A Study on Metaphoricity of Duck across Word Classes with Wmatrix[i] and BNCweb[ii] Combined — Implications for Learning of Polysemous Words

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Abstract   This paper combines Wmatrix with BNCweb to look at the grammar of linguistic metaphors formed by concrete nouns and their derivatives across word classes in order to shed light on learning of polysemous words. The methodology is to search different word classes of such a noun in BNCweb, use the concordances to construct corpus data and upload the data to Wmatrix for semantic domain tagging, choose the self-contained corpus in Wmatrix — British English 2006[1] — for a reference corpus to do the frequency comparison, then study the resultant key semantic tags as clues to identify the source domains of metaphor. The underlying idea of Cognitive Metaphor Theory, the Great Chain of Being[2] and the semantic makeup of a concept will help with the identification of a metaphor. The case study on *duck* shows the detailed process and feasibility of the research method. The research results reveal how different meanings of a concrete noun are related by metaphor or metonymy, which facilitates the learning of polysemous words.

Keywords   Wmatrix, BNCweb, Metaphor, Word Classes, Polysemy, Learning

1. Introduction

The study of metaphor in discourse is at full swing; however, the study at the lexical level is still necessary and useful, and is more feasible given the availability of extremely large corpora like British National Corpus (hereafter BNC). Since metaphor involves systematic semantic mapping, any corpus tool that only provides grammatical tagging is insufficient to identify the source and target domains in a metaphor. Wmatrix [1] can help

with the identification by virtue of its semantic tagging function; however, it runs on self-uploaded files, which is why we need the data from BNC. This paper finds an effective interface between Wmatrix and the web edition of BNC—BNCweb[2]—in the exploration of possible linguistic metaphors by a concrete noun and its derivatives across word classes.

2. Literature review

2.1. Studies on the Grammar of Metaphor

The research in this paper belongs to the field of the grammar of metaphor in terms of word classes. Studies on the grammar of metaphor can be found in the works of Brooke-Rose, Andrew Goatly, Lynne Cameron, Alice Deignan, Gerard Steen, and so on. The earliest researcher is B. Rose (quoted from A. Deignan [3]145-46) who studies the grammar of metaphor in literature. She finds some subtle semantic variations with different linguistic forms, e.g. the different effects of noun metaphors with or without the definite article. L. Cameron [4]89 researches the question of metaphor and part of speech in her classroom data, finding that verbs account for nearly half of the metaphors in her data, while adjectives and adverbs together account for less than five per cent of the total, hence the tendency of English to put metaphoricity on the verb. She also finds that "metaphors with single nouns as vehicle terms, often the form used to exemplify metaphor theory, account for only 5 percent of the total." But in my opinion, she may have ignored the fact that English is a noun-dominated language. Even noun metaphors only account for 5 percent of the total number of metaphors in her data, the number of noun metaphors in the whole language can still be larger than that of verb metaphors, and still be the most prototypical in the common sense of the general public. And G. Steen [5]194-207 gets different results from Cameron's in terms of metaphor and word classes, which shows that different research contents may lead to different results sometimes. The more evidences we

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get, the closer we are to the realities. A. Goatly [3] 146-47 makes some interesting observations about metaphor and word class, proposing that noun metaphors are inherently more marked than verb metaphors. His reason is that the primary function of a noun is to refer, and therefore an unconventional referent is very noticeable. According to him, verbs used metaphorically may also be marked, but that depends on our perceiving an unusual context rather than an unusual referent. To this, I disagree. Just because of the context that we feel verb metaphors more marked in that they are more vivid and economical, but need less processing effort to be understood. This conforms to the Relevance Theory by Sperber & Wilson [6]. A. Deignan [4]147-67 investigates the carrying-over relation between different parts of speech of a word, like the semantic relation between the noun *dog* and the verb *dog* in metaphor; different semantic prosodies between different inflectional forms, like the positive prosody from the singular noun *rock* and the negative prosody from the plural noun *rocks*; different linguistic collocations in the literal use and metaphoric use of a word, like the transitive verb *build* to be used literally, while the intransitive verb *build* followed by the particle *for* to be metaphoric. Deignan is the only scholar who has dedicated a book to the grammar of metaphor. She proposes that many linguistic metaphors seem to be restricted grammatically either at the macro-level of word class, or at the more concrete level of syntactic patterns. Under the inspiration of these scholars' research, esp. Deignan's, this paper attempts to study the grammar of linguistic metaphors by a concrete noun and its derivatives across word classes in order to find how different meanings of a word are related. The relation may be based on metaphor, metonymy, metaphor-based metonymy, metonymy-based metaphor, and so on. Since the focus in this paper is on metaphor, the mention of metonymy is not much detailed. The target words come from the 2-5 levels in the Great Chain of Being [7]. The findings are intended to shed light on the learning of polysemous words.

There are semantically content words and empty words [4]49. The former include nouns, verbs, adjectives and adverbs, and the latter include pronouns, conjunctions, prepositions, auxiliaries and articles. Content words usually constitute the most prototypical metaphors, while empty words, especially pronouns, articles and conjunctions are seldom metaphoric. It is well known that content words make the majority of the vocabulary of any language, and they can be changed into other word classes by conversion or derivation. It is quite common for a noun to be turned into a verb, adj. and adv by (zero) fixation, and normally there are semantic carry-over between different meanings of the word within a certain word class or across word classes. And that is the scope of study in this paper.

Due to the limit of space, the paper will take an animal word, *duck*, from the second level of the Great Chain of Being as example to look at its metaphoricity as noun and across word classes. In addition, this paper mainly studies

the situation when such a word acts as the source domain in metaphor, and ignores personifications where it acts as the target domain.

2.2. Studies on Metaphor Identification

Collins English Dictionary (21st Century Edition) [8]978 defines metaphor as a figure of speech in which a word or phrase is applied to an object or action that it does not literally denote in order to imply a resemblance. It is widely accepted that metaphor is no longer merely regarded as a figure of speech; instead it is found pervasive in human thought and behavior [9]3, and its nature is to experience or understand one thing in terms of another [9]5, which is the fundamental idea behind the Cognitive Metaphor Theory (hereafter CMT). The thing to be experienced and understood is the target domain, while the thing used to understand and experience the target domain is the source domain. Although there are other metaphor theories, like the mental space blending theory by G. Fauconnier [10], CMT is by far the most influential paradigm in metaphor studies.

Metaphor identification is the most critical step for any metaphor studies. There are some well-known metaphor identification procedures, like MIP proposed by the Pragglejaz Group [11], and MIPVU by Steen *et al* [5] for corpus-based metaphor studies. However, because this paper exploits a semantically tagging corpus tool, a different way of metaphor identification is suggested instead. This paper follows the design idea of Wmatrix [1][12][13][14] that the semantic domains tagged by the tool are roughly equivalent to the source or target domain in metaphor. Rather than marking up every word as metaphoric or non-metaphoric, this paper only looks at those semantic tags that are related to the search word and are likely to be the source domain (in this paper, only source domains are targeted at); as a result, unrelated words, even metaphoric, will be dismissed as irrelevant.

Normally three aspects are considered when searching for the source and target domains. The first is disparateness between the two conceptual domains. This is determined by the nature of metaphor to experience and understand one thing in terms of another. If two things are too alike, they will constitute an ordinary comparison, or a model relation [15]24. The second standard is semantic incongruity resultant from the disparateness between the source and the target domains. And the third is similarity perceived between the two disparate and seemingly incongruous concepts or propositions, without which metaphor will become willful.

There are two things to clarify. One is about the nature of the source domain. It is well-known that CMT assumes the source domain concept to be dominantly concrete, while the target domain concept to be mainly abstract. Most of the time this is the case, reflecting the cognitive economy of human thinking; but theoretically and practically there are metaphors where the source domain terms can be abstract

or difficult in order to de-automatize too familiar concepts, especially in literary language. Another thing is that similes are treated as metaphors and included in the scope of study here. In addition, metaphoric idioms are also included.

The process of metaphor identification is a combination of both top-down and bottom-up procedures. On the one hand, from the schematic makeup of a concept as the source domain we can guess what can be mapped onto a target domain, and this is the top-down part. According to Lakoff & Turner [7]63-64, the schematic structure of a concept includes the slots, attributes, relations and knowledge. Take *duck* as noun for example. Its slots can be the bird itself and its body parts; its attributes include its appearance, habits, behavior, etc.; relations may include its instinctual habit of swimming in water; knowledge is the causal relation(s), or the logic, e.g. a duck loving water suggesting intense fondness. Relations and knowledge can form analogy-based metaphors: the knowledge that *ducks* are born to swim can be mapped to convey easy excellence of somebody in doing something. All the above information will guide us in telling what is relevant and irrelevant in a metaphor triggered by the noun *duck* as the vehicle. On the other hand, what may happen may not really happen. In other words, there may be accidental gaps. This is the very meaning of corpus-driven studies on naturally occurring data. We check the concordances from BNC about *duck* to look for what about *duck* is really mapped to form metaphors. This data-driven part constitutes the bottom-up part of the procedure.

The identification should be guided by rough pre-knowledge about what can be the candidate source domain(s) or the target domain(s). Knowing one part will lead to an oriented search for the other. Semino [14] and Koller [13] use Wmatrix to search for candidate source domains based on prior knowledge of candidate target domains. Stefanowitsch [17]63ff looks for possible target domains based on possible source domains. As to metaphor use at the word level, some words tend to be the source domains, like *war*; others tend to be the target domains, like *life*; and some can be both, like *cancer*. In case a word belongs to the source domain, the task is to look for candidate target domains, and the situations for the other two cases are inferable. Since the research in this paper only concerns metaphor and personification is not included, so only the source domains will be looked for.

The identification would be easier if we refer to the Great Chain of Being [7]160ff which has five levels: humans, animals, plants, complex objects and natural physical things, with each level having its own nature, i.e. its defining features and behavior. Higher-order attributes and behaviors, like *thought* and *character* are the defining features of humans; *instinctual attributes* and *behavior* are the defining features of animals; *biological attributes* and *behavior* are

the defining features of plants; *structural attributes* and *functional behavior* are the defining features of complex objects; *natural physical attributes* and *physical behavior* are the defining features of natural physical things. When concepts in levels 2-5 are mapped onto humans, metaphors occur; when concepts concerning humans are mapped onto concepts of all the other levels, personifications are produced. Mappings between levels 2-5 are seldom, if any. According to the theory, only the defining features of one level can be mapped onto another in metaphor. For example, when humans are understood in terms of an animal, it is the animal's instinctual attributes and behavior that are mapped onto human beings, so anything related to human beings will belong to the target domain, while anything related to the animal will form the source domain. So lexical items referring to human character, like *confident*, *considerate*, *wise*, etc., can only belong to the target domain *human beings,* rather than to the source domain *animal*. This helps us put related lexical items into proper source or target domains, and exclude impossible ones.

3. Methodology

Before the appearance of a semantic tagging corpus tool, the most prevailing tagging was grammatical tagging, represented by POS tagging, i.e., part of speech tagging. Then what a corpus researcher generally did was key in the syntax in the query box of the corpus, get the concordances, look at the hits to find evidences for their research. And so was the corpus research into metaphor. The researchers would look at the concordances to tell the metaphoricity of the search word, group those that are metaphoric, and then elicit the cognitive metaphor(s) [3]160, [16]191ff.

However, since Dr. Paul Rayson [1] developed and ran Wmatrix under the UCREL infrastructure of Lancaster University, things have somewhat changed. Given that metaphor involves semantic mappings, grammatical tagging can not be of much help in metaphor identification. Wmatrix was originally developed for thematic studies in discourse analysis; however, it was creatively borrowed by some scholars in Lancaster University for metaphor research. Hardie et al [12], Koller et al [13] and Semino et al [14] try some methods to pin down candidate source domains of metaphor and suggest some calculations, including tag-lemma ratio and lemma-token ratio, to look at the density and variation of metaphors in a corpus. Their studies have proved that Wmatrix can effectively extend the researchers' instincts in finding more relevant tokens that might prove their pre-assumptions, or lead them to new findings.

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Folder duck_N                                                              Wmatrix
                                                    You are logged in to Wmatrix3 as: linghuanrong
[ Tagging > Tag Wizard... | My Tag Wizard... | Domain Tag Wizard... | Load file without tagging... ]
[ Folders > My folders | Details | Create... | Delete... | Archive... | Extract... | Join... | Share... | NEW! CrossTab... | Empty TRASH ]
[ Options > Switch to Simple Interface | Edit user options... ]
[ Help > Contents | Availability | Tagsets: POS & Semantic | USAS: Lexicon & MWEs & Context rules | Updates | Feedback ]
                                                    [ You are here > My folders > duck_N ] File details | Summary sheet

                         Frequency list              Concordance N- & C-grams  Collocation         Keyness analysis
                                                                                         Key words compared to:
         Word       Word only (Sorted by: Frequency; Word)    Word                      BNC Sampler Spoken     ▼ Go
                                                                                         Key POS compared to:
    Part of speech  POS only (Sorted by: Frequency; POS)      POS                       BNC Sampler Spoken     ▼ Go
                    Word and POS (Sorted by: Frequency; Word; POS)
                                                                                         Key concepts compared to:
         Semantic   USAS Tag only (Sorted by: Frequency; USAS tag)  USAS tag            BNC Sampler Spoken     ▼ Go
                    Word and USAS tag (Sorted by: Frequency; Word; USAS tag)
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Screencast 1.   The folder page before the keyness analysis list pops out

This paper combines BNCweb with Wmatrix, with the former for data, and the latter for semantic tagging. The method is to key in the search word in the query block of BNCweb, click on "Start query", get the concordances, use them to build a word document, delete filenames and numberings to reduce unreadable words and useless information. Since all of the hits in a BNC concordance are cut on the sentence boundary, the new file is made up of complete sentences, so insufficiency of context can be ignored to a certain degree. Re-save the word document in the format of a plain text, upload it to Wmatrix by clicking on "tag wizard" button on the top of its homepage, allow some time, and POS tagging and semantic tagging will be finished automatically. And then a folder will be produced and added to the file "My folders". Click on "My folders", choose and click on the target file, and the following page will appear. Under "keyness analysis" area, go to "Key concepts compared to:", click on the dropdown arrow, choose "British English 2006" in the menu, click on "Go", and a keyness analysis list in terms of semantic tagging with the target file and British English 2006 compared will pop out. Refer to Screencast 1 and 2 to get a glimpse into how this works.

The main task of the study is to look into the keyness analysis list, esp. the items whose loglikelihood value is above 6.63, which means the significance of the statistical item is above 99%. According to the procedures about how to identify metaphors, open the concordances of those items that may serve as the source domain in metaphor, list them, and try to find the regularities about how different meanings of a word are related to each other. Although metaphor is the focus of study, sometimes metonymy is unavoidable. And we all know that metonymy involves substitution of one thing for another within a single conceptual domain based on proximity. When the duck is used to refer to the duck egg, it makes a metonymy. Sometimes, there are more complicated cases: metaphor-based metonymy and metonymy-based metaphor.

4. Case Study on the Word Duck

Due to the limit of space, this paper only picks the animal word *duck* from the second level of the Great Chain of Being for illustration. First, key in *duck* in simple query mode in BNCweb, click on Start query, choose Frequency breakdown in the dropdown menu with New Query at the top, and 99 types (2982 tokens) will be obtained. Among them, the noun (duck, ducks), the verb (ducks, ducked,

ducking) and the adjective (ducky) forms of *duck* can be found, and no adverbs are returned. The compounds like *duckbilled*, *duck-toed*, *duck-like* are all dismissed except various forms of *lame duck* which is highly lexicalized, with forms of lameducked, lameducking, lame-duck and lame duck. Obviously, *lame* has become a frequent collocation of *duck*. The type *duckie* is a noun, a diminutive term, and it is also dismissed.

4.1. Duck as Noun

Key in {**duck/N**} (N for noun) in simple query mode in BNCweb, and 1,893 hits in 585 different texts will be returned. Save the concordances in the word format, deleting the columns containing the numberings and the filenames respectively. Merge all the words, and a file with 40,683 words, punctuation marks included, will be obtained. Re-save the content in the text format. Browse the resultant document to delete unnecessary blank spaces, paragraph markers and other symbols that will affect the accuracy of tagging (cf. http://ucrel.lancs.ac.uk/wmatrix3.html). Then upload the file to Wmatrix by pressing the Tag Wizard button on top of the homepage of Wmatrix, where POS tagging, USAS (UCREL semantic annotation system) tagging and frequency counting will be conducted automatically. The results will be saved in the folder entitled **duck_N**. Open the folder, and in the keyness analysis area, go to the third search box **Key concepts compared to,** choose the folder **British English 2006 (BE06)** in the dropdown menu as the reference corpus, click on **Go**, and a list of key semantic domains with log-likelihood value (hereafter LL) in decreasing order will appear. Take all the items whose LL value is equal to or higher than 6.63:

Since *duck* is a water bird, if it functions as the vehicle of a metaphor, it must be the defining features and behavior of the bird that are mapped onto the target domain. To be specific, they include the slots, features, relations and knowledge about a duck. Go through the above list, it is not difficult to guess that there should be words under Items 1, 7, 11 and 14 that belong to the source domain in metaphor. Since a duck is a bird, it must be under Item 1. Open the concordance of Item 1, one can find that it is dominated by the word *duck*. However, to one's surprise, duck alone seldom makes metaphor except as an endearing term, like "my love", which must be grounded on the assumption that a duck is something lovely. Item 7 is chosen because swimming is an instinctual feature or action of a duck. But in the concordance, only one metaphor is found:

			Item	O1	%1	O2	%2	LL	LogRatio	
1	List1	Broad-list	Concordance L2	1448	9.17	2501	0.27 +	6744.96	5.09	Living creatures: animals, birds, etc.
2	List1	Broad-list	Concordance O4.3	252	1.60	2327	0.25 +	490.15	2.67	Colour and colour patterns
3	List1	Broad-list	Concordance T2-	144	0.91	1762	0.19 +	217.18	2.27	Time: Ending
4	List1	Broad-list	Concordance Z4	218	1.38	3890	0.42 +	210.84	1.72	Discourse Bin
5	List1	Broad-list	Concordance A7-	70	0.44	446	0.05 +	178.22	3.21	Unlikely
6	List1	Broad-list	Concordance F1	181	1.15	3318	0.36 +	168.53	1.68	Food
7	List1	Broad-list	Concordance M4	96	0.61	1062	0.11 +	159.56	2.41	Sailing, swimming, etc.
8	List1	Broad-list	Concordance N3.2-	83	0.53	996	0.11 +	127.63	2.29	Size: Small
9	List1	Broad-list	Concordance W3	112	0.71	2460	0.26 +	78.47	1.42	Geographical terms
10	List1	Broad-list	Concordance N3.2--	14	0.09	48	0.01 +	49.96	4.10	Size: Small
11	List1	Broad-list	Concordance O1.2	51	0.32	938	0.10 +	47.26	1.68	Substances and materials: Liquid
12	List1	Broad-list	Concordance F4	40	0.25	673	0.07 +	41.89	1.81	Farming & Horticulture
13	List1	Broad-list	Concordance I1.3	47	0.30	913	0.10 +	40.18	1.60	Money: Cost and price
14	List1	Broad-list	Concordance B1	212	1.34	8067	0.87 +	34.41	0.63	Anatomy and physiology
15	List1	Broad-list	Concordance A9+	225	1.42	8910	0.96 +	30.53	0.57	Getting and possession
16	List1	Broad-list	Concordance A11.2+	23	0.15	353	0.04 +	27.04	1.94	Noticeable
17	List1	Broad-list	Concordance L1	16	0.10	191	0.02 +	24.73	2.30	Life and living things
18	List1	Broad-list	Concordance N3.2+	47	0.30	1259	0.14 +	22.28	1.14	Size: Big
19	List1	Broad-list	Concordance N6-	24	0.15	457	0.05 +	21.14	1.63	Infrequent
20	List1	Broad-list	Concordance A6.2+++	4	0.03	9	0.00 +	16.99	4.71	Comparing: Usual
21	List1	Broad-list	Concordance O4.1	72	0.46	2595	0.28 +	14.52	0.71	General appearance and physical properties
22	List1	Broad-list	Concordance N3.7-	18	0.11	366	0.04 +	14.34	1.53	Short and narrow
23	List1	Broad-list	Concordance M5	24	0.15	594	0.06 +	13.45	1.25	Flying and aircraft
24	List1	Broad-list	Concordance O2	149	0.94	6418	0.69 +	12.90	0.45	Objects generally
25	List1	Broad-list	Concordance W2-	12	0.08	199	0.02 +	12.81	1.83	Darkness
26	List1	Broad-list	Concordance L3	42	0.27	1474	0.16 +	9.34	0.75	Plants
27	List1	Broad-list	Concordance X3.1+	3	0.02	14	0.00 +	9.18	3.66	Tasty
28	List1	Broad-list	Concordance M1	209	1.32	9910	1.07 +	8.95	0.31	Moving, coming and going
29	List1	Broad-list	Concordance H4-	3	0.02	16	0.00 +	8.52	3.46	Non-resident
30	List1	Broad-list	Concordance T3+	26	0.16	818	0.09 +	8.20	0.90	Time: Old; grown-up
31	List1	Broad-list	Concordance O1.1	54	0.34	2107	0.23 +	7.85	0.59	Substances and materials: Solid
32	List1	Broad-list	Concordance X3.2+	9	0.06	174	0.02 +	7.75	1.61	Sound: Loud
33	List1	Broad-list	Concordance N3.7--	2	0.01	6	0.00 +	7.57	4.29	Short and narrow

Note: O1 refers to the number of hits in the corpus under study, O2 to the number of hits in the reference corpus; %1 means the frequency in O1, %2, the frequency in O2. It is the same with Screencast 2 to come. The semantic domains with + are all overused in **duck_N** in comparison with British English 2006.

Screencast 2.   Key semantic domains in duck_N in comparison with British English 2006

1)   He writes as a duck swims.

Item 11 is very conspicuous, because common sense tells us that ducks are closely related to water, and water is a liquid. Open the concordance, and the assumption can be proved: the page is occupied conspicuously by *water*: Among all the 51 occurrences, 40 are *water*. Read each hit carefully, such analogy-based metaphors from different collocations of duck with *water* are found:

> Like a duck out of water: metaphoric meaning "very uncomfortable"
> Take to something like a duck to water: metaphoric meaning "be good at or fond of something very much"
> Water off a duck's back/pour water on a duck's back and watch it run off: metaphoric meaning "be in vain; without effect".

Item 14 is chosen because the body parts of a duck must be included under the item "Anatomy and physiology". The neck, the feet, the toe, etc., may be borrowed for description of a person. They may also form such compounds as duckbilled, duck-toed, duck-webbed, etc., or similes like "his neck is like a duck's".

As to other items that are not chosen, there are ample reasons. For example, Item 2, "color and color patterns": even the color of a duck is metaphoric, it must be very rare, because the color of a duck is not its defining feature. Item 3, "Time: ending", is obviously irrelevant to *duck.* Item 4, "Discourse bin", since it only includes discourse markers, hence is irrelevant, too. Item 5, "Unlikely", irrelevant; Item 6, "Food", should also be irrelevant in that it at most contains the word *duck* referring to the meat of this bird,

and that does not make a metaphor, but a metonymy. The non-metaphoricity of other items can be inferred according to our knowledge about the bird *duck* in combination with our prior study on metaphor theories.

To sum up, most metaphors formed by the noun *duck* come from the relation or knowledge concerning the habitual behavior or living environment of the bird. They are most analogy-based metaphors. And the results also prove L. Cameron's observation: metaphors from single nouns are quite few.

Now let's look at the different meanings of *duck* as noun and the possible relations between them. Look up *duck* in *Collins English Dictionary* [8], and the meanings are as follows:

> 1 any of various small aquatic birds of the family *Anatidae*, typically having short legs, webbed feet, and a broad blunt bill: order *anseriformes*. 2 the flesh of this bird, used as food. 3 the female of such a bird, as opposed to the male (drake). 4 any other bird of the family *Anatidae*, including geese, and swans. 5 Also: **ducks**. *Brit. informal.* dear or darling: used as a term of endearment or of general address. see also *ducky*. 6. A person, esp. one regarded as odd or endearing. 7. *Cricket.* a score of nothing by a batsman. 8. **like water off a duck's back.** Informal. without effect. **9 take to something like a duck to water.** *Informal.* to become adept at or attracted to something very quickly.

Here the first meaning of *duck* is the most basic; the second meaning is related to it based on the metonymy that DUCK MEAT IS DUCK; the third and fourth meanings are

narrowed and broadened meanings respectively, and no metaphors are formed; the fifth and sixth meanings are metaphor-based metonymies, coming from the metaphor that AN ENDEARED (ODD) PERSON IS A DUCK; the seventh meaning is a metaphor-based metonymy in which the metaphor is ZERO IS SHAPED LIKE A DUCK EGG, and the metonymy is BREAKING ONE'S DUCK IS BREAKING ZERO, meaning scoring; the eighth and ninth meanings are analogy-based idioms whose meanings can be inferred by referring to the cognitive knowledge about what happens in the real situations about a duck.

4.2. *Duck as Verb*

Key in {duck/V} (V for verb) in the query box of Wmatrix, and 585 hits in 320 different texts will be returned, showing *duck* as verb is not as highly used as its noun. Build a new corpus **duck_V** with all the concordances, upload it to Wmatrix, compare its frequency list with that of British English 2006, and the following results will be returned:

			Item	O1	%1	O2	%2	LL	LogRatio	
1 List1	Broad-list	Concordance	M1	881	6.73	9910	1.07 +	1709.75	2.66	Moving, coming and going
2 List1	Broad-list	Concordance	B1	291	2.22	8067	0.87 +	188.68	1.36	Anatomy and physiology
3 List1	Broad-list	Concordance	H2	126	0.96	2395	0.26 +	144.05	1.90	Parts of buildings
4 List1	Broad-list	Concordance	M6	304	2.32	12848	1.38 +	68.10	0.75	Location and direction
5 List1	Broad-list	Concordance	O2	179	1.37	6418	0.69 +	66.13	0.99	Objects generally
6 List1	Broad-list	Concordance	A1.9	28	0.21	306	0.03 +	55.64	2.70	Avoiding
7 List1	Broad-list	Concordance	Z8	1417	10.82	81906	8.81 +	55.07	0.30	Pronouns
8 List1	Broad-list	Concordance	M2	150	1.15	5420	0.58 +	54.29	0.97	Putting, pulling, pushing, transporting
9 List1	Broad-list	Concordance	N3.8+	46	0.35	1044	0.11 +	41.40	1.65	Speed: Fast
10 List1	Broad-list	Concordance	L2	78	0.60	2501	0.27 +	37.72	1.15	Living creatures: animals, birds, etc.
11 List1	Broad-list	Concordance	N3.7-	24	0.18	366	0.04 +	35.19	2.22	Short and narrow
12 List1	Broad-list	Concordance	B5	77	0.59	2586	0.28 +	33.49	1.08	Clothes and personal belongings
13 List1	Broad-list	Concordance	L3	50	0.38	1474	0.16 +	28.84	1.27	Plants
14 List1	Broad-list	Concordance	G3	67	0.51	2280	0.25 +	28.23	1.06	Warfare, defence and the army; weapons
15 List1	Broad-list	Concordance	N4	127	0.97	5627	0.61 +	23.85	0.68	Linear order
16 List1	Broad-list	Concordance	I3.1-	14	0.11	211	0.02 +	20.78	2.24	Unemployed
17 List1	Broad-list	Concordance	M3	70	0.53	2720	0.29 +	20.63	0.87	Vehicles and transport on land
18 List1	Broad-list	Concordance	O4.3	62	0.47	2327	0.25 +	20.22	0.92	Colour and colour patterns
19 List1	Broad-list	Concordance	O4.4	52	0.40	1861	0.20 +	19.30	0.99	Shape
20 List1	Broad-list	Concordance	M4	35	0.27	1062	0.11 +	19.04	1.23	Sailing, swimming, etc.
21 List1	Broad-list	Concordance	M5	20	0.15	594	0.06 +	11.36	1.26	Flying and aircraft
22 List1	Broad-list	Concordance	E3-	49	0.37	2063	0.22 +	11.13	0.75	Violent/Angry
23 List1	Broad-list	Concordance	H5	35	0.27	1342	0.14 +	10.73	0.89	Furniture and household fittings
24 List1	Broad-list	Concordance	X3.2	37	0.28	1446	0.16 +	10.72	0.86	Sensory: Sound
25 List1	Broad-list	Concordance	X8+	31	0.24	1151	0.12 +	10.42	0.93	Trying hard
26 List1	Broad-list	Concordance	Z4	80	0.61	3890	0.42 +	9.97	0.55	Discourse Bin
27 List1	Broad-list	Concordance	X1	10	0.08	220	0.02 +	9.42	1.69	Psychological Actions, States And Processes
28 List1	Broad-list	Concordance	G3@	1	0.01	0	0.00 +	8.55	7.15	
29 List1	Broad-list	Concordance	W2-	9	0.07	199	0.02 +	8.41	1.68	Darkness
30 List1	Broad-list	Concordance	N3.3---	4	0.03	43	0.00 +	8.05	2.72	Distance: Near
31 List1	Broad-list	Concordance	S1.2.3-	4	0.03	46	0.00 +	7.62	2.63	Unselfish
32 List1	Broad-list	Concordance	Z5	4224	32.24	287186	30.88 +	7.59	0.06	Grammatical bin

Screencast 2: Key semantic domains in duck_V in comparison with British English 2006

Since *duck* now is a verb, signifying an action, only those semantic tags of action can subsume it. Browse the above list, and only Items 1, 6, 8, 20 and 25 are such tags. To decide which one or ones can serve as the source domain, we have to refer to the concept *duck* again. Here, it must be the typical behavior or action of the bird *duck* that is relevant. Before making the decision, I refer to the online edition of Collins English Dictionary [8] again, and find the following meanings of duck as v:

1. to move (the head or body) quickly downwards or away, esp. so as to escape observation or evade a blow
2. to submerge or plunge suddenly and often briefly under water
3. (*when intr,* often foll by *out*) *informal* to dodge or escape (a person, duty, etc.)
4. (*intransitive*)*bridge* to play a low card when possessing a higher one rather than try to win a trick

Among the four meaning, the second one must be the most basic, because it signifies the typical instinctual action of a duck. The first one is a little bit away from the second one: it signifies a similar physical action, but takes the meaning "to evade something physical, like a blow". The extension is based on the intention. The third one is still further away: it carries over the "*evade*" part of the first meaning and signifies a completely abstract action, and its objects can be such words as duty, question, responsibility, etc, which are completely unrelated to the action of a duck. The fourth entry is also far from the second meaning: it carries over the "taking a *low* posture" part of the duck action and refers to an attitude in playing the bridge.

Given the above results, it is very clear which items are relevant: only Item 1 and Item 6. Open their concordances, I find that the concordance of Item 1 is dominated by various verbal inflections of *duck*. I even find one example in which *duck* is used literally[3].

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3 Some scholars may not agree that *duck* here is used literally. It is really hard to tell. Here the subject of *duck* is *duck* the bird itself. The action it signifies is the most basic behaviour of a *duck*. All the other meanings of the verb duck are extended from it.

*2) Mist hung over the water and the huge concourse of duck swam and **ducked** and preened.*

Read the concordances of Item 1 and 6 carefully, and the following dominant cognitive metaphors can be extracted:

SUBMERGING INTO WATER IS DUCKING;
LOWERBING ONE'S BODY OR BODY PARTS IS DUCKING LOW/DOWN
DODGING SOMETHING MOVING AND DANGEROUS (BULLET, SHOT, SPEAR, OR OTHER FLYING OBJECTS) IS DUCKING;
MOVING QUICKLY INTO/OUT OF SOMETHING IS DUCKING INTO/OUT OF SOMETHING;
BENDING OR LOWERING FOR ENTRY OR PASSAGE (DOOR, INN, TRENCH) IS DUCKING (IN/INTO);
AVOIDING SOMETHING TROUBLESOME (QUARREL, ISSUE, RESPONSIBILITY, DUTY ETC.) IS DUCKING

It is quite easy to find that the target domains in the above list are becoming more and more abstract. The extension of meaning between the meanings is quite clear. And the most abstract is the ones when *duck* is followed by completely non-physical objects, like issue, duty, quarrel, etc. And that is the commonest type of metaphor: to use something concrete to metaphorize something abstract.

4.3. *Duck as Adjective*

Search {ducky/A} in Wmatrix, and 28 hits in 13 different texts will be returned. Among them, 20 are an addressing term, four are capitalized either as the name of a person, or of a pony. Only three are used as an ordinary adjective, among which two are found in the expression 'chucky duchy lover', where *ducky* means 'lovely', and one in its literal sense, as in

*3) ... watching the ducks do **ducky** things in the water.*

The situation with *ducky* in (3) is quite similar to that of *ducked* in (2) where the logical subject of both is *duck* the bird. They can be regarded as literal, or metaphoric if the attributes or actions of a duck are extracted and generalized.

The frequent occurrences of *ducky* are dominantly a noun, a highly conventionalized metaphor, and equivalent to *duck/ducks* when used as an address term. So *duck*, *ducks* and *ducky* can all convey the concept of a 'lovely' human metaphorically. Of course, they can also be called metaphor-based metonymies because their major function is to refer, or address.

4.4. A glimpse into the Collocation of Lame with Duck

The frequency breakdown for *duck* gives such compound forms as: duck-like, duck-billed, duck-egg, duck-quack, duck-toed, diving-duck, duck-egg-blue, duck-shaped, duck-jumping, duck-talk, duckboard, duck-pond, etc., which fall into two word classes: nouns

and adjectives. It seems that almost all adjectives, including duck-shaped, duck-billed, duck-toed, duck-like, duck-egg-blue, etc. are metaphoric, describing the properties of something else, while most nouns tend to be literal.

Among all the compounds, *lame* is found to be a frequent collocation of *duck*. Search lame*duck* in BNCweb, we can get 17 hits in 8 different texts in the form of four types: *lame-duck (*8 hits), *lameduck* (2 hits), *lameducked (*3 hits), *lameducking* (4 hits). Besides, the search *a lame duck* gets 13 hits; and *lame ducks*, 10 hits; *lamest duck*, 1 hit. All of them are metaphoric. Almost all the noun forms refer to people/organization/project... that are losing (have already lost) their current power, vigor, benefit, etc., like a President (or his administration) that has failed in the election into the next term. There is one exception in which a lame duck actually refers to a lame person who limps out of the room. Of course, that is an example of direct mapping between a *lame* duck and a *lame* person. However, all of the verb forms mean *to sympathize or comport a person who has become a lame duck*, as in

3) I am the one who needs lameducking.

So here, the meaning of the verb lameduck is obtained not from metaphor but from a metonymy THE RESULT IS THE REASON. To be specific, since a lame duck is a person who needs sympathy, to lameduck somebody is to show sympathy to the lameducked person because of his disadvantageous position. The situation of the verb lameduck is quite different from that of the verb duck where the meanings of the verb duck all come from the typical action of the bird duck based on metaphor.

6. Discussion

6.1. About Other Scholars' Studies

The research results in this paper shed some light on prior studies. If we compare the results from *duck* with Goatly's [3] study, we can come to a different conclusion: nouns used in metaphor seem to be less marked than verbs, since the verbal metaphors in the case of *duck* are more eye-catching, more vivid and easier to be understood.

Cameron's studies can also be justified to a certain degree: that is, English tends to put metaphoricity more on verbs. This can be seen from the frequency of the verbal *duck* metaphors. But further generalization must be based on much more evidences.

As to Deignan's [3] studies, the study of *duck* across its word classes shows that the nominal metaphoric meanings and verbal metaphoric meanings come from different parts of the concept *duck*: the former are from *duck*'s features, relations and logic, which form descriptive and analogous metaphors; while the latter mainly from its behavior, describing the actions of human beings. This further proves that metaphoric mappings are more of conceptual than linguistic.

And the study also proves Deignan's above-mentioned assumption that many linguistic metaphors seem to be restricted grammatically either at the macro-level of word class, or at the more concrete level of syntactic patterns. *Duck* as a verb almost always makes metaphor; however, as a noun, it often makes metaphor in some fixed collocations, or syntactic patterns.

The results also reveal that although the noun *duck* alone seldom makes metaphor, it often makes analogy-based metaphors by collocating with other things essential in its existence, like *water*.

6.2. About *Duck and Lameduck*

In 4.1 - 4.3 the relations of different meanings of the noun *duck*, the verb *duck* and the adjective *ducky* have been examined, showing that all meanings of the word *duck* and its derivatives are related: Some are evolved around its basic meanings; others are evolved from its extended meanings. The defining features and behavior of the bird *duck* determine the extension relations between these meanings. And the extensions are realized mainly by metaphor or metonymy. And the most basic meanings of the verb *duck* and the adjective *ducky* come directly from the defining features and behavior of the bird *duck*.

The finding about lameduck as verb is a little bit different from that of duck as verb. The meaning of duck as verb comes from the bird's typical action, so the extension of meaning is based on metaphor; however, the meaning of lameduck as verb comes from how a lame duck is treated because of the bird's lameness; therefore, the extension of meaning is based on metonymy.

It is important to find regularities and rules governing language phenomena. It is even more important and useful to mind the differences.

6.3. Implications for Learning of Polysemous Words

The nouns from the five levels of the Great Chain of Being make a bulk part of the vocabulary of English. They are polysemous as noun, and many of the nouns can be converted or changed into verbs/adjectives/adverbs, and most of these derivatives are polysemous, too. The most important is, there is obviously connection between the meanings of the word across different word classes. There are many polysemous words like *duck* in English. Since they have many meanings, it is not easy for language learners, esp. beginners to memorize them one by one. If we can find out how different meanings of such a word, within a word class and across word classes, are related by virtue of metaphor/metonymy, the learning process will be easier.

Of course, different words may have different ways of meaning extension. For example, when the word *fish* is converted into a verb, it is often used in such quite fixed patterns as *go fishing* and *fish for*, in which fish the animal becomes the target of *catching*. This is because *fish* as a creature is a kind of important sources of food for common

people, hence the extension of meaning4. That is to say, besides the defining features and behavior of the referent in the real world, the ways human beings influence it also exert great impact on the extension of its meaning. And this is more obvious with a word *bottle* from the fourth level of the Great Chain of Being. When it is converted into a verb, its functional behavior of holding something is carried over, and *to bottle wine* can only mean *to pour wine into a bottle for keeping*.

To sum up, the Great Chain of Being is helpful in guiding us in how to understand and remember the extended meanings of a noun and its derivatives. The defining features and behavior of the correspondent referent of a word, and possible human influence on it can give us clues as to the possible extended noun meanings, derived verb meanings, adjective and adverb meanings.

But one thing must not be forgotten. To any rule, there may be exceptions. The context of language use must be borne in mind. For example, *to bottle wine* is easy to be understood, but *to bottle a person* must mean differently: how big must a bottle be to hold a person? And here, its meaning may be changed into "to attack a person with a bottle" [18]. The daily container *bottle* now becomes a weapon in a different context.

Rules and regularities can save us a lot of efforts in learning polysemous words, but remember the variable—context—all the time.

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i Wmatrix (http://ucrel.lancs.ac.uk/wmatrix) is the first well accepted semantic tagging corpus tool developed by Dr. Paul Rayson operated online under the infrastructure of UCREL (short for University Centre for Computer Corpus Research on Language) at Lancaster University, UK.
ii BNCweb (http://bncweb.lancs.ac.uk) is the web edition of the British National Corpus (with 100 million words in 4124 texts) run online under the infrastructure of Lancaster University, Uk. It has 98,313,429 words in 4,048 texts, just a little bit smaller than the non-web edition.