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GESTALT PRINCIPLES OF PERCEPTION AS A FACTOR MOTIVATING THE IRREGULAR PROPERTIES OF UNINFLECTED PLURAL-ONLY NOUNS

The paper investigates the issue of motivation of a subcategory of nouns called by Quirk et al. (1985: 303) and Huddleston & Pullum (2002: 345), respectively, unmarked plural nouns and uninflected plural-only nouns. These are nouns with untypical, from the perspective of the majority of English nouns, properties: their form, despite the plural designation, is singular.

Adopting the general cognitive perspective on motivation in language (e.g. Lakoff 1987; Heine 1997; Radden, Panther 2004; Gibbs 2005; Panther, Radden 2011, etc.), the paper analyses whether such irregular properties of uninflected plural-only nouns can be motivated by one of the factors shaping visual experience – Gestalt principles of perception (e.g. Koffka 1936; Pomerantz 1981; Rock & Palmer S. 1990; Palmer S. 1999).

Keywords: cognitive linguistics, Gestalt principles, motivation, uninflected plural-only nouns

1. Introduction

The English number system is typically associated with a simple, singular-plural contrast (e.g. Bloomfield 1933: 266; Lyons 1968: 281; Quirk et al. 1985: 297). And while it is true that such a system may seem simple in comparison with the number system in other languages (e.g. Corbett 2000: 19-38) and that most English nouns have both singular and plural forms (Huddleston and Pullum 2002: 340), this division is by no means restricted to just a simple singular noun – plural noun dichotomy. Actually, within these two categories Quirk et al. (1985: 297-298) distinguish the following classes (most of which consist of

further subclasses): singular invariable nouns, plural invariable nouns, nouns with regular plural, and nouns with irregular plural. This is largely convergent with the classification proposed by Huddleston and Pullum (2002: 340-349): plural-only nouns with the -s ending, other plural-only nouns, singular nouns with the -s ending, and variation between singular and plural construals.

The category that constitutes the object of the present analysis is, from the perspective of the totality of all English nouns, unusual. In general, these are nouns which, in at least one of their senses, refer to more than one entity and whose form, despite multiple referents, is uninflected – singular. The goal of the paper is to check whether such properties are in any way congruent with the scenes involving the noun' designations or, more specifically, with the effect that human vision produces by means of Gestalt principles of perception. This is achieved by scrutinising the scenes associated with these nouns' referents from the perspective of Gestalt laws and checking whether the effects that these principles produce are congruent with the nouns' grammatical properties.

In order to achieve it, the paper is organised as follows: first, the cognitive stance on motivation is briefly presented. This is followed by a discussion of the major Gestalt laws and processes related to them. The fourth section is devoted to a characterisation of uninflected plural-only nouns, and the fifth one – a detailed analysis of five nouns from this category. The paper is concluded with a discussion of the findings.

2. Motivation in grammar and lexicon

In contrast to the structuralist approach to language, where linguistic units are considered to be arbitrary (de Saussure 1916/1959: 133; Bloomfield 1933: 145; Palmer F. 1984: 11, etc.), cognitive linguistics views the relationship between the signifier and signified as motivated. What does this mean? Actually, the notion of motivation in language can be applied today to a set of quite distinct phenomena.

Most generally, it can be assumed that "the structure of language directly reflects some aspects of the structure of reality" (Haiman 1980: 515). This characterisation is in fact reminiscent of the division postulated by Peirce (1932), who introduced what Haiman (1980: 515) calls 'imagic' and 'diagrammatic' iconicity. We talk about the former one when a sign resembles "its referent in respect to (not necessarily visual) characteristic", e.g. photographs, statues, or onomatopoeic words. As for the latter one, which is also the object of our considerations in the article, it concerns cases when there is a systematic arrangement of signs, "none of which necessarily resembles its referent, but whose relationships to each other mirror the relationships of their referents".

At the same time, there are scholars who focus on very specific dimensions of motivation and claim that "form classes are semantically motivated, and that differences in grammatical behavior reflect iconically differences in meaning" (Wierzbicka 1985: 313, cf. Wierzbicka 1988: 501). Finally, we can come across a claim that seems to constitute the opposite pole of de Sassure's (1916/1959: 133) claim: "in natural language, motivation seems to be more the norm than the exception" (Lakoff 1987: 346). However, what we want to emphasise about motivation is that "cognitive linguistics embraces the important idea that linguistic structures are related to, and motivated by, human conceptual knowledge, bodily experience, and the communicative functions of discourse" (Gibbs 2005: 90).

This last approach is significant, for it considerably broadens the scope of linguistic investigation as, apart from linguistic structures, it takes into consideration three further, quite distinct factors. As for human conceptual knowledge, its delineation is problematic because, in most general terms, it encompasses all the possible aspects of knowledge associated with the given concept. The example of Langacker's (1987: 154) characterisation of the concept BANANA may be instructive:

> The concept [BANANA], for example, includes in its matrix a specification for shape in the spatial (and/ or visual) domain; a color configuration involving the coordination of color space with this domain; a location in the domain of taste/ smell sensations; as well as numerous specifications pertaining to abstract domains, e.g. the knowledge that bananas are eaten, that they grow in bunches on trees, that they come from tropical areas, and so on.

Naturally, while characterising a specific concept it is only possible to refer to a limited amount of properties. Still, the set or type of these properties is not, in any way, limited.

As for bodily experience, it can be seen from a number of perspectives (see e.g. Gibbs [2005: 11-13] for a more exhaustive discussion). For our purposes, it suffices to draw attention to just one of these aspects: the human body has a specific structure, which forces people to adopt a peculiar view of each scene – a view that is between a bird's and a frog's-eye view. As is shown in the course of the analysis, taking this perspective into consideration helps us to understand certain lexical and grammatical peculiarities.

Finally, we need to mention discourse. Although in the present paper its role is minimal because we deal with the grammatical properties of well-established nouns, it should not be completely omitted from general motivation studies. As Drożdż (2020: 849) shows, some untypical mass senses of otherwise count nouns are most likely to appear in specific types of discourse. For instance, *oven* in the sense 'oven size' appears in the discourse of restaurant owners, and *chin* in the

sense 'an exercise that requires pulling oneself on a bar up to the chin' – in the discourse of people dealing with fitness.

At the same time, Gibbs (2005) points to one more dimension inherently related to motivation: culture. As he notes, "bodies are not culture-free objects, because all aspects of embodied experience are shaped by cultural processes. Theories of human conceptual systems should be inherently cultural in that the cognition that occurs when the body meets the world is inextricably culturally based" (Gibbs 2005: 13). This means that, in order to trace the perceptual motivation of nouns, it is not enough to focus on human perceptual system alone. It is necessary to take into consideration such factors as the whole of the conceptual knowledge, embodied experience, discourse, as well as the cultural situatedness of the scene.

3. Gestalt principles of perception

The Gestalt movement was started at the beginning of the 20th century by three scholars: Max Wertheimer, Wolfgang Köhler and Kurt Koffka. It was an approach to the study of perception that was in opposition to two, dominant at that time, trends in psychology: structuralism and behaviourism, and all they represented: "to sensations as data and the accompanying mosaic view of perception, to crude atomism, to introspection as a method, and to the search for a bogus objectivity in psychology" (Gordon 2004: 12-13; cf. Wagemans 2015).

Although today this area of psychology is developing less vigorously, it undoubtedly laid the foundations for the way cognitive linguists perceive the relationship between language and reality and for one of the major cognitive postulates – the thesis of embodied cognition (e.g. Evans 2019: 64; Gibbs 2005; Rohrer 2007). It also provided the theoretical base for extensive research in various branches of cognitive linguistics: the study of prepositions (e.g. Vandeloise 1991; Tyler, Evans 2003), spatial frames of reference (e.g. Levinson 2003; Talmy 2000), and cross-linguistic variation (e.g. Fortescue 2011; Thiering 2015).

As Pomerantz (1981: 151-152) notes, the classical work of Gestalt theorists identified two types of factors. "The first kind was associated with certain laws of grouping, including similarity, proximity, and common fate", which were certain aspects of the stimulus. The second one results from the conclusion "that there must be a general underlying principle behind the numerous examples of organization that they discovered. It was as though perception tended, wherever possible, towards simplicity, symmetry, and wholeness, a tendency summarized by the German word, *Prägnanz*" (Gordon 2004: 17). Hence the present section is divided into two subsections, each dealing with the respective factor.

3.1. Laws of grouping

The laws of grouping are named so because they are concerned with one observation: "elements tend to be grouped perceptually if they are close together, similar to one another, form a closed contour or move in the same direction" (Rock, Palmer S. 1990: 85). As a result, the following laws can be enumerated: proximity, similarity, common fate, closure, and a more recently added one (Palmer S. 1992) – common region.

Proximity

In its most elementary formulation, the law of proximity states that "things that are close together are grouped together" (Bruce et al. 2003: 123). Though succinct, this definition requires elaboration. First of all, as Pomerantz (1981: 153) notes, being close is not to be seen in absolute, but relative terms – it is impossible to establish one, universal distance below which all possible entities will be perceived as functioning together. Still, it is certain that the closer the elements are, the more strongly they are grouped together (Palmer S. 1999: 257). What is more, Pomerantz (1981: 153) indicates that grouping is more likely when the stimulus is distant rather than proximal.

Similarity

The law of similarity concerns the situation when "all else being equal, the most similar elements (in color, size, and orientation [...]) tend to be grouped together" (Palmer S. 1999: 258). Again, however, there is more to it than meets the eye. As Pomerantz (1981: 155) observes, "grouping by similarity has little in common with 'ordinary' similarity". In other words, this law is not about a simple degree of similarity or dissimilarity between two regions of the visual field. What needs to be taken into consideration as well is the internal level of complexity of each of the regions in question. Or, more specifically, if the variance "*between* the regions of the visual field does not exceed the variance *within* the regions by a sufficient margin, the perceptual system concludes that they are not different; the two regions are grouped together as one, and discrimination is difficult". And conversely, "if the between-regions variance is larger than the within, a difference is noted perceptually, and the two regions of the field are segregated into distinct units" (cf. Ramanarayanan, Bala, and Ferwerda 2008 for a more extensive analysis of different facets of this phenomenon).

Still, even simple camouflage strategies observed among animals – adjusting to the average colour and brightness of the habitat – help them efficiently to blend with a uniform background. Good examples of creatures applying this strategy are tropical tree snakes, which are green, and polar bears, which are white (Bruce et al. 2003: 130).

Common fate

The name of this law is, to a certain extent, self-explanatory – "elements that move in the same way tend to be grouped together" (Palmer S. 1999: 258). This is what we can observe in the case of a flock of birds or a school of fish. Actually, one of the reasons why people have developed so many different names for all kinds of groups of animals or, more generally, things, may be the law of common fate. Consider, for instance, such groups as *a pack* (of wolves), *a herd* (of cows), *a pride* (of lions), *a swarm* (of bees), as well as *a pile* (of clothes), *a bunch* (of flowers), *a set* (of tools), or *a fleet* (of ships).

At the same time, motion does not seem to be a necessary condition. As Gibbs (2005: 12) notes, "perception is tightly linked to subjunctive thought processes whereby objects are perceived by imagining how they may be physically manipulated". In other words, it seems to be quite sufficient to see a group of objects and imagine how they move. What is more, Bruce et al. (2003: 124) observe that the law is also applicable to situations when the background is stationary. Then, as long as the camouflaged animal remains stationary, it remains well hidden. It becomes easier to see the moment it begins to move.

Common region

The last law is defined by Palmer S. (1999: 260) in the following manner: "elements that are located within the same closed region of space will be grouped together", for example "a line of otherwise equivalent, equally spaced dots is strongly organized into pairs when they are enclosed within the same surrounding contour". At the same time, he also notes an important property of this law – it is so powerful that it overcomes a different law – the law of proximity, which would normally result in a different grouping structure.

Visual completion

The last two processes to be discussed are not Gestalt principles, but perceptual processes that are inextricable in organising the visual field into objects. The first of them belongs to a set of more general mechanisms called visual interpolation (Palmer S. 1999: 288), whose main function is to guess the nature of things that are only partly visible (ibid.).

Visual completion concerns the perception of objects and surfaces that are partly occluded. It turns out that despite partial visibility of objects the perceptual system automatically perceives such entities as "whole and complete, usually including their shape, texture, and color" (Palmer S. 1999: 288). What is more, as Palmer S. (ibid.) stresses, "the completed portion is supported indirectly by visible information elsewhere in the image".

Parsing

To conclude the section on grouping, we need to mention one more fundamental process related to the organisation of perceptual object – parsing. This process is in fact opposite to grouping, as it involves "dividing a single element into parts" (Palmer S. 1999: 274) or, more specifically, "it determines what subregions of a perceptual unit are perceived as 'going together' most coherently". In other words, it affects the way in which certain perceptual scenes are coded (both perceptually and in language) – either as compact, uniform or, rather, as consisting of more elements.

The factor that plays a crucial role in parsing is the shape of the object. While a figure like a circle or a line has no natural parsing, consider, for instance, two overlapping circles:

> if we examine the places at which it is natural to divide such figures, it turns out that they divide at deep concavities: points at which the contour undergoes a sharp bend toward the interior of the region (Hoffman & Richards, 1984) [...] parsing occurs where there are pairs of such discontinuities. (Palmer S. 1992: 274)

This means that when a single, though irregular, figure has indentations, our perceptual system will have a tendency to divide it into smaller elements rather than perceive it as one whole.

3.2. Figural goodness

Figural goodness refers to situations when the perceived image is ambiguous, not easily or immediately interpretable, possibly – partly hidden. In such circumstances, the shape of the figure that we perceive to a large extent depends on a specific factor – whether "the visual field will be organized in the simplest or best way possible" (Pomerantz 1981: 160). However, such a definition leaves a lot of room for controversy – what do 'simple' or 'best' mean? While Gestalt scholars did not define it, several suggestions have been offered in psychology.

Rock and Palmer S. (1990: 86) indicate one of them, put forward by Emanuel Leeuwenberg and Hans Buffart – that "good" figures "contain little information, and "bad" ones contain a lot". This is consistent with the stance formulated by Palmer S. (1999: 289), where "the term "good" refers to the degree of figural simplicity or regularity". What is more, as all the scholars also emphasise, the conceived shape must be "consistent with the information available" (Rock and Palmer S. 1990: 86). This means that if we are faced with a figure consisting of numerous elements, it will be easier for our perceptual system to process it as a single, irregular shape rather than a collection of dozens of overlapping elements. At the same time, the information that we have about the entity has an

influence on the ultimate reception – if it is consistent with the holistic interpretation, the image will be perceived as a single whole. If, however, the information suggests an aggregate of objects, the image will be interpreted accordingly.

We also need to mention the proposal made by Pomerantz (1981: 162) – that "the 'good' patterns are the ones for which the various rules of grouping all point to a single, unique organization". This, again, seems an example of a more general regularity – we choose the interpretation of a shape that is congruent with the unified vision of it.

Concluding this section, one more remark is due. An application of Gestalt principles to grammatical irregularities might appear far-fetched – they may be considered as "mere textbook curiosities" (Palmer S. 1999: 261) that play no role in forming and formulating grammatical properties. Still, as the ongoing research on them shows, these principles "pervade virtually all perceptual experience because they are responsible for determining the objects and parts we perceive in the environment" (Palmer S. 1999: 261). And because the major assumption of the present paper is that grammatical properties of nouns are at least partly based on conceptualisations of nouns' designations, a reference to perceptual experience is vital in understanding the unusual behaviour of nouns.

4. Plural-only nouns with the singular form – a characterisation

Before we analyse uninflected plural-only nouns, it is good to mention the general phenomenon of plurality. For the start, it needs to be emphasised that the meaning of plural nouns extends beyond mere "more than one" (Bloomfield 1933: 266; Lyons 1968: 281; Quirk et al. 1985: 297), typically accompanied in English by the plural suffix -*s* added to the lexical base (e.g. Huddleston, Pullum 2002: 340). Naturally, this dimension is inevitably present in the sense of plurality, but what is equally important is that there is also, among others, a sense of generality, a reference to multiple entities, encoded in it. What is more, this multiplicity of reference is iconically reinforced by means of the plural suffix.

At the same time, a plural noun imposes a specific construal on its referents – it "portrays the mass it designates as consisting of individual "particles" salient enough to be countable" (Langacker 2008: 130; cf. Langacker 2016: 88). What is more, because plural nouns are "based on the term for an individual particle" (Langacker 2008: 131), they foreground the constitutive entities rather than the mass.

This means that when we consider such exemplary plural-only nouns as *police*, *cattle*, *poultry*, *livestock*, *vermin*, *people*, and *folk*, which have no overt plural marking, their interpretation is different from that of regular plural nouns. The iconic element of plurality encoded in the structure of such nouns is absent,

and the only remaining formal sign of plurality is of the secondary, syntactic nature – by means of plural determiners, plural concord, and some numerals. In other words, their plurality is not reflected in the form.

As a result, iconically, such a structure produces a different construal of the individual particles – they become less salient than in the case of regular plural nouns. Actually, the designation of plural-only nouns is seen, as Huddleston and Pullum (2002: 345) dub it, "en mass, with none of the individuation into atomic entities". That this type of interpretation is linguistically plausible can be seen in the quotation provided by Reid (1991: 85), where a theatrical director objects to the use of the noun *people*, as downplaying individuality:

> To help everyone get a feel for the story, King-Devine said she began each rehearsal by reading aloud at least one entry from the diary. 'This play is not about six million *people* dying in Holocaust', she said she told the cast every evening after reading. 'It's about six million *individuals* – with lives and hopes and dreams – being murdered. (italics added)

What is also worth noting, the category of uninflected plural-only nouns is far from coherent. Both Quirk et al. (1985: 303) and Huddlestone and Pullum (2002: 345) indicate that the nouns belonging to the category of uninflected plural-only nouns reveal a handful of divergent properties. *People*, for instance, can appear with low numerals (*five people*) and, in the sense "the people who belong to a particular country, race, or area" (Longman Dictionary of Contemporary English Online – LD), it can be a regular plural noun taking the plural *-s*: *the peoples of Europe* (LD).

This might suggest that the property that appears to be one of the most characteristic for this category – the lack of occurrence with numerals – is actually problematic. The most radical stance on this issue is presented by Quirk et al. (1985: 303), who maintain that such nouns' occurrence with numerals is rather limited, e.g. *police* is said to appear only in the collective sense 'the police force'. This position is relaxed by Huddlesotn and Pullum (2002: 345), who note that plural-only nouns appear only with "high round numerals", e.g. *a thousand cattle* or *two hundred police*. At the same time, linguistic corpora show something that may even seem contrary to Quirk et al. (1985: 303) – both COCA and Google Books US contain expressions like *these/those police* and even *one/ two police* (in the sense *these/ those policemen* and *one/ two policeman/ policemen*) (Gardelle 2019: 114).

However, in our opinion the very fact that a plural-only noun occurs with a numeral cannot be treated as a factor excluding this noun from the plural-only nouns category – this only shows that this noun reveals certain uses/ senses that are distinct from its prototypical property and, as a result, the noun is not the prototypical member of the plural-only category. What should also be taken into

account while deciding about the noun's classification is the frequency of these less typical uses and the type of dialect in which they appear. Under close scrutiny, it turns out that the number of hits for e.g. *two police* is much lower than for *two policemen* (six versus seventy seven hits) (ibid.: 109-110). What is more, the expression *one police* only appears in only one of the corpora analysed by Gardelle (2019) – the Corpus of Contemporary American English (COCA), and not in Google Books US.

Similar observations can also be made about other nouns. While Gardelle (2019: 114, 158) indicates that *infantry* and *cavalry*, *livestock*, and *poultry* are restricted in the uses with *how many* and can appear with *these/ those*, they do not licence uses with the most prototypical numerals – *one* and *two*, and only two of them, *infantry* and *livestock*, can be found in both corpora analysed by Gardelle. In a similar vein, *cattle* can be characterised as possible with *these/ those* and *how many* in both corpora though, as Gardelle (2019: 175) notes, uses with low numerals are extremely rare, and they are restricted to professional contexts. For us, such properties reinforce the general conclusion that uninflected plural-only nouns do not *readily* appear with numerals.

At the semantic level, belonging to the plural-only category entails a problem with individuation of the designated entities, and this can also be seen in a close analysis of the contexts in which *two police* or *these/those police* are used. Gardelle (2019: 109-110) indicates that such uses do not construe the people as individuated or differentiated, but as those who "belong to the same socio-professional category" and appear "in contexts of professional activity", which emphasises the policemen's homogeneity (cf. Hirtle 2009: 97-98). This reinforces the general conclusion that the entities that such nouns designate are less distinguishable, and thus construed as less individuated than those designated by regular plural nouns.

However, this is just one of several possible approaches to plural-only nouns with the singular form. An alternative one is adopted e.g. by Depraetere (2003) or Koptjevskaja-Tamm (2004). Because they characterise collective nouns not as "singular forms characterised by plural reference" (De Vries 2021: 259), but as having "multiple animate (inclusive or generic) reference" (Depraetere 2003: 87), they classify uninflected plural-only nouns as collective. Despite such a proposal, in the present analysis we see these two categories as distinct – we entirely agree with the observation made by De Vries (2021: 259) (cf. Gardelle 2017: 4) – that what collective nouns refer to is "more than the sum of their parts. A team is not just a collection of team members; it's an entity in itself, with its own internal structure, its own complex way of functioning and its own independent goals".

5. An analysis of selected nouns

In order to provide the most reliable set of observations, the nouns selected for analysis come from what Gardelle (2019) considers to be three different categories of nouns: those that originate from collective nouns (*cavalry*, *infantry*) (ibid.: 114), those that are derived from mass/ aggregate nouns (*livestock*, *poultry*) (ibid.: 154), and the noun that seems to be the 'odd-one-out' (*cattle*) (ibid.: 174). The goal of the analysis is to determine if the grammatical properties of these nouns can be traced back to the visual experience associated with their designations, which entails careful consideration of the typical visual scenes evoked by each of the nouns in their adequate historical and geographical setting.

As for cattle, the typical visual scene probably includes a large herd of cows and bulls being driven by cowboys to a railroad town, which took place from the mid-1860s to the mid-1880s (Online source 1). What sort of visual impression does such a scene produce? First of all, the creatures, due to their number, similarity, proximity, and common fate, do not seem to be a collection of individual animals, but rather a shapeless mass. This impression is additionally reinforced by the fact that cattle normally went through dusty plains and plateaus, and the rising clouds of dust must have obscured the view of individual animals. In such a situation, the focus on the animals as a kind of mass was an easier option for the human visual system than the perception of hundreds of them. In Gestalt terms, we can conclude that such a scene activates most of the discussed principles: figural goodness, proximity, similarity, and common fate, which may strongly influence the general reception of cattle as an unindividuated mass.

At the same time, there are two further dimensions of such a scene that should not be overlooked. First, cows are large and, as a consequence, they are relatively well distinguishable from one another. This, in turn, may be an important factor enabling visual completion – completing the image of individual animals on the basis of the view of parts of their back. Second, the visual scene with cattle highlights the significance of the human perspective on the creatures (cf. Gibbs 2005: 32). If cattle were looked at from the frog's-eye view, they would be perceived as a mass supported by numerous legs. From the bird's-eye view, they would constitute an irregular, moving, but rather flattish surface. And the human perspective, the perspective of the average human height – around 170-180 cm above the ground, is still different. What also plays a role is that cattle are only a little smaller – the average cow is 157-175 cm tall (Online source 2). This means that when people are looking at cattle they do not see, like in the case of the bird, a more or less homogeneous surface. Instead, they see a large number of salient parts of cattle that quite visibly project above the level of cattle's backs – their heads with horns (hence also probably the metonymic expression for a single member of a cattle herd – a head of cattle).

This visual perspective means that probably one more perceptual process is involved – parsing. In the case of cattle, parsing seems to arise not only from concavities between the sides of large cows but also, or chiefly, from the concavities between the heads of individual animals.

Although the next two nouns to be analysed, *infantry* and *cavalry*, are not included among uninflected plural-only nouns in Huddleston and Pullum (2002: 345) or Quirk et al. (1985: 303-304), the corpus analysis conducted by Gardelle (2019: 114) shows that these nouns reveal plural-only properties even more strongly than *people*, *police*, or *folk*, i.e. they appear with 'these/ those' and 'number of' but not with 'one', 'two', or 'various', while the three nouns easily occur with all five expressions. At the same time, only *cavalry* occurs with 'number of' and 'several', and only *infantry* can be found with 'how many', while *people*, *police*, and *folk* appear with all of them.

Coming back to the analysis, it is good to observe that two of the properties noticed about cattle, their relatively large size and a high degree of distinguishability, are also important dimensions in the case of the designations of *infantry* or *cavalry*. However, before they are discussed, it should be noted that both of these nouns are French borrowings, and an analysis of this aspect provides us with important insights into their meaning. OED2 notes that *infantry* comes from the French word *infante*, which meant 'a youth, foot-soldier'. Due to the suffix *–ery/ –terie*, the word developed into *infanterie* – 'foot-soldiery' or, as OED2 defines it, 'foot soldiers collectively'. A less complex story can be told about *cavalry*, because the French word *cavallerie* comes from the Latin *caballarius* – 'horseman', which must have been only partly transparent in French, as there was a similar word for the horse (*cheval*), and the suffix *–erie* designating, among others, someone's employment (OED2).

Yet, it is important to note that initially each of these nouns was ascribed a different grammatical property. Although OED2 defines both of them as referring to a collection of soldiers, which means almost the same designation, only *cavalry* receives an additional note that the noun is "usually construed with plural verb". This is also reflected in the properties ascribed to these nouns today – LD and LEXICO (LEX) classify *infantry* as a mass noun, while *cavalry* – as "plural, uncountable" (LD) and "usually treated as plural" (LEX).

One of the reasons of this diversity may be visual in nature. It is significant that the definition of *infantry* proposed by LEX is "soldiers marching or fighting on foot" (cf. a very similar definition in one of the major French dictionaries – *Le Petit Robert*). In other words, one of the most typical situations evoked by the word is a brigade or troop of marching soldiers and this, in the past, this was inevitably associated with two visual dimensions. The one that interests us at the moment is the fact that marching soldiers all looked alike – they had identical uniforms, rifles, they were close to one another, and they moved in the same direction. What is more, it was easier to see all the soldiers as one 'figure' than

hundreds or thousands of individual people. This means that, through the activation of four of the Gestalt laws: proximity, similarity, common fate, and figural goodness, such a scene must have evoked a very strong perceptual uniformity of the marching troop.

Cavalry is different in this respect. Both the English and French definitions highlight the main purpose of cavalry – fighting, and make no mention of their marching. This implies that the reception of the typical visual scene associated with cavalry must have been that of a charge, and this must have led to a different reception of the soldiers than in the case of infantry – more individualised.

Again, it is possible to suggest the visual basis of this characteristic. Unlike marching infantry, performing all the motions in a coordinated and synchronised way, attacking cavalry cannot be too close to one another and they may be moving in a much more chaotic and disorderly manner. What is more, riders constitute a readily visible element projecting over the horse's back, with very deep concavities around the saddle. These characteristics, reinforced by the process of parsing, must have made cavalry a set of distinct soldiers.

Why has *infantry*, then, become a plural-only noun? For the start, we should mention the fact that the mass classification of *infantry* is not unanimous – LD illustrates the mass definition of *infantry* with examples that show its countable properties, e.g. "like a starved infantry" and "the infantry were peasants", which means that *infantry* can be singular (preceded by the indefinite article) and can have the plural agreement.

Let us then analyse the visual reasons for the plural property. As has been mentioned, the view of marching infantry must have highlighted two significant dimensions of the scene. One was the reception of infantry as a unified whole. The other one, however, was quite different. Looking at marching infantry, onlookers saw numerous, separate rifles projecting above the level of the soldiers' heads. This was a view that could be compared to the view of cattle's heads – due to the law of visual completion, the observer could easily complement the unseen parts of the soldiers by means of the information that was visible somewhere else – that the marching rifles were actually carried by individual people. What is more, parsing enabled the division of the mass of infantry into individual soldiers.

A different selection of Gestalt laws seems to be involved in the properties of the noun *livestock*, designating cattle, sheep, pigs, goats, horses, etc. First, however, let us analyse the very noun. The examples provided by OED2 show that it originated as a compound consisting of *live* and *stock*, and the latter, in the sense of "farm animals", had been used in reference to "the animals on a farm" and as "a collective term for horses, cattle, and sheep bred for use or profit" (OED2). Most probably, because many senses of *stock* were mass, and 'farm animals' is enumerated as sense 54 (OED), *stock* is classified as mass both by LD and LEX. However, this property must have seemed dubious, as LEX illustrates

this sense with: "all the stock were housed and fed in sheds", where *stock* has the plural agreement.

As a result, probably by analogy to *stock*, LEX classifies *livestock* as uncountable though, again, the examples that it provides show something different. Out of 21 examples, 18 are indeterminate, e.g. "The government took the initiative to send seed and livestock to these farms", and in three *livestock* behaves like a zero-plural noun. In two cases it is used with plural verbs – *are* and *graze* ("livestock in fields are safe" and "livestock graze the sward very tightly"), and in one case it is used with a plural pronoun – them ("He then sold all his livestock and replaced them with four breeds of pedigree cattle"). In other words, the contexts suggest either a collective or plural-only interpretation rather than mass.

However, apart from grammatical and historical reasons, is there visual motivation for the singular form of the noun? At first sight, this would be counterintuitive – livestock consist of quite diversified types of animals: cattle, sheep, pigs, goats, and horses, and these are creatures of different sizes, shapes, colours, and sounds produced, that is, it is impossible to talk about their similarity, proximity or common fate. What is more, they rarely stand next to one another, so it would be unjustified to propose that they constitute a good visual figure. At the same time, there is a law that conceptually holds all the creatures constituting livestock together and thus, it can be argued, has an influence on the singular form of the noun – the law of common region.

We argue that this principle is crucial, because all these animals can be found in the same perceptual scene – with the exception of pigs, they all live and spend time in the same enclosed region – the barn or pasture. And, as Palmer S. (1999: 260) insists, the law of common region is able to overcome other laws, including the law of proximity. In the case of livestock, the fact that they are enclosed in the same space is a sufficient reason for treating the animals as constituting a certain whole.

At this point, a contrary question can be posed – what makes this noun plural? Here the answer is relatively simple. As has been already pointed out, *livestock* refers to a diversified set of animals, and this facilitates the operation of two visual processes: completion and parsing – the laws that trigger the perception of plurality and, as a consequence, can stimulate the plural agreement of the noun.

Finally, consider *poultry*. Like *infantry* and *cavalry*, it comes from French. It is important to note that the root of this noun originally referred to the hen (*poule*). Later, through derivation, it developed into the word *polet* – 'cock' or 'young cock' (DMF). At the next stage, the word *pouleterie* appeared, and it referred either to a single flying creature or a collection of them (*volaille* – DMF). When this word was adopted in English, it was used either as a collective or individual plural (OED2). Why, then, did the plural-only sense evolve?

The visual experience seems to provide a substantial part of the answer, as the situation seems to be comparable to *livestock*: on the one hand, poultry are birds that are reared for their flesh, eggs, or feathers (OED2). In other words, people are not interested in these creatures as individuals, but treat them as a source of profit, and hence are likely treat them as an undifferentiated whole. What is more, poultry are typically kept together in an enclosure, e.g. the yard or the barn (OED2), which, through the activation of the common region law, may additionally reinforce treating them as one whole.

At the same time, poultry are highly diversified – they consist of chickens, ducks, geese, turkeys, and guinea-fowls. These birds, despite being relatively small, are easily distinguishable visually from one another – they move differently, they have different colours, shapes, and they make very distinct sounds. And this, both visually and aurally, enables parsing them. In grammatical terms, we argue, this is likely to prompt plural concord.

6. Conclusions

The analysis shows a high degree of congruence between the visual impressions produced by Gestalt laws and the grammatical properties of uninflected plural-only nouns. In each of the discussed cases, the general visual impression of the nouns' designations is that of an unindividuated mass, which correlates iconically with the fact that such plural-only nouns lack the plural morpheme. At the same time, each of the visual scenes contains certain perceptual facets that stimulate individuation of the designated entities, which corresponds to the nouns' plural agreements. And this, in our opinion, justifies the opinion that at least a part of the motivation of the irregular properties of nouns can be ascribed to the human visual experience and the Gestalt laws shaping it.

At the same time, it should be emphasised that not all nouns from this category are motivated by visual experience in the same way and to the same extent. Such nouns as *people*, *police*, or *vermin* are, in our opinion, much more strongly motivated by other cognitive factors, as suggested by Berezowski (2020: 23) in the case of generic uses of animal species. However, a confirmation of this hypothesis requires further analysis.

Concluding, we wish to indicate the plausibility of the general cognitive linguistics approach to motivation in language. To see it, we need to take into consideration not only linguistic constructions, but also such factors as the human bodily experience, conceptual knowledge and, as has been stressed in the analysis, the cultural background of the analysed visual scenes. It is all of them that ultimately provide an adequate source of what can be called linguistic motivation.

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