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English animal zero plurals. A new explanation

1. Introduction

The paper discusses English animal nouns whose singular and plural forms are identical, which has inspired scholars to label them zero plurals (Quirk et al. 1972), e.g.:

(1) *Heilen **trout** are, in my opinion, some of the most beautiful wild **brown trout** in Scotland and they fight more furiously than you can ever imagine. (AS7),*

(2) *I've been shooting **partridge** with Rupert. (CAO).*

In (1) the zero plural is the only choice available in the paradigm of the noun in question, while in (2) the use of the zero plural is optional as it alternates with a fully regular form:

(3) *Rotational set-aside policies have proved a mixed blessing for birds such as skylarks, lapwings and **partridges** that nest in uncut fields. (J3J).*

However, both in (1) and (2) the plurality of the noun has to be inferred from contextual clues. In (1) it is easily deduced from the use of a plural verb and pronoun, and in (2) it can be worked out from the absence of the indefinite article.

The existence of the pattern illustrated in (1) - (2) has been duly noted in a variety of descriptive grammars, but it has not been much discussed. Most authors merely repeat the claim first made in Sweet (1898), which links the use of zero plurals with hunting, and do not go into any details. Consequently, scholars ranging from Zandvoort (1960) to Corbett (2000) and to Acquaviva (2008) all cover zero plurals in a paragraph or two and uniformly state that the group includes nouns denoting animals which have been hunted for food and / or trophies. The only studies that explore the zero plural pattern in more detail are Allan (1976) and Toupin (2015).

The former elaborates on Sweet's hypothesis, while the latter develops an independent historical analysis but, as shown below, both reach fairly similar conclusions and fall short of accounting for the full range of corpus data.

The goal of this paper is to show that English animal zero plurals may be more adequately described by exploring a cognitive factor motivating such usages. The discussion is based on data drawn from the British National Corpus and focuses on accounting for the range of use of animal zero plurals in Present-Day English. The explanation to be developed below is then used to address the question of the feasibility of compiling an exhaustive list of zero plurals, raised in Toupin (2015), and, finally, placed in a broader context of cognitive linguistics.

The account is based on data culled from the BNC by searching the corpus for animal nouns that are not overtly marked for the plural and then extracting from the data sets obtained for each such noun all the tokens whose context of use leaves no doubt that in fact they are zero plurals. The explicit cues indicating the plural reference of any such nominals were plural agreement, e.g. *herring congregate*, the use of numerals, e.g. *nine salmon*, quantifiers, e.g. *many reindeer*, and collective expressions, e.g. *a herd of musk ox*. An implicit cue applicable to a fair number of cases was the disuse of the indefinite article, e.g. *They shot duck*.

The paper is organized as follows. Section 2 investigates the use of zero plurals in nouns denoting aquatic creatures, uses that data to assess the adequacy of the two previous explanations noted above and lays down the main claim of the paper. Section 3 shows how the use of zero plurals in nouns denoting land animals and birds furnishes further support for the claim advanced in Section 2. Section 4 applies that claim to accounting for generic uses of zero plurals, and Section 5 draws final conclusions.

2. Aquatic creatures

English grammars including frequency lists of animal zero plurals, e.g. Jespersen (1914), Quirk et al. (1985) or Biber et al. (1999), invariably show that the pattern is the most readily found in nouns denoting aquatic creatures. The BNC offers a broad array of examples which bear this claim out, e.g. the following report on the fish formerly caught in the Thames:

- (4) *The river also provided a tremendous variety of fish and certainly the Millers would have taken advantage of this from the Garden*

*frontage. Faulkner's local History mentions **trout, pike, carp, roach, dace, perch, chub, barbel, smelt, flounder, shad, lamprey and eel** all being caught in the river off Chelsea and also records nine **salmon** weighing 171" lbs. being landed there in May 1664. (ALU).*

The BNC likewise records cases of zero plurals designating a variety of marine invertebrates, e.g.:

- (5) *Female **squid** do not extend any parental care of protection to their eggs and may become so exhausted by the act of reproduction that they die shortly after. (C96),*
- (6) *It pointed to reports that catches of **shrimp** (the Gulf's most important food source) had fallen dramatically since the war. (J39),*
- (7) *The rest of the time he caught **snapper or conch or lobster**, and brooded over the souls of his ramshackle family; each of whom was named for a different book in the Bible. (CCW).*

Technically, the creatures referred to in (5) - (7) belong to quite diverse groups of marine animals, ranging from cephalopods (squid), to crustaceans (shrimp and lobster) and to sea snails (conch). However, in terms of plural formation the nouns that designate all these invertebrates pattern exactly in the same way as the nouns denoting fish in (1) and (4) and birds in (2) above.

Since this grammatical uniformity goes hand in hand with the fact that the animals referred to in (1) - (7) are commonly caught for food, the corpus data that has been presented so far appears thus to lend support to the explanation originally put forward in Sweet (1898) and argued for at length in Allan (1976). Specifically, Allan claimed that the distribution of English zero plurals (which he called collectivized nouns) is correlated with the extent to which humans treat wild animals designated by particular nouns as sources of food and other useful products (e.g. tusks, skins, feathers, etc.). According to Allan (1976:107), zero plural is thus ruled out in nouns designating domestic animals and vermin (e.g. ducks or rats); it is optional in nouns that denote animals which are occasionally hunted (e.g. lions or elephants) and obligatory in nouns designating animals that are fished or hunted on a regular basis (e.g. salmon).

Besides positing such a cline of zero plural usage, Allan identified also a factor that motivates that pattern in general. In his opinion, repeated later in a number of studies, e.g. Corbett (2000) or Acquaviva (2008), the use of zero plurals reflects the intuition that the interest of hunters lies not

primarily in wild animals as distinct creatures but in the products that can be derived from them, which makes differentiating particular individuals insignificant (Allan 1976:111).

An essentially similar factor was independently postulated in Toupin (2015). Her explanation does not invoke Sweet's hypothesis and relies on investigating English historical sources instead, but concludes that the use of zero plurals reflects viewing animals as game (Toupin 2015:113), which has been salient in English culture since Anglo-Saxon times (Toupin 2015:107-109).

The validity of such explanations is, however, undermined by BNC data that go beyond the examples presented in (1) - (7) above. The most conspicuous finding that defies Allan's and Toupin's claims is the negative fact that the entire BNC does not record a single sentence in which the noun *whale* takes a zero plural form in the context of whaling.

Whales had been hunted for centuries, with English speaking whalers playing a significant part in the process, and epic whaling expeditions have been described by English-language authors (e.g. Melville's "Moby Dick"). Given the long standing tradition of whaling and the fact that whalers were primarily interested in obtaining highly prized natural products from their quarry, e.g. blubber, baleen, ambergris, etc., it would be only natural to expect that the noun *whale* should be found among standard examples of zero plurals if Allan's or Toupin's explanation is correct.

The same expectation obviously pertains also to nouns designating particular species of whales targeted by whaling expeditions, e.g. the right whale, the bowhead whale, the humpback whale, the grey whale, the sperm whale, the fin whale, etc. However, the BNC records examples of zero plurals only for two Arctic species: the narwhal (three cases) and the beluga whale, also known as the white whale (one case), e.g.:

- (8) *For example, narwhal were traditionally hunted for food by the Inuit Eskimoes of the eastern Arctic region of Canada, who ate the outer layer of meat and skin (muktuk) and some of the red meat, and fed the remainder to their sled dogs. In recent years sled dogs have been replaced by snowmobiles, so now the main incentive for the whale hunt is the narwhal's single ivory tusk. (ABC).*

All further plurals referring to these two species in the BNC (37 instances) are inflected and the same is the case with plurals designating any other whale species, e.g.:

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- (9) *In Greenland alone, 1000 - 3000 harbour porpoises are killed each year, along with 300 - 600 belugas (white whales) and 400 - 500 narwhals and some pilot whales.* (ABC),
- (10) *Aboriginal subsistence whaling was allowed to continue subject to a catch limit of 141 bowheads over the three years 1992-94 (with a maximum annual strike of 54) for Alaskan Eskimos, 169 gray whales per year for 1992-94 for Soviet Eskimos, and for Greenlanders 21 fin whales in 1992 and 315 minke whales over 1992-94 (maximum 115 per year) off west Greenland and a maximum of 12 minke whales per year for 1992-94 off east Greenland.* (HL7).

The contrast in plural formation between nouns designating whales and scores of other aquatic creatures that range from tiny crustaceans to huge fish cannot thus be attributed to catching and processing such animals as argued for in Allan (1976) or viewing them as game as posited in Toupin (2015). It may, however, be motivated by a fairly straightforward cognitive factor that has not so far been noted in the discussion of zero plurals.

The fish and marine invertebrates that are readily designated by zero plurals spend virtually all their lives below the surface of seas, oceans, rivers, lakes, ponds and other bodies of water, while whales surface quite frequently. The former remain thus out of sight for humans who want to catch them but the latter can be observed with the naked eye. Amateur anglers and commercial fishermen cannot see their quarry and do not know what they have caught until hooks or nets are pulled out of water, while whalers and whale watchers can sight their targets and aim their harpoons and cameras at specific individuals.

The difference is due to the fact that sunlight is either reflected off water surface or dissipates soon after crossing it, which makes those aquatic creatures that spend their entire lives under water remain in the dark and, consequently, practically invisible for humans located on dry land or in fishing boats. Water surface creates thus a cognitive barrier which prevents humans from observing animals that dwell below it, and that simple fact of life appears to be reflected in the use of zero plural. The inability to individuate particular specimens, i.e. to construe them as separate individuals (Grimm 2018:528) in their natural habitat is therefore claimed to be mirrored in the absence of overt plural inflection, while specimens which can be spotted and individuated on or above water surface are posited to be denoted by overtly inflected forms. The use of zero plural is thus ultimately claimed to be motivated by a simple limitation of human perception.

Besides accounting for the data presented so far, this explanation offers also interesting insights into a number of further facts of English. Perhaps the most immediate one is explaining why zero plural is found not only in nouns designating particular species of fish but also in the superordinate term *fish* itself. This noun is predicated quite freely of a wide range of aquatic creatures that can breathe underwater, which means that they are invisible to the naked eye in their natural habitat because they do not have to rise to the surface. In terms of the explanation put forward above, the use of zero plurals to designate any such animals is thus only to be expected and the same applies to a long list of compounds featuring the noun *fish* as a constituent, e.g. anglerfish, clownfish, damselfish, porcupine fish, sailfish, shellfish, starfish, swordfish, etc.

Adopting the cognitive perspective explains also why zero plurals are eschewed in nouns not only designating whales but also other marine mammals, e.g. seals:

- (11) *Hunters from the south who took thousands of **whales** and **seals** did not generally compete with the indigenous folk or reduce the food available to them.* (G1E).

Seals had been as heavily hunted as whales, but what is much more important is that even though they feed in the sea, they bask and breed on land and ice, where they are easily visible. Consequently, the BNC records only one example of a zero plural referring to that animal, in contrast to as many as 393 inflected plurals.

Since seals are predators, they furnish evidence in support of the claim advanced above not only when they are the helpless quarry of sealers but also when they prey on other aquatic creatures themselves:

- (12) *The largest Antarctic seals are **southern elephant seals**, which breed on cool, temperate and Antarctic fringe islands; immature animals appear on Antarctic mainland coasts in summer. These are probably the deepest divers, feeding mainly on **fish and squid**. Intensively hunted during the nineteenth century, they have more recently been managed and subject to controlled hunting on South Georgia (Laws, 1960). **Ross and crabeater seals** live solitary or in widely-dispersed communities on the pack ice, usually toward the outer edge, feeding largely on **krill**.* (G1E).

As predicted, the animals that spend their entire lives roaming the depths of the oceans are designated by zero plurals, e.g. *fish*, *squid* and *krill*, while

the creatures that can be observed on water surface and / or ice are denoted by inflected plurals, e.g. *southern elephant seals*, *Ross and crabeater seals*.

Perhaps the finest piece of evidence supporting the perception-based account of zero plurals is provided by the noun *shark*. It designates a sleek predator that cruises the depths of the ocean in search of prey and does not have to surface to breathe like seals or whales. However, in shallow water its dorsal fin can occasionally be seen sticking out above the surface, and this ominous view has been immortalized in countless horror movies and newspaper pictures. Given these facts, it is no wonder that in the BNC there are only three instances of zero plurals designating that animal (and all three referring to the depths of the ocean), while there are as many as 152 inflected plurals, e.g.:

(13) *He had been a fisherman and told tales of the waters 'boiling' with seals near the Monach Isles, of canoeists setting off for St Kilda and of frequent sightings of porpoises, dolphins, basking sharks, even the occasional whale...* (BMF),

(14) *Among many deep sea angling operators, Alternative Cornish Holidays runs a 32 ft, 120hp motor fishing vessel from Padstow to hook bass, mackerel, cod, ling, congers, pollock and even shark.* (AJA).

Sharks that bask on the surface in (13) and are thus easy to spot are designated by inflected plurals and the same is the case with dolphins and porpoises, i.e. mammals that frequently breach water surface to breathe and play, but sharks that are hooked underwater by deep sea anglers and thus remain invisible to the naked eye until they are pulled out of water are duly designated by a zero plural in (14).

However, the inability to spot and individuate aquatic creatures that live their entire lives underwater is not only due to the fact that human eyesight is able to penetrate the water surface only to a very limited extent. Another source of the problem is that even when such animals actually do come close enough to the surface to be noticed, they frequently do so in numbers and at speeds that make individuating particular specimens next to impossible, e.g.:

(15) *As I turned forward again I saw with alarm that we were running into apparently broken water. Then, to my relief, what I had taken to be great patches of surf resolved into luminous shoals of herring or mackerel, which shot away at our approach, each individual fish an incandescent streak. The whole effect was that of an underwater*

firework display. Two dolphins joined in the fun, their tumbling, lithe bodies clearly visible as they weaved sparkling trails of fire at high speed under our bows. (H0C).

And the problem obviously recurs if an underwater scene is reported by a diver or shown and narrated in a TV documentary:

- (16) *Herring* congregate in immense shoals, half a mile across, containing many millions of individuals. If a *barracuda* approaches, those on the outer margin of the shoal dart inwards, taking refuge among the silvery bodies of their companions so that the whole shoal bunches. (F9F).

From the perspective of an underwater observer, the fish that roam the depths without ever surfacing are well visible, but it is only the lone predator, i.e. a barracuda, that can be easily individuated. Its prey is packed into a shoal that swirls so speedily and numbers so many fish that any attempt at distinguishing particular individuals is bound to be unsuccessful, which is then reflected in the use of zero plural.

Besides herring and mackerel the noun *shoal* collocates in the BNC with nine other zero plurals designating species of fish. Inflected plurals are recorded only for two marine mammals and two species of aquarium fish.

For marine creatures, congregating in numbers that defy counting is only an additional characteristic that precludes humans from spotting particular specimens and motivates the use of zero plurals. However, this obstacle to clear individuation of animals gains more prominence on land, where water surface is no longer a barrier limiting the range and acuity of human perception.

3. Land animals

As has been noted above, on land the inability to spot and individuate animals is due to their gregarious behavior. When animals gather in a large group, those specimens that face the observer and stand on the outside can be individuated quite easily, but all the rest, whether standing closer to the center of the group or on its far side, are visible only partly or not at all. They are blotted out by the animals facing the observer, which makes individuating all group members next to impossible. And when the group starts to move doing so is even harder as the animals mix and blur.

Zero plurals should thus designate land animals that live in herds and that indeed is the case, e.g. the following species found in the Arctic:

- (17) *Caribou and reindeer, respectively new-world and old-world representatives of a single species, form large migratory herds which winter on southern tundra or within the forest, and move north across the tundra in summer.* (G1E).

Caribou live in huge herds in the North American Arctic and reindeer do so in Northern Europe and Asia, and this gregarious behavior is duly reflected in the use of zero plural. For caribou it is the only plural form available, while for reindeer the BNC records also 14 instances of the inflected plural. However, all these cases come from Santa Claus stories, e.g.:

- (18) *Now, Randolph lived in Snowdown Green cottage in the middle of Greenland. It was Christmas Eve, therefore Santa Claus and his helpers were all very busy. Randolph had a very strange problem as you might have guessed before, he had a white nose! All the other reindeers had red noses just like Randolph's daddy, Rudolph.* (KA1).

Since according to Santa Claus lore each of such animals has a name, individuating them is not a problem, and it is no wonder that some authors decided to switch from zero plural to the inflected form. However, whenever real reindeer are designated, zero plural reigns supreme, e.g.:

- (19) *Nathan asks how many reindeer the Lapp has and is rewarded with a piercing look. Odd-Knut tells us that to ask a Lapp that question is like asking an Englishman how much money he has in the bank.* (A6T).

An even finer illustration of the contrast between zero and inflected plurals is offered by the noun *ox*. When it designates the well-known domestic animal, which may be put to work in teams but does not live in herds, only the archaic inflected plural *oxen* is recorded. However, when the same noun designates the musk ox, which roams the tundra in large herds, cases of zero plural can be found, e.g.:

- (20) *In contrast, if by grouping together animals can resist a predator altogether, as a herd of musk ox can drive off wolves, we can reasonably speak of mutual benefit.* (AE7).

Zero plurals obviously also designate gregarious animals that live in more temperate climates, e.g.:

- (21) *'Okay, gentlemen, today we hunt buffalo!' Senator Nathaniel Sherman stood in the middle of the camp clearing, his booted feet astride, clutching a hand-crafted Purdey .450 double-barrelled rifle in one fist.* (FU8),

- (22) *For hours I strolled through the birch and Scots pinewoods with herds of **roe deer** only yards in front of me.* (EFF),
- (23) *On either side there was open parkland grazed by a herd of **red deer** or, now that it was December and the males were apart, two herds.* (HP0).

In its heyday a single North American herd of buffalo certainly numbered many more individuals than even several herds of roe deer or red deer have ever done, but what matters is not herd size but the fact that buffalo did and deer do live in groups which are constantly on the move, which makes individuating particular creatures quite difficult, especially if they are viewed in their natural habitats, i.e. prairie tall grass for buffalo and temperate forests for deer.

All these animals both live in herds and are hunted for meat and / or trophies, but the fact that the use of zero plurals extends also to domestic animals leaves no doubt that it is the former that in fact motivates the use of such grammatical forms and not the latter:

- (24) *According to these factors they decide just how much land to use for each crop and just how many **sheep**, beef cattle or dairy cows to keep.* (B1H),
- (25) *'So what is the connection between King John and a girl who herds **swine** on Ridgery Steep and goes holidaying with outlaws.'* (BMX).

Sheep are well known to graze in huge flocks in which individuating specific lambs, ewes and rams is hardly possible, and swine used to be raised in the same manner under the supervision of swineherds remembered in a variety of sources that range from historical narratives (e.g. the excerpt quoted above) to fairy tales (e.g. H. Ch. Andersen's story titled "The Swineherd"). Given the fact that sheep and swine are farm animals and live in relatively close contact with the people who own, shear and / or feed them, it is, however, even more important that there is no widespread tradition of giving such animals names or other individuating designations, which puts them in sharp contrast to domesticated bovines. Cows and bulls may also graze in large herds, but the former are commonly named and the latter branded, which gives farmers and ranchers an easy way of recognizing particular individuals. Consequently, *sheep* and *swine* are prime examples of zero plurals, while *cow*, *bull*, *calf* or *heifer* take inflected plurals.

Given such grammatical facts and farming practices, the use of zero plurals in the case of sheep and swine is then well motivated in the cognitive

perspective argued for in this paper, while the explanations based on conceptualizing animals as game for hunters are quite helpless in this respect. Allan (1976:107) was forced to exclude domestic animals from the range of data that his account is applicable to, while Toupin (2015:112) claims that both nouns in question have retained up to now their Old English nominative plural zero endings. She argues that these two nouns have resisted regularization because sheep and swine were likely to be counted and the obligatory genitive case endings of Old English nouns followed by numerals were gradually lost in Middle English. However, this explanation is quite speculative given the obvious fact that other animals designated in Old English by neuter nouns with nominative plural zero endings were also likely to be counted, e.g. horses, but doing so did not stop such nouns from evolving into regular plurals.

The historical facts adduced in Toupin (2015) are much more consistently explained by the cognitive account argued for in this paper since horses are commonly named or branded, which makes individuating them quite easy even if they graze in large herds, while sheep and swine are not given any such individual designations, which makes identifying particular specimens in a flock or herd virtually impossible. Consequently, the noun *horse* takes the regular plural ending, while the nouns *sheep* and *swine* are zero plurals.

The cognitive approach is also robust enough to explain why zero plurals are not found in nouns designating pests, e.g. rats or mice, as reported in Allan (1976) and confirmed by BNC search returns. Since vermin are not hunted for food, Allan had to exclude from his account any nouns that denote them (Allan 1976:107), but in the cognitive explanation no such arbitrary step is needed. Rodent colonies are well known to live in burrows or in the nooks and crannies of human habitations, which means that in either case they are well hidden and remain out of sight. They usually forage at night, which makes them even harder to spot, and humans typically get to see only stray specimens accidentally caught scampering across barns, rooms and backyards. Consequently, rodents are usually seen in quite small numbers, which makes them easy to individuate and precludes the use of the zero plural as has been argued for above.

By far the largest variety of land animals designated by zero plurals live in the tropical zone, e.g.:

- (26) *Dry desert gave way to blue lagoons full of water lilies, palm trees, islands and deep blue lakes. Herds of giraffe and waterbuck raced*

across the swamps in our shadow as we swooped on to the sandy airstrip. (ARB),

- (27) *Buffalo, zebra, wildebeest, topi, and Thomson's gazelle live together in huge groups which together make up some 90% of the total weight of mammals living on the Serengeti.* (GU8).

Whether these animals are formally classed as antelope, i.e. Thomson's gazelle, topi, waterbuck and wildebeest, or otherwise, e.g. buffalo, giraffe and zebra, they are all known to live in large herds roaming the grasslands of East Africa. The extent to which herd behavior impacts our ability to individuate such animals is perhaps best illustrated by the following description of the epic migration of wildebeest:

- (28) *On the plain I could see long, black, sinuous lines of wildebeest, hundreds of thousands of them, constantly on the move. These absurd-looking antelopes cavort, buck, kick and run in all directions, making a strange honking sound. The annual migration of some one and a half million wildebeest is an awesome spectacle as they travel about 800 kilometres in search of water and green pastures for survival.* (HSG).

Given the staggering number of animals involved and the fact that they keep moving all the time, it is no wonder that human observers are unable to individuate and follow particular specimens. The use of zero plurals to designate such gregarious animals is thus only to be expected.

However, most of these magnificent creatures are also hunted and hunters likewise use zero plurals to refer to their quarry, e.g.:

- (29) *The British officers of the crack Arab Legion entertained us for our weekend. Off-duty, the subalterns took to their jeeps and accelerated into the desert to shoot antelope.* (ARB),
- (30) *I hunted buffalo in the swamps at Bilen; it was exciting following them through the dense reed beds. With more success I hunted greater and lesser kudu, oryx, waterbuck and gazelle. My aim was to secure a good head of each species and, in consequence, except when I shot for meat, I shot selectively and seldom.* (HOA).

Such examples are traditionally adduced in support of the hunting hypothesis, e.g. Allan (1976), but the BNC offers clear evidence that the use of zero plurals in cases like (29) - (30) is not motivated by the fact that the antelope species referred to in these two examples are the game of hunters, but by the fact that all these creatures live in large herds.

The point is that the BNC records hardly any instances of zero plurals designating game animals that live more solitary lives than antelopes and specifically only one such example in the context of hunting:

- (31) *The poachers are continuing to kill **rhino** despite the de-horning operation embarked on by wildlife authorities.* (J3G).

The form that predominates in passages devoted to hunting and poaching big game is the standard inflected plural, e.g.:

- (32) *The over-hunting of **African elephants** as a source of ivory for ornaments and jewellery is a case in point in this latter context.* (B1E),
- (33) *Reports from Zimbabwe suggest that poachers are killing **black rhinos** even though they have been dehorned by the authorities to make them unattractive to hunters.* (J3F).

More instances of zero plurals are found only in cases where semiaquatic large animals are referred to or the concept of the species is explicitly or implicitly invoked, e.g.:

- (34) *Three days after leaving Mojo we crossed the Awash river by a rickety bridge; a large crocodile basked on the river bank and there were tracks of many **hippopotamus**.* (HQA),
- (35) *We saw dozens of animal and reptile species at close range including **elephant, warthog, wildebeest, zebra**, monitor lizards and a dozen types of **antelope**.* (CBC),
- (36) *The problem is not so much the effect this will have on eastern and central African populations of **leopard**, which are relatively stable, but the disastrous impact it could have on the species elsewhere.* (B7J).

Hippos are known to live in pods and enjoy swimming with only their eyes and nostrils visible above the water, which makes individuating particular specimens hardly possible and offers compelling motivation for the use of zero plural in (35). The other two examples are generic in that the referents are species (36) or entire populations (37), and such zero plural usages will be examined at length in Section 5 below.

The BNC data differ thus quite starkly from the findings reported in Allan (1976:99), where it is shown that zero plurals occur quite frequently in the context of hunting. On closer inspection the difference is, however, highly meaningful. As noted in Allan (1976:116-117), his account is based

on data drawn from narratives published in the 1920s and 1930s. Given the generally known decline in the numbers of large African animals in the final decades of the previous century, the authors of the narratives examined by Allan must have written them at times when elephants, rhinos and other large game were much more numerous than they are now, and stalking such animals, hunters must in fact have followed entire herds. The fact that the descriptions left by such authors are reported by Allan to contain numerous examples of zero plurals designating all types of game animals is thus only to be expected. The only drawback of that situation is that in such circumstances it was perfectly possible to mistake the practice of hunting for the real factor motivating the use of zero plurals.

The BNC is, however, based on texts written much later, after a sharp decline in the numbers of large African animals had been recorded. The fact that zero plurals are found in BNC data only in descriptions of hunting smaller game living in large herds leaves thus no doubt that the true factor motivating the use of zero plurals is in fact the inability to individuate particular animals when they congregate in large numbers. Stalking or chasing their game, hunters are simply subject to the same cognitive limitations as other observers, e.g. tourists, photographers or national park rangers, and that fact is then duly reflected in the use of zero plurals in hunting narratives.

Adopting the perspective argued for above eliminates also an inconsistency identified in Corbett (2000:68). Commenting on the explanation posited in Allan (1976), Corbett noted with much surprise that zero plurals claimed to be motivated by hunting are also used in reference to conservation. In the cognitive perspective argued for in this paper no such discrepancy arises because all individuals, whether they are hunters, poachers, rangers, tourists or conservationists, are subject to the same limitations of human perception. Their goals may be quite diverse, but they all have the same problem with individuating animals that live in large herds. The use of zero plurals in contexts ranging from hunting and poaching to tourism and conservation is thus equally well motivated.

It is, however, even better motivated in the case of trapping. While for hunters, tourists or photographers it is essential to be able to spot the animals they are after, this is not the case with trappers. Viewing is vital for individuals who have to aim their guns, binoculars or cameras in order to be successful, but it is not for those who set up their traps, leave and return later to collect the animals which have been caught. For the former it is important if the animals they are interested in are easy to individuate or

not, but for the latter the difference is insignificant because individuation does not play any role in their craft. Trappers do not target any particular specimens and it does not matter for them if their traps are set off by solitary animals or members of large herds. Trappers are away when that happens and they have no clue what animals have been caught until they inspect their traps, which may be days later.

For trappers their quarry is thus as much out of sight as it is for fishermen and anglers, which, in the light of the cognitive explanation argued for in this paper, should lead to the use of zero plurals whether the animals they designate live in herds or not, and that indeed is the case, e.g.:

- (37) *Mackenzie expected to exchange trade goods for beaver skins, but the Nez Perce refused to trap **beaver**, since it was not consistent with their seasonal existence.* (ALX),
- (38) *In the early eighteenth century, Russian fur-trappers began to work in Svalbard, even overwintering in order to trap **Arctic fox** and **polar bear**, and to hunt walrus and seal.* (CRJ).

Beavers live in colonies that build dams and lodges while arctic foxes and polar bears are solitary predators that roam vast expanses of the Arctic, but all three creatures are designated by zero plurals in the context of trapping because it does not require its practitioners to observe the animals that are to be caught.

4. Birds and insects

Nouns designating birds generally follow the pattern described for land animals in the preceding section. Large flocks, which preclude individuating particular birds, motivate the use of zero plurals, while nouns denoting birds that live more solitary lives tend to take inflected plural forms, e.g.:

- (39) *Large numbers of waders pass through in the autumn including **curlew**, **sandpiper** and **ruff**. In winter the deliberate flooding of an area of the reserve known as The Scrape encouraged hundreds of **wigeon**, **teal** and **mallard**. You might also see **gadwall**, **Brent geese** and **Bewick's swans**.* (CHJ),
- (40) *Birds of prey are animal hunters and most catch their prey alive, killing it quickly with their specially strong feet or talons, and if necessary tearing it into smaller pieces to swallow. **Eagles**, **falcons**, **hawks**, **buzzards**, **kites** and **caracaras** also find dead animals, known as carrion, to eat. **Vultures** rarely kill their own food, but*

are known for tidying up after the kills of bigger mammal predators such as of lions. (AM2).

Birds of prey mostly live and hunt alone, so individuating them is not a problem, which is duly reflected in the use of inflected plurals, as shown in (40), and the same is the case with swans in (39). They are obviously not raptors but live in fairly small family groups, which makes them quite easy to spot individually, just like many other birds that nest or feed close to human habitations, e.g. blackbirds, magpies, storks, swallows, etc. Consequently, the nouns that designate them are consistently inflected in the plural. The remaining birds listed in (39), i.e. curlew, gadwall, mallard, ruff, sandpiper, teal, tufted duck and wigeon, nest, though, in huge colonies and fly in giant flocks, which hampers individuating particular specimens and motivates the use of zero plurals.

The only exception in (39) is Brent geese, which also live in large colonies but are designated by an inflected plural. Since in the BNC there are hardly any zero plural forms of the noun *goose* or compounds in which it is a constituent, the difference may be due to the fact that the inflection in question is a vowel mutation, but it is beyond the scope of this paper to verify if and why that observation might be true.

Since the birds that are shot for meat, trophies or other reasons tend to fly in flocks, zero plurals are likewise found in hunting contexts, e.g.:

- (41) *When I was fifteen we rented a rough shoot of about a thousand acres on Stowe Hill, part of the Stanage estate; Guy Rogers let us have it for a fiver. There we shot **grouse, partridge, pheasant**, occasional **duck, snipe** and **woodcock** and innumerable rabbits, more than earning whatever we shot by the amount of exercise we took to get it.* (H0A).

As has been shown in the preceding section and in (39) - (40) above, the rationale for using such zero plurals comes, though, from the gregarious nature of the birds in question and not from the fact that they are the quarry of hunters.

The usage is, however, quite different when a noun designates insects. They can be observed to fly alone like multicolored butterflies or in swarms numbering hundreds of thousands of individuals like locusts, but the difference does not seem to be reflected in grammar. Groups of insects are invariably designated by inflected plurals in the BNC and the only zero plurals recorded in that corpus expressly refer to entire species, e.g.:

- (42) *Meanwhile in Brownsville, Texas, townsfolk anxiously await an invasion no amount of six-shooters can repel - the coming of a particularly nasty strain of killer **bee**, whose sting is nearly ten times more deadly than the 'common or garden' variety.* (CFT),
- (43) *If you are not careful, you can even be bitten by a hundred different kinds of **mosquito**.* (EFR).

The nouns *strain* in (42) and *kind* in (43) leave no doubt that such examples are generic and they will be discussed at length in Section 5 below.

Given the facts adduced above, the lack of zero plurals designating insects in non-generic contexts is unexpected, but, as has been pointed out by an anonymous reviewer, it may be attributed to the way insects are perceived in everyday experience. They swarm at times but in most cases they are noticed individually or in small numbers, when their annoying buzz, dazzling colors and / or painful stings alert humans to their existence. They are then observed with awe, swatted with vengeance or ignored, as the case may be, but their sounds and colors make them easy to individuate, which, as has been shown above, leads to the use of inflected plurals.

5. Generic uses

Species of animals have been discovered, described and discussed by naturalists in innumerable publications, but actual observers can only see particular specimens or their groups. Species are established by abstracting away from the characteristics of specific individuals and generalizing over entire populations, i.e., by cognitive processes which are in stark opposition to individuating particular animals.

In terms of the account argued for in this paper, invoking the concept of the species should thus yield ideal motivation for the use of zero plurals and that indeed is the case, e.g.:

- (44) *There are ten species in the sailfish family. These include **spearfish**, **marlin**, and **swordfish**.* (ARE),
- (45) *All species of **whale** and **dolphin** usually produce a single young.* (ABC).

In the case of fish which cruise the depths of oceans like spearfish, marlin or swordfish, the use of zero plurals would be expected also in non-generic contexts, as has been shown in Section 2 above. However, for whales and

dolphins generic statements are in fact the only environments in which zero plurals can be found at all.

The same pattern can be observed in nouns designating land animals. Since species can be described and discussed but not seen, in generic contexts zero plurals can designate any creatures, e.g.:

(46) *The region is relatively untouched by urban and industrial development, and contains a wealth of animal and plant species not seen elsewhere in Poland, including **bison**, **wolf**, **otter** and some 200 species of birds.* (J3D),

(47) *There are about 2,700 species of **snake** in the world, yet only 50 or so are highly venomous.* (CJ3).

Given the discussion in Section 3, the animals identified in (46) could be again expected to invite the use of zero plurals also in other contexts, but for snakes such plural forms are recorded in the BNC only in explicitly generic statements. The same is also the case for insects, as has been shown in (42) - (43) above and birds that do not fly in flocks, e.g.:

(48) *Among the diurnal raptors, the various species of **eagle** appear to be the most important predators of larger animals.* (B2C).

Understandably, the same zero plural pattern is also motivated by extinct species and higher taxonomic units, e.g.:

(49) *Curiously, the reason why some species of **dinosaur** became very large is seldom addressed in either the popular or academic literature, and yet as an anatomical fact it can hardly be side-stepped.* (C9A),

(50) *Today there are about 35,000 species of **crustacean** - four times as many as there are of birds.* (EFR).

If it is impossible to see an existing species, it is even more so with those which are extinct (49) and with more abstract categories, e.g. the subphylum of arthropods referred to in (50).

The abstract nature of species and other taxonomic units makes thus the nouns that designate them the most wide-ranging examples of zero plurals recorded in the BNC, offering firm support for the account argued for in the preceding sections.

6. Conclusions

The account developed above shows that English animal zero plurals are not motivated by the extent to which humans view animals as game as posited in Toupin (2015) or treat them as sources of food and other useful products, as claimed by Sweet (1898) and a host of his followers, e.g. Allan (1976), Corbett (2000) or Acquaviva (2008), but by the inability to individuate particular animals in their natural habitat. As has been demonstrated, the inability is due to the properties of water in the case of aquatic creatures, the gregarious behavior of animals subsisting in other habitats, the fact that species are abstracted away from real specimens, or any combination of these features.

The account is thus essentially cognitive in that it shows a grammatical pattern to be motivated by a common property of human experience, which explains why zero plurals are used not only in the context of fishing, hunting, trapping or poaching, but also in the context of conservation, farming, tourism, nature photography or scholarship. Since the people pursuing any of these activities are all affected by the same imperfection of human vision, it is no wonder that they have the same problems with individuating the animals they are interested in and reflect that fact in the use of zero plurals.

Adopting a cognitive approach to animal zero plurals makes it thus possible to develop a consistent account of corpus data and to explain a number of otherwise puzzling quirks of English usage. For example, the cognitive account offers a straightforward explanation why zero plurals are readily found in nouns designating some creatures, e.g. fish, squid, sheep, deer, antelopes or gregarious birds, but are rare or non-existent in nouns designating other animals, e.g. sharks, marine mammals and solitary predators, or why the use of zero plurals in the context of trapping is significantly different than in hunting or other related activities. What is perhaps the most crucial, though, is that the account is robust enough to go beyond the range of data traditionally addressed in discussions of zero plurals and covers also their generic uses, whose existence has so far been noted in published research only in Toupin (2015).

The cognitive account also casts new light on the question of the feasibility of compiling an exhaustive list of zero plurals. The issue was raised in Toupin (2015), where the feasibility of compiling such a list is clearly presumed and examining a corpus made up of five fiction works, three dictionaries, two field guides and a national park magazine is reported to have yielded 85 zero plurals.

However, in the light of the findings of this paper, compiling any such exhaustive list is clearly not feasible. The main reason is that in generic contexts, as has been shown in Section 5, there are no limits on the use of zero plurals and practically any animal noun may take that form. Another reason is the huge number of nouns designating aquatic creatures that spend their entire lives underwater and do not surface. As has been shown in Section 2, any such noun may be used as a zero plural and there are hundreds of them, which would make any list featuring them all quite impracticable. For example, in the BNC there are only zero plural forms of the nouns *bass*, *hake*, *halibut*, *krill*, *plaice*, and *turbot*, to name only a few.

In a broader sense, the explanation argued for above is thus a *prima facie* example of the principle of embodiment underlying cognitive linguistic research. In a typical formulation the principle reads, “[t]he idea that experience is embodied entails that we have a species-specific view of the world due to the unique nature of our physical bodies. In other words, our construal of reality is likely to be mediated in large measure by the nature of our bodies” (Evans and Green 2006:46).

The illustration of the principle adduced in Evans and Green (2006) is that the perception of color is limited by the acuity of the human eye, which makes infrared and ultra-violet wavelengths invisible to people and ultimately restricts the range of color vocabulary to the visible part of the light spectrum. The account developed in the preceding sections shows that the incidence of English animal zero plurals is a further example illustrating the operation of the same principle in that it demonstrates that the availability of such forms is correlated with the inability of speakers to individuate particular animals in their natural habitat.

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English animal zero plurals. A new explanation

The paper explores English animal zero plurals using data culled from the BNC and argues that the rarely discussed pattern is motivated by a cognitive factor. Specifically, it is argued that the use of the zero plural mirrors the inability to individuate referents in their natural habitat, i.e. the inability to distinguish between particular individuals. In nouns designating aquatic creatures the inability is rooted in the fact that human eyesight is able to penetrate the water surface only to a very limited extent, which makes animals that live underwater and do not surface practically invisible (e.g. *They caught lots of herring* vs. *They observed a pod of whales*). In the case of land animals and birds the inability is due to the fact that some animals live in large groups, which thwarts distinguishing particular specimens (e.g. *They watched a herd of wildebeest / a covey of quail* vs. *They spooked a couple of grizzly bears*). It is further shown that the zero plural pattern is the most widespread in generic contexts (e.g. *There are about 2,700 species of snake*), which accords well with the explanation argued for in the paper as species are mental constructs that can be readily talked about but are invisible to the naked eye.

Keywords: number, English animal zero plural.

