarding generics will be discussed; our analysis on generics, not only based on cognitive conceptualizations but also as quasi-universally quantified generalizations, will be presented in section 3; and section 4 will conclude our discussion.

## 2. Previous Approaches

### 2.1. Majority-based approach

Cohen's (1996, 1999, 2004) majority-based theory is known to be a quite elaborated account on generics. Concerning examples (3a, b), Cohen (2004) argues that they are truth-conditionally equivalent, but not equivalent in terms of felicity. He proposes the 'homogeneity' requirement, as defined in (4), in order to account for this difference in felicity.

- (3) a. ?Mammals are placental mammals.  
b. Mammals have a placenta.
- (4) The generic  $\mathbf{gen}(\psi, \varphi)$  presupposes that exactly one of the following holds:  
a. for every psychologically salient partition  $\Omega$  on  $\psi$ , and for every  $\psi' \in \Omega$ ,  $P(\varphi \mid \psi')$  is high.  
b. for every psychologically salient partition  $\Omega$  on  $\psi$ , and for every  $\psi' \in \Omega$ ,  $P(\varphi \mid \psi')$  is low.
- (5) Truth condition for generics:  
 $\mathbf{gen}(\psi, \varphi)$  is true iff  $P(\varphi \mid \psi) > 0.5$

That is, he argues that both (3a, b) satisfy (5), but only (3b) fulfills (4a). In other words, " $\mathbf{gen}(\psi, \varphi)$  is true iff the conditional probability of  $\varphi$  given  $\psi$  is high (specifically, greater than 0.5)." Furthermore, the "generic  $\mathbf{gen}(\psi, \varphi)$  presupposes that its domain,  $\psi$ , is homogeneous, in the following sense: for any psychologically salient criterion by which  $\psi$  may be partitioned into subsets, the conditional probability of  $\varphi$  ought to be roughly the same given every such subset of  $\psi$ " (Cohen 2004, p. 531). He further proposes two ways of partitioning the domain,  $\psi$ , of a generic into subsets,  $\psi'$ s: one is 'tree' or 'featural' representation, while the other is 'geometric' or 'multidimensional space' representation. For (3b), he argues that its domain is partitioned into subsets according to the age, size, etc., using a multidimensional representation. Consequently, the homogeneity is satisfied. For (3a), however, it is argued to be represented as a tree that is partitioned into different kinds of mammals, such as placental and marsupial mammals. The probability of the placental subset is high (i.e. 1), whereas that of the marsupial subset is low (i.e. 0), which violates

the homogeneity. This violation leads to the infelicity of (3a).

He argues that the infelicity of the following generics could be accounted for in a similar way. For example, primary school teachers are partitioned into male and female teachers in example (6a), books are divided into hardcovers and paperbacks in (6b), and Israelis are classified into residents in different inlands, such as Nazareth, Jerusalem, Beer Sheba, etc., and residents on the coastal plain in (6c), respectively, using a tree representation. All these generalizations violate the homogeneity presupposition, which causes their infelicity.

- (6) a. ?Primary school teachers are female.
- b. ?Books are paperbacks.
- c. ?Israelis live on the coastal plain.

However, the choice between the tree and the multidimensional partition is quite often unclear. Although Cohen argues that (3a) violates homogeneity because its syntactic form triggers a tree partition, making a choice between the two representations would not be easy for those who are not familiar with the dichotomy between placental and marsupial mammals. On the other hand, those who are well aware of the classification between them would accept neither (3a) nor (3b) as appropriate.

## 2.2. Normalcy-based approach

Nickel (2009; 2010a,b) argues that sentences like (7a) cannot properly be interpreted using a majority-based approach. That is, (7b), the gloss of (7a), is interpreted, as in (9), based on the schematic majority-based view (8), where  $C$  is the restriction on the domain of  $A$ .

- (7) a. Elephants live in Africa and Asia.
  - b. Elephants live in Africa and elephants live in Asia.
- (8)  $G(A;F)$  is true iff, across a sufficiently long stretch of time, most  $As$  that are also  $C$  (where  $C$  is determined as a function of  $F$  and possibly the context) are  $F$ .
- (9) Across a sufficiently long stretch of time, most elephants that are also  $C$  live in Africa *and*, across a sufficiently long stretch of time, most elephants that are also  $C'$  live in Asia.

According to Nickel, (9) entails that there are elephants that live in both Africa and Asia, which is an implausible interpretation. The basic idea of a majority view is that a characteristic property of the kind should be shared by the majority relevant members of the kind. However, Nickel argues that if there are multiple ways of being characteristic, none of these is a characteristic property shared by the majority relevant members of the kind. As a result, majority views are essentially faulty.

Nickel proposes the following truth-conditions for characterizing sentences:

- (10)  $G(A; F)$  is true iff there is a way  $w$  of being an  $F$ -normal  $A$  such that all  $A$ s that are  $w$  are  $F$ .

Among examples (11a, b, c), only (11a) is an appropriate generic sentence, although the sets of chickens laying eggs, being hens, and being females are the same. Given this problem, Nickel specifies in (10) that a way of normality  $w$  should be  $F$ -normal, which means that the way of being normal is determined by the predicate. For example, in (11a), the way of normality is determined ‘with respect to how chickens extrude offspring,’ whereas in (11b, c), it is ‘with respect to the sex of chickens.’ Hence, (11a) is appropriate, while (11b, c) are inappropriate, since roosters and male chickens are also normal with respect to their sex.

- (11) a. Chickens lay eggs.  
b. ?Chickens are hens.  
c. ?Chickens are females.

Nickel also argues that a normality view provides a successful interpretation, (12), for (7b).

- (12) There is a way ( $w_1$ ) of being a normal elephant in respect of its habitat and all elephants that are normal in  $w_1$  live in Africa. There is also a way ( $w_2$ ) of being a normal elephant in respect to its habitat, and all elephants that are normal in  $w_2$  live in Asia.

Hoeltje (2017) argues, however, that Nickel’s normality-based approach is too weak in that it licenses too many inappropriate generics, like (13a, b).

- (13) a. ?Elephants live in Gambia.  
b. ?Elephants live in Sumatra.

That is, the distribution of elephants in Africa is haphazard and not confined to Gambia or Sumatra. The generic reading of neither (13a) nor (13b) should be true. Having demonstrated this problem against Nickel's normality-based approach, Hoeltje further discusses Nickel's 'homogeneity' principle as follows:

- (14) For any way  $w$  of being  $F$ -normal, all  $As$  that are normal in that way  $w$  are *homogeneous* with respect to being  $F$  (i.e., either *all* or *none* of them are  $F$ ).

Hoeltje claims that Nickel's truth-conditions, along with homogeneity, too easily allow a generic to be true. Nickel (2018) provides a reply to Hoeltje's criticisms in a squib, although this does not constitute a full defense.

### 2.3. Cognition-based approach

Leslie (2007a,b; 2008; 2012) proposes that Gen expresses generalizations as a variable-binding operator, but it is not a quantifier. She argues that generics are the cognitive system's most primitive, default generalizations, as evidenced by the observation that children acquire and master generics much more easily and quickly than explicit quantifiers.

The four main features of Leslie's cognitive approach to generics could be summarized as follows. First of all, she proposes that for a generic to be true, the so-called 'negative counterinstance constraint' must be satisfied for its exceptions. For example, the exceptions to the generic, "birds lay eggs," are male birds, and these male birds 'do not lay eggs' rather than 'bear live young.' Male birds that don't lay eggs, distinct from those that bear live young, are not positive, but negative counterinstances, which satisfies the first feature. On the other hand, the exceptions to the generic, "books are paperbacks," are hardcover books, which are positive rather than negative counterinstances. Consequently, the generic, "books are paperbacks," is false due to the violation of the first feature, even if most of the books are paperbacks.

Using the negative counterinstance constraint as a higher-level feature, the second feature for licensing a generic is that its predicate belongs to a 'characteristic dimension' of the members of the category set. For example, 'laying eggs' belongs to a characteristic dimension of birds, whereas, say, 'having a long tail' does not. Leslie argues that no statistical assessment is required to make a generalization, but, for example, experiencing a single instance of listening to a bird's chirping suffices as a generalization of the bird kind. Her third feature for warranting a generic is

the feature of 'strikingness.' The more striking the feature is, the more likely it is to be generalized. Very dangerous and surprising properties, like 'carrying the West Nile Virus,' 'attacking bathers,' and 'mauling children' can be used to generalize categories at a very low prevalence, as the result of which we have generics like (2a, b, c, and d). The fourth feature, 'majority' or 'prevalence,' could also license generics, such as "barns are red" or "cars have radios." Leslie (2008) argues that when the negative counterinstance constraint is satisfied and the other features are not present, the fourth feature plays a determining role in licensing a generic.

However, the main feature of Leslie's mechanism of generalization, the 'negative counterinstance constraint,' also has counterexamples. The constraint does not allow exceptions to have 'equally vivid, concrete positive' properties. For example, in (15a), we have yellow and green apples in addition to red apples. Being green and being yellow are positive properties, but Leslie could argue that these are not 'equally' vivid, concrete positive properties. The examples of 'roses' and 'barns' could also be explained in a similar way. (15b) is not good, since there exists an equally vivid, concrete positive property, such as being a hardcover. (15c) is also unacceptable, since there are Israeli people who live in inland areas like Nazareth, Jerusalem, or Beer Sheba. Living in an inland area could be counted as an equally positive property.

- (15) a. Apples/Roses/Barns are red.
- b. ?Books are paperbacks.
- c. ?Israelis live on the coastal plain.

On the other hand, the following counterexamples, (16a, b), satisfy the negative constraint. That is, the exceptions for (16a) have only a negative property, 'being not-over-three-years-old'(three-years-old or younger). The exceptions for (16b) also have only a negative property, 'not-less-than-1000-feet-tall'(1000-feet-tall or taller). Furthermore, both (16a, b) satisfy the fourth feature, the majority feature. As a result, they should be acceptable according to Leslie's four-feature constraint, but they are not. Similar to examples (16a, b), the exceptions of (17) also have only a negative property, 'not-having-a-radio,' and satisfy the majority feature. Unlike (16a, b), however, (17) is regarded as a felicitous generic sentence.

- (16) a. ?People are over three years old.
- b. ?Buildings are less than 1000 feet tall.

(17) Cars have a radio.

Consequently, Leslie's four licensing features are too weak to refute inappropriate generics like (16a, b). First of all, it is necessary to reconsider the effectiveness of the negative constraint. Furthermore, what is involved here seems to be something more complex than just being in the 'majority' or being 'salient.' This 'majority' feature is also in conflict with the nonquantificational characteristic of generics proposed by Leslie. In addition, the feature of saliency or strikingness could be analyzed as forming part of the feature of characteristic dimension.

Leslie also proposes that generics are 'defeasibly' valid or constitute 'default' inferences. If more information is added, their validity could be reversed. Kahneman (2002) and others propose a 'Two Systems' view of cognition: System 1 is a fast, automatic, and effortless lower-level system, while System 2 is a slower, more effortful, and rule-governed higher-level system. According to Leslie, generics belong to System 1 judgments, which are non-quantificational and cognitively basic. In contrast, quantifiers are System 2 judgments, which are easily describable in terms of set-theory. Generics are also frame dependent. Their truth depends on how the information is presented. For example, people are more likely to prefer a medical procedure described as having a 90% survival rate compared to the same procedure being described as having a 10% mortality rate.

In the following section, we will present a new cognitive analysis on generics, which could complement Leslie's (2007a, b; 2008; 2012) cognition-based approach.

### 3. A New Analysis

#### 3.1. Generics are cognitively conceptualized

We have already discussed in section 2.3. how Leslie's four features are not sufficient enough to account for the licensing of generics. The question, therefore, is what predication could be licensed as a characteristic of the kind set. As discussed above, the concept of majority alone is not sufficient. It is also not clear whether the concept of strikingness is sufficient to license generics. Setting aside for a moment the 'majority' and 'strikingness,' which will be taken up again later in section 3.2., reconsider the following examples from section 2.3.:



- (18) a. Apples are red.
- b. Roses are red.
- c. Barns are red.

For example, for generic (18a), a red apple is one of the most common and seasonless fruits worldwide. People in general grow up and grow old eating, singing, and reading about red apples. For example, a witch and a poisoned red apple appear in the all-time favorite fairy tale, *Snow White*. We also have a children’s ‘Last and First,’ such as “a monkey’s butt is red, a red thing is an apple, an apple is delicious, a delicious thing is a banana, etc.” As a result of experiencing and knowing these things, we tend to accept “apples are red” as a good generic, even while being aware of the existence of green and yellow apples. That is, we have this well-conventionalized conceptualization of apples as being red. We have a similar well-conventionalized conceptualization for red roses, as in (18b). We buy, grow, and see red roses. We hear, sing, and read about red roses. Consequently, “roses are red” is generally accepted as a good generic, even though there are white, yellow, and even blue, genetically modified roses. As for generic (18c), Americans grow up and grow old seeing red barns around them and conceptualize a characteristic of barns as being red, mostly not knowing why most barns are painted red. There are theories for red barns, such as ‘red paint is cheap due to the abundance of iron that makes red paint,’ ‘red paint repels harmful insects,’ ‘red paint made with a variety of things, including rust, was believed to kill fungi and mosses in old times, and many people still choose red paint for their barns in honor of tradition,’ etc.

As for the following good generic, (19), it has been a long time since a radio came to be installed in a car without additional expense. A radio or stereo is not an option but is considered a basic apparatus of a car. We also experience cars with radios, for example, watching movies and reading books, where the actors and characters listen to music or news through the radio. Hence, having a radio is conceptualized as a firmly entrenched characteristic of having a car.

- (19) Cars have a radio.
  
- (20) a. ?Books are paperbacks.
- b. ?Israelis live on the coastal plain.

On the other hand, for the recited inappropriate generic, (20a), we have more

paperbacks than hardcover books mainly due to cost and convenience. Old generations have also grown up reading hardcover books rather than paperbacks. We go to the library and find numerous old hardcover books, and we usually have both paperbacks and hardcover books on the bookshelf at home. There are also books available in both hardcover and paperback form in the market. Consequently, paperback is not conceptualized as a characteristic of books despite currently constituting the majority of books. As for another false generic, (20b), groups of people, including Israelis, tend to live in many different places. One place could be populated with the majority of a group of people. However, this does not necessarily lead to a conceptualization of that place as the habitation of the people.

Consider the following examples of inappropriate generics:

- (21) a. ?Primary school teachers are female.
- b. ?Primary numbers are odd.
- c. ?People are over three years old.
- d. ?Buildings are less than 1000 feet tall.

For example (21a), most primary school teachers are female. We are well aware of the situation where women prefer to be primary school teachers compared to men due to various reasons, as well as the concern that this gender imbalance is not desirable for the children. We know that being female cannot be conceptualized as a characteristic of primary school teachers, unless there exists a well-entrenched connection between women and primary school teachers. For (21b), most primary numbers are odd, which is, however, just accidental. For (21c), most people are over three years old, since the average life expectancy of the entire population of the world is approximately 70 years old. People of all ages exist, and a specific age span cannot characterize humans. As for (21d), buildings whose height is 1,000 feet or higher are quite rare. All the buildings in Korea, for example, are less than 1,000 feet tall. A specific height range of buildings cannot, therefore, be conceived as a characteristic of buildings, unless, again, there exists any conceptualized correlation between the height range and buildings.

Based on these discussions, we propose that what is crucial for satisfying the characteristic features of generics is the process of cognitive conceptualizations in the manner described by Lakoff and Johnson (1980), Lakoff (1987), and Kövecses (2010), among others. That is, a characteristic of a kind set is established from a well-entrenched conceptualization, based on the language users' long-term experiences,

learnings, and activities in their lives. These experiences, as well as the encyclopedic knowledge of the language users, also include their cultural and geographical backgrounds and knowledge. For example, the Yuncheng area of Shanxi Province in China is famous for producing good-quality green apples. As a result, it could be difficult for its inhabitants to accept “apples are red” as a good generic. For them, being green is a quite salient characterizing predicate for apples, even though they could be aware of the wide distribution of red apples throughout the world.

Next, consider the following set of examples:

- (22) a. Penguins live in Antarctica.
- b. Penguins live in Australia.
- c. Penguins live in South Africa.
- d. Penguins live in the West coast of South America.
- e. Penguins live in the Galapagos Islands.

It seems that example (22a) is generally accepted as an appropriate generic, whereas all the others, (22b, c, d, e), are not. Penguins are, in fact, found on every continent in the Southern Hemisphere. Yet, Antarctica has been conceptualized by many people as the only habitat of penguins, like a myth. Consequently, for those who are well aware of the existence of various other penguin habitats, (22a) could be considered as inappropriate. Also consider the following example, (23a), recited from section 2.2., which is presented by Nickel (2009; 2010a, b) as a counterexample to the majority-based view:

- (23) a. Elephants live in Africa and Asia.
- b. Elephants live in Africa and elephants live in Asia.

Generic (23a) does not mean that elephants in general live in both Africa and Asia at the same time, which is physically impossible. It instead means that Africa and Asia have been conceptualized as the two main natural habitats of elephants in the world. We have been seeing, reading, experiencing, and learning about elephants living in Africa and Asia through various media, including movies like ‘Tarzan’ and ‘King and I.’ Hence, (23b) means, at best, that Africa is one main habitat of elephants in general, and that Asia is another main elephant habitat. In dialogue (24), Mary’s answer to John’s question would be insufficient to Helen, who knows another habitat, Asia:

- (24) John: Where do elephants live?  
Mary: Elephants live in Africa.  
Helen: Elephants also live in Asia.

In the following section, we will propose Gen as a quasi-universal quantifier and discuss Nickel's examples, (23a, b), in more detail.

### 3.2. Gen is a quasi-universal quantifier

None of the three representative theories of generics discussed above dispense with the concept of quantification. The normalcy view, as well as the majority view, analyzes a generic as a quantified sentence. Leslie's cognitive view also resorts to the concept of majority in order to account for generics like "barns are red" and "cars have a radio," although she argues that the generic operator is not a quantifier.

A generic on a kind set is basically a generalization on all the members of the set as a whole. One difference from an explicitly quantified sentence is that it allows exceptions. However, the exceptions should be perceived as negligible. If a number of prominent exceptions are perceived for a generic, then it tends to be judged as inappropriate. In other words, we propose that a generic should 'conceptually' be a 'quasi-universally quantified' generalization with a small number of trivial exceptions. For example, the generalization, "dogs have four legs," is well accepted as a good generic, since both inborn and acquired less-than-four legged dogs are easily perceived as insignificant exceptions. Albino tigers are also perceived as negligible exceptions without much difficulty to another good generic, "tigers have stripes." On the other hand, for a generalization like "apples are red," exceptions like green and yellow apples exist, as discussed above. If they are discerned as significant exceptions, the generic cannot be judged as appropriate, as in the case of the people in Yuncheng, China, which is famous for green apples. To take another similar generalization, "lions have manes," people who know the existence of maneless female lions would not regard this as a good generalization.

Reconsider the following generics recited from section 1:

- (25) a. Mosquitoes carry the West Nile Virus.  
b. Sharks attack bathers.  
c. Pitbulls maul children.  
d. Tigers eat people.

Example (25a), which is accounted for not as an absolute but as a relative generic by Cohen (1996) because only a small number of mosquitoes actually carry the West Nile Virus (henceforth, WNV), could be considered as inappropriate if carrying WNV is perceived as applying to only a small portion of the mosquito set. Yet, any mosquito is a dangerous potential carrier of WNV from the perspective of humans, although the number of mosquitoes actually carrying WNV is relatively small. Furthermore, tiny insects like mosquitoes could be regarded as a whole indiscriminately. This potentiality pertains to all the members of mosquitoes except for some feeble ones, which could help license (25a) as a good generic. A similar argument could be made for (25b). It is a fact that not all species of shark attack humans, especially when they are not threatened. If you are aware of this, you could disallow it to be appropriate. Species of shark that do not attack humans could be perceived as significant counterexamples to (25b). On the other hand, humans could be threatened by the potential danger of any shark attacking bathers without being able to distinguish non-aggressive sharks from aggressive ones, and could therefore judge (25b) as appropriate. Examples (25c, 25d) could also be accounted for in quite a similar way. From time to time, we hear from the media about pitbulls mauling and even killing children. Based on these horrible experiences, we are forced to learn the potential danger of an attack by an uncontrolled pitbull, and quite understandably accept (25c) as a good generic. On the other hand, for generic (25d), compared to (25a, 25b, 25c), our direct or indirect experiences of tigers eating people must be quite rare. We also observe tigers getting along with zookeepers and Las Vegas showmen. Accordingly, eating people is possibly, but not easily, conceptualized as a characteristic of tigers.

Returning to examples (23a, b), we propose that (23a) should be interpreted with a disjunction, as in (26a), rather than with a conjunction, as in (26b). Although *and* is used in (23a), this does not mean that elephants live in both Africa and Asia at the same time. It is rather like listing the main habitats of elephants. Hence, *and* rather than *or* is used, but it should be interpreted as in (26a). Consequently, (23a) is not equivalent to (23b), which is formally represented as in (26d). Furthermore, (26a) is not semantically equivalent to (26c), as illustrated by sentences (27a) and (27c). That is, (27a) is not equivalent to (27c).

- (26) a.  $Gx[E(x) \wedge [L\_in\_Af(x) \vee L\_in\_As(x)]]$   
 b.  $Gx[E(x) \wedge [L\_in\_Af(x) \wedge L\_in\_As(x)]]$   
 c.  $Gx[E(x) \wedge L\_in\_Af(x)] \vee Gx[E(x) \wedge L\_in\_As(x)]$   
 d.  $Gx[E(x) \wedge L\_in\_Af(x)] \wedge Gx[E(x) \wedge L\_in\_As(x)]$

- (27) a. Almost all dogs ate or slept.  
b. Almost all dogs ate and slept.  
c. Almost all dogs ate or almost all dogs slept.  
d. Almost all dogs ate and almost all dogs slept.

To summarize, we propose generic operator Gen as a quasi-universal quantifier. That is, the exceptions of a generic should be limited to a small number of negligible deviations in ‘all’ cases. If a generic is perceived to include some real exceptions, then it is difficult to be judged as appropriate. It is proposed that Cohen’s (1996) ‘relative’ generics, Pelletier and Asher’s (1997) ‘quantifier domain restriction,’ and Leslie’s (2007a, b; 2008; 2012) ‘strikingness,’ which were argued to complement the majority/normalcy/cognition-based theories, respectively, should all be rejected.

Discerning the existence of real exceptions depends on the information state of the language user. If, for example, he/she is aware of the existence of maneless female lions taking up roughly half of the total lion population, “lions have manes” will not easily be accepted as a good generic. Whether he/she assesses certain exceptions as being negligible or real could also rely on his/her conceptualizations. Green and yellow apples, for example, could be perceived as either trivial or real exceptions depending on the individual’s cultural and personal experiences and knowledge. Furthermore, perceptions on the exceptions of a generic could be affected by contextual factors. For example, in a zoology class, where technical knowledge on animals is dealt with, “lions have manes” or “mammals have a placenta” cannot be regarded as a suitable generic. In a casual conversation, in contrast, these could be accepted without much resistance.

Concerning these factors influencing the perceptions on the exceptions of generics, as well as the distinction between trivial and real exceptions, experimental results supporting our arguments will be presented in section 3.4. Before that, several types of generics will be discussed in the next section.

### 3.3. Generics are classified into several types

In this section we will classify generics into six types and briefly explain each of them. The following (28) is the list of the six types of generic, while (29) provides examples of the six types:

(28) 6 types of generics:

- I. Scientific facts without exceptions
- II. Generalizations with trivial exceptions
- III. Generalizations on a majority or half of a set with real exceptions
- IV. Generalizations on a small portion of a set with real exceptions
- V. Well-entrenched stereotypes and beliefs
- VI. Personal prejudices and beliefs

(29) Examples:

- I. Humans are mortal.
- II. Dogs have four legs.
- III. Birds can fly. / Lions have manes.
- IV. Koreans eat dog meat.
- V. French people love wine.
- VI. Skinny people have a short temper.

First, type I generics are scientific facts without exceptions. (29I) is an example of this type, which is 100% true. Type I generics will be judged to be appropriate unless the facts are unknown to the addressee. Type II generics are generalizations with only a small number of trivial exceptions, like example (29II). Both inborn and acquired less-than-four legged dogs are trivial exceptions that could be ignored. Therefore, type II generics are predicted to be judged as appropriate in the majority of cases. A type III generic is a generalization on a majority or half of a set. Two examples of type III, (29III), have non-negligible exceptions, such as chickens, ostriches, and penguins, and female lions, respectively. Depending on whether these exceptions are perceived as real to the addressees, the judgements are predicted to vary.

Type IV generics are generalizations on a small portion of a set. As for (29IV), the number of Koreans eating dog meat is, in fact, relatively small. Compared to 10 or 20 years ago, the number has now drastically decreased in accordance with an acute increase in the number of families with companion dogs. We predict that type IV generics, like (29IV), could be judged depending on various factors. For example, some American and European activist groups advocating animal rights could regard (29IV) as an appropriate generic.

Type V generics, like (29V), include well-conventionalized stereotypes and beliefs. It is obvious that not all French people love wine, but France is well-known as a major wine producer and consumer. However, type V generics could quite often

be rejected given that they are not based on scientific or statistical facts. Type VI generics, like (29VI), could be more prejudiced than type V ones, which could lead to a higher rejection rate.

The judgment on a generic could be affected by various factors, as discussed above. One important factor is the type of a generic, while the information state of the addressee is another determining factor. This factor includes his knowledge and cultural background, both of which play an important role in the conceptualization processes of generics. The situation whereby a generic is addressed, for example, whether it is formal or informal, is another influential factor.

In the following section, the results of an experiment designed to test the acceptability of the six types of generic will be presented. We will also discuss the factors that influenced the judgements of the subjects on the generics.

### 3.4. Experimental results support Gen as a quasi-universal quantifier

The experiment, which was designed to investigate Korean language users' perceptions of the six types of generic, utilized 24 English sentences, which are listed in the appendix. Right next to each of the 24 English sentences, its Korean counterpart sentence was provided in order to avoid the risk of being misinterpreted. For each of the six types in (28), four examples were assigned, creating a total of 24 examples [4 generics × 6 types = 24 examples]. The 50 subjects, who were all Korean college students, were asked to mark x (very inappropriate, 1 point), △ (a bit inappropriate, 3 points), or ○ (appropriate, 5 points) for each of the 24 examples. They were also asked to write down reasons for their △ and x answers. The results of this experiment are summarized in the following tables. First, Table 1 shows the average points for each experiment item and the sum average for each type:

**Table 1.** Summary of the averages for type I~VI examples

	I	II	III	IV	V	VI
1st	4.68	4.28	2.64	1.92	3.16	1.8
2nd	5	4.64	3.56	2.92	2.64	1.24
3rd	5	4.4	2.84	3.28	2.8	2.08
4th	4.92	4.28	4.36	2.56	2.16	2
Sum average	4.9	4.4	3.35	2.67	2.69	1.78



First, all four experiment examples for type I received high average points, close to 5 points, while the average for type I was 4.9. This result was predicted as discussed above, since type I examples are law-like generics without exceptions. Each of the type II examples, which are generics with a small number of trivial and ignorable exceptions, also received high average points, with the sum average for type II being 4.4. As for type III generics, which have significant numbers and kinds of exceptions, the average, 3.35, was much lower than types I & II. For type IV, the average was 2.67, which was much lower than type III. This was also predicted since conceptualizations based on a small striking portion of a set like type IV generics could more easily be refuted than those on a majority of a set. For type V generics, which are mostly well-entrenched stereotypes, the average was low, 2.69, whereas for type VI generics, which are mostly prejudiced generalizations, the average of 1.78 was much lower than that of type V. All in all, the averages for the six types were scalar from type I, the highest, to type VI, the lowest, as predicted.

Table 2 summarizes the reasons for the  $\Delta$  and x answers to the 24 examples. The reasons given by the subjects were summarized into seven different categories: A, B, C, A&C, B&C, A&B, and None. Reasons A, B, and C are explained at the bottom of Table 2. Some subjects gave two reasons for one example, such as A&C, B&C, or A&B. These double reasons each were counted as one reason for convenience. Some subjects gave no reason for their  $\Delta$  or x answer, which is marked as 'None.' The maximum number of the answer sum for each example of a type is 50, since 50 subjects participated. For example, example #12 of type VI had sum 50, which means none of the subjects judged it as appropriate ( $\circ$ , 5 points). Examples #1 (type I), #7 (II), #9 (I), #14 (I), and #19 (I) had very low sums (6, 8, 0, 0, and 2, respectively), which means none or just a few subjects judged them as inappropriate. In contrast, examples #3 (IV), #6 (VI), #17 (VI), #21 (VI), and #23 (V) had very high sums (47, 45, 46, 48, and 47, respectively), which means almost all of the subjects judged them as inappropriate.

One notable example, #1 (I), "tigers belong to the cat family," was judged to be inappropriate by six subjects, a relatively high number compared to the other three type I examples. Five of the six subjects gave reason B (no information) for their judgments, which explains why we have more  $\Delta$  or x answers, for example #1. Example #3 (IV), "Koreans eat dog meat," was judged to be inappropriate by 47 subjects, with A (32), C (2), and A&C (11) given as reasons. All of the subjects were Korean students, and none of them gave B as a reason. Most of the subjects answered 'only a small number of Koreans eat dog meat,' while some answered

**Table 2.** Summary of the reasons for  $\Delta$  and x answers to 24 examples

	A	B	C	A&C	B&C	A&B	None	Sum
#1 (type I)	0	5	0	0	0	0	1	6
2 (II)	11	0	1	0	0	0	3	15
3 (IV)	32	0	2	11	0	0	2	47
4 (III)	38	0	0	1	0	0	2	41
5 (V)	17	6	7	2	1	0	4	37
6 (VI)	4	1	33	0	0	0	7	45
7 (II)	8	0	0	0	0	0	0	8
8 (IV)	14	6	12	3	0	1	2	38
9 (I)	0	0	0	0	0	0	0	0
10 (V)	12	4	19	3	0	0	3	41
11 (III)	25	0	0	0	0	0	3	28
12 (VI)	2	3	40	1	0	0	4	50
13 (V)	17	1	3	0	0	0	4	25
14 (I)	0	0	0	0	0	0	0	0
15 (II)	6	7	1	0	0	0	1	15
16 (IV)	21	11	1	0	0	0	2	35
17 (VI)	13	3	23	2	0	1	4	46
18 (III)	30	1	0	0	0	0	2	33
19 (I)	0	0	0	0	0	0	2	2
20 (II)	10	4	0	0	0	0	1	15
21 (VI)	19	2	22	1	0	0	4	48
22 (III)	2	11	0	0	0	0	2	15
23 (V)	19	3	19	0	0	0	6	47
24 (IV)	18	5	11	1	0	0	5	40

A: Exceptions exist / There are more exceptions than non-exceptions.

B: I am not sure. / I have no information to make a judgment.

C: It is a prejudice. / It is a misinformed generalization. / It is an inappropriate generalization.

‘it is a prejudiced generalization.’ It is predictable that a different result could be obtained from people who are not Korean and who therefore both do not have enough information regarding the situation and could be biased against the culture

of eating dog meat itself.

Another notable example is #4 (III), “apples are red.” It is a relatively frequently cited generic, but its average, 2.64, was less than 3 points. Surprisingly enough, 41 subjects judged it as being inappropriate. All the answers, except for two ‘none’ answers (i.e., 39 answers), were reason A (including one A&C), while the existence of different colored apples, such as green and yellow apples, was mentioned. It is predictable that a similar result could be obtained for a generic like “roses are red,” since today many things come in various colors, shapes, and sizes compared to the past. For example, we now have various colored roses, including genetically modified blue roses, as mentioned above.

Examples #11, #16, and #22 are also notables. Both examples #11, “birds can fly,” and #22, “mammals have a placenta,” are categorized as type III, which contains non-negligible real exceptions. The former includes chickens, ostriches, penguins, etc. as exceptions, while the latter includes marsupials and monotremes. However, the former received average points of 3.56, whereas the latter produced a result of 4.36. This relatively large difference is analyzed to be due to the fact that the reasons for  $\Delta$  and x answers for the former were mostly ‘A’s (25), and not ‘B’s (0), while the reasons for the latter were mostly ‘B’s (11) with only two ‘A’s. That is, for the former, the subjects were aware of the exceptions, whereas for the latter, quite a few subjects (11) had no information about the exceptions. Also, for example #16, “mosquitoes carry WNV,” a considerable number of subjects (11) gave ‘B’s as the reasons for their  $\Delta$  and x answers. As is shown in Table 2, 11 was the biggest number for reason B, and only examples #16 and #22 received 11 B answers.

Table 3 adds up the sums of the four examples of each type given in Table 2 as follows:

**Table 3.** Summary of the reasons for  $\Delta$  and x answers to 6 types

	A	B	C	A&C	B&C	A&B	None	Sum
I	0	5	0	0	0	0	3	8
II	35	11	2	0	0	0	5	53
III	95	12	0	1	0	0	9	117
IV	85	22	26	15	0	1	11	160
V	65	14	48	5	1	0	17	150
VI	38	9	118	4	0	1	19	189

First,  $\Delta$  and  $x$  answers for type I generics received no reason A. Compared to type I, types III and IV received numerous reason 'A's, 96 and 101 'A's including 'A&C's (1 and 15) and 'A&B's (0 and 1), respectively. In other words, compared to types I and II generics with no or trivial exceptions, types III and IV with non-negligible exceptions received much higher instances of reason A, as predicted. Types V and VI generics, which are mostly based on stereotypes and prejudices, received a great deal of reason 'C's, 54 and 122 'C's including 'A&C's (5 and 4) and 'B&C's (1 and 0), respectively. As for the sum value, whose maximum number is 200 [50 subjects x 4 examples] for one type, the sum of  $\Delta$  and  $x$  answers for type I was the lowest, with just eight, since type I generics are exceptionless. The sum for type II was the second lowest, 53, because type II generics have only a small number of negligible exceptions. Compared to types I and II, the sums for types III and IV were much higher, 117 and 160, respectively, since they have non-negligible real exceptions. The sums for types V and VI were very high, 150 and 189, respectively, since these generics are not based on facts, but on stereotypes and prejudices.

#### 4. Conclusions

The experimental results confirm that generics are perceived as quasi-universally quantified generalizations in that the subjects did not tolerate non-negligible real exceptions. For example, a frequently cited generic, "Norwegians are good weightlifters," could be judged to be appropriate only when it is perceived as a generalization about all Norwegians, with the exception of some ignorable, trivial exceptions. Suppose that it is a generalization made from the fact that a considerable number of Norwegians won medals in weightlifting at the Olympics and other international competitions in the past. Although members of a national team are not many, they are selected from the people and represent them. In this sense, Norwegians in the generic possibly do not just refer to the players, but to Norwegians in general. The generic could be judged to be appropriate in this way. However, if non-negligible exceptions are perceived or the national team representing the Norwegian people is not accepted, it could be judged to be inappropriate. In a similar vein, generics like "Koreans eat dog meat," "sharks attack bathers," and "tigers eat people" received lower than three average points in the experiment. That is, if a generic generalized from a small number of cases is not perceived to characterize a whole kind, then

it is judged to be inappropriate. Furthermore, a well-known generic like “apples are red” also received less than three average points. Exceptions like green and yellow apples disallowed the generic to characterize the whole apple kind. In other words, it has been shown that a generic is perceived quite strictly as a quasi-universally quantified generalization that allows only a small number of insignificant exceptions. Consequently, it has been shown that the proposed concepts such as Cohen’s relative genericity, Pelletier and Asher’s quantifier domain narrowing, and Leslie’s strikingness do not seem to work in general.

It has also been confirmed by the experimental results that the perception of a generic could be influenced by various factors, including the language user’s knowledge state and cultural background. If he/she is aware of the existence of real exceptions, he/she tends to judge the generic inappropriate. For example, example #18, “lions have manes,” received 2.84 average points from the subjects, while 30 subjects gave A (exceptions) as the reason for their  $\Delta$  and x answers. They mentioned the existence of maneless female lions. In contrast, as discussed above, example #22, “mammals have a placenta,” received 4.36 average points, while 11 subjects gave B (no information) as the reason for their  $\Delta$  and x answers. On the other hand, example #3, “Koreans eat dog meat,” received 1.92 average points; 32 subjects gave A (exceptions) and 13 subjects gave C (prejudice) as the reason for their  $\Delta$  and x answers, which reflects the subjects’ knowledge state and cultural background. As discussed above, they were all Koreans.

In addition to these factors, generics could be affected by various other factors. For example, a generic could be accepted more easily if the situation is more tolerant or if the generalization itself is not that technical or specific. A generic like “mammals have a placenta” is not appropriate in a zoology lecture. That is, depending on whether a generic is uttered in a casual conversation or in a formal situation, such as technical lectures, the appropriateness of a generic could be judged differently. To be more specific, in this generic, mammals should technically refer to only pregnant and fetus mammals if we consider the fact that a placenta is formed from the fetus mammal to a pregnant mammal. Yet, if we think of the matter in such a way that all mammals go through the process of being born, then we do not have to exclude non-pregnant mammals and non-fetus mammals as exceptions. Furthermore, we also have another technical fact in that placental mammals give birth after raising the young in the uterus through the placenta, while marsupials and monotremes also have a placenta, but which is very short-lived and does not function as a fetal nourishment passage. However, say for example that not all of us have all this

detailed technical information. What happens? We just resort to what we know in a given situation.

The world is big and constantly changing. Consequently, conceptualizations on generics could vary with different cultures and with time. They are continuously going through changes, since people keep getting exposed to new experiences and information. In this context, various aspects of generics, such as their historic, cultural, perceptual, contextual, and abusive aspects, could offer interesting topics for future research.

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## Appendix

### Type I

- #1. Tigers belong to the cat family (호랑이는 고양이과에 속한다).
- #9. Humans are mortal (인간들은 언젠가는 죽는다).
- #14. Triangles have three angles (삼각형은 세 개의 각을 갖고 있다).
- #19. Fish live in water (어류는 물에 산다).

### Type II

- #2. Pigeons can fly (비둘기들은 날 수 있다).
- #7. Dogs have four legs (개들은 네 개의 다리를 가지고 있다).
- #15. Lions have a bushy tail (사자들은 털이 복슬복슬한 꼬리를(끝에) 갖고 있다).
- #20. Tigers have stripes (호랑이들은 줄무늬를 가지고 있다).

### Type III

- #4. Apples are red (사과는 붉은 색이다).
- #11. Birds can fly (새들은 날 수 있다).
- #18. Lions have manes (사자들은 갈기를 가지고 있다).
- #22. Mammals have a placenta (포유동물들은 태반을 가지고 있다).

### Type IV

- #3. Koreans eat dog meat (한국인들은 개고기를 먹는다).
- #8. Sharks attack bathers (상어들은 해수욕객들을 공격한다).
- #16. Mosquitoes carry the West Nile virus (모기들은 웨스트나일(뇌염) 바이러스를 옮긴다).
- #24. Tigers eat people (호랑이들은 사람을 잡아먹는다).

### Type V

- #5. French people love wine (프랑스 사람들은 와인을 애호한다).
- #10. Italians have a sense of style (이태리인들은 스타일 감각을 가지고 있다).
- #13. Dogs are faithful to their owners (개들은 주인에게 충실하다).
- #23. Japanese people are polite (일본인들은 예의바르다).

### Type VI

- #6. Women are more emotional than men (여자들은 남자들보다 감정적이다).
- #12. Skinny people have a short temper (마른 사람들은 성마르다).
- #17. Men are more interested in a woman's appearance than her personality (남자들은 여자의 성격보다는 외모에 더 관심이 있다).
- #21. People drive expensive cars to show off rather than for safety reasons (사람들은 안전 정보보다는 과시를 위해 값비싼 차를 탄다).