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ARE PHONESTHEMES EVIDENCE OF A SUBLEXICAL ORGANISING LAYER IN THE STRUCTURE OF THE LEXICON?

Testing the OED analysis of two phonesthemes with a corpus study of collocational behaviour of *sw-* and *fl-* words in the OEC

Abstract Phonesthemes (Firth 1930) are sublexical constructions that have an effect on the lexico-grammatical continuum: they are recurring form-meaning associations that occur more often than by chance but not systematically (Abramova/Fernandez/Sangati 2013). Phonesthemes have been shown (Bergen 2004) to affect psycholinguistic language processing; they organise the mental lexicon. Phonesthemes appear over time to emerge as driven by language use as indexical rather than purely iconic constructions in the lexicon (Smith 2016; Bergen 2004; Flaksman 2020). Phonesthemes are acknowledged in construction morphology (Audring/Booij/Jackendoff 2017) as motivational schemas. Some phonesthemes also tend to have lexicographic acknowledgment, as shown by etymologist Liberman (2010), although this relevance and cohesion appears to be highly variable as we will show in this paper.

This paper seeks to compare two phonesthemes in a combined lexicographic and corpus study with a view to testing the results obtained. **Firstly**, following Smith (2016) which identified 11 semantic categories of *fl-* words in the OED, we analyse the OED entries for 245 *sw-* monomorphemes with a view to carrying out a key word analysis and a semantic trait analysis. The 245 monomorphemes have a total of 469 senses out of which 330 can be classified into 18 recurring semantic traits in Table 1.

semantic traits based on OED key words	**number of senses carrying the trait**
sway sweep swish	78
strike blow swipe	56
pressure swell swathe	57
sway swagger boast	11
compact cluster agitated	7
big fellow	4
flame burn waste	10
deceive sway swindle	11
faint swoon agitated	18
cool dark	7
drink	19
surface	9
hollow	10
exchange swap	6
labour toil sweat	12

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semantic traits based on OED key words	number of senses carrying the trait
deviate deflect	6
sound	9
Total	330

Table 1: Lexicographic behaviour of sw- senses in the OED

Then, in a **second step**, the comparison between the OED analysis of *fl-* and *sw-* monomorphemes shows that *sw-* words appear less likely to undergo any semantic change and therefore appear to be less indexical. In the light of these differing lexicographic behaviours, we aim, in a third step, to analyse the collocational behaviour of some common phonesthemic verbs carrying *fl-* and *sw-*. Collocational behaviour via a collexeme analysis will enable us to identify combinatorial patterns of use. For the study, we use the very large contemporary (2 billion words) OEC corpus (2000–2005) using Sketch Engine (Kilgarriff et al. 2004). The results of the compared analysis allow us to discuss whether phonesthemes are actual (sub)lexical "chunks" deserving of a lexical status, or whether they belong to larger phraseological "chunks" or units. This question raises the issue of the architecture of the lexico-grammatical continuum, the "constructicon": does the constructicon accommodate or require a sublexical layer?

What are the repercussions for lexicography and phraseology?

Keywords Phonesthemes; analogy; collocational behaviour; OED; OEC; phraseological chunks

1. Lexicography challenges: diachronic, usage based, cognitive lexicography

1.1 The OED as a historical emergent dictionary

1.1.1 Challenges and revision: using the OED as a usage-based historical database

Thanks to its philological beginnings, the OED is well known to be the most extensive historical dictionary of English (see Considine 2016; Mugglestone 2009; Brewer 2009, 2016; Paton 1995), and is regarded as an exceptional source of diachronic information, including etymological, morphological, semantic, diasystematic, and frequency data. It is used frequently for diachronic lexical analysis, such as Allan (2012), Durkin (2016a, b).

The challenges facing the OED and its revision process are now that of a hybrid evolving database. Indeed, as Brewer (2016) explains the OED3 is constantly under revision, "blending different versions of the dictionary in a proportion that changes every quarter as the revision progresses; currently the mix is roughly one-third revised third edition and two-thirds unrevised second edition". The revision process of the electronic version of the OED is gearing towards a-based historical emergent dictionary, aiming to improve systematicity in definitions, etymology, labelling, checking of attestation dates. The revision process stages in Table 2 are clearly outlined by chief editor Michael Proffitt on the OED blog page, which aims to provide transparent information for users.

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OED Revision Project	Total Progress to date	Progress targets for 2021/22
Entries rewritten or added	149,747	3,200
Senses rewritten or added	460,846	14,000
New senses added	169,280	2,500
Quotations added	1,315,621	
Etymologies added	75,623	
Variant spellings added	264,064	

Table 2: OED revision progress update

1.1.2 Usage based lexicography and cognitive lexicography

The challenges of a usage-based lexicography coincide with those of usage-based semantics, and usage-based theories of lexical semantics. Osterman (2015), Geeraerts (2016) call for a more integrated cognitive lexicography, that takes into account the users' mental lexicon. For Rundell/Atkins (2008, p. 48) the objective of a lexicographer is to identify **norms and typicality** (see also Hanks 2013):

> If our goal is to provide 'typifications', then how do we know whether a given utterance is typical (and therefore worth describing) or merely idiosyncratic (and therefore outside our remit)? A typical linguistic feature is one that is both *frequent* and *well-dispersed*. Any usage which occurs frequently in a corpus, and is also found in a variety of text-types, can confidently be regarded as belonging to the stable 'core' of the language

For Rundell/Atkins (2008, p. 280) the goal is to accommodate a certain degree of fuzziness since the lexicon is ever-changing: Therefore, the role of lexicography is to present norms (and exploitations in Hanks 2013) for users. Typicality is an important factor:

> A prototype approach to WSD has two major advantages over the classical model: It reflects the way people create meanings when they communicate, and thus it goes with the grain of the language, and accommodates creativity and fuzziness. It makes the lexicographer's task more manageable, because it allows us to focus on the prototype and its common exploitations, rather than requiring us to predict and account for every possible instantiation of a meaning.

For the historical OED, it becomes more complex to integrate indicators of typicality outside of the current time frame. The inclusion of obsolete and infrequent words specifically, which are often disregarded in other dictionaries, does call into question the notion of typicality; norms change over time for different communities of speakers. How to improve the feedback loop between lexical semantics and lexicography? This is the hope expressed by Geeraerts (2016, p. 438) for "a constant confrontation with the facts of linguistic usage draws lexicography and lexical semantics together".

How does the structure of the usage-based lexicon influence the lexicographical information in dictionaries? These are some of the challenges of usage-based lexicography and pattern analysis. Signs of a move towards cognitive aspects of lexicography can be identified in the interest for what are coined foundation words by Mickael Proffitt in the OED blog post titled *The Oxford English Dictionary: focus areas and goals for 2021*,[1] "words

[1] https://public.oed.com/blog/the-oed-2021/ (last access: 2022-04-08).

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with the greatest longevity and frequency, and which exhibit the greatest historical, semantic, and cultural complexity". [...]. The interest lies in their "**elasticity and adaptiveness in their relationships** with other words, by forming many compounds and phrases", i. e. in the structuring role in the lexicon.

1.2 Background on phonesthemes and their function in the lexicon

1.2.1 Defining phonesthemes

Phonesthemes are frequently consonant clusters at the onset of short words in English such as *fl-* (*flush*, *flap*, *flit*, *fly*) and *sw-* (*swish*, *swap*, *swindle*, *swoop*), or *sp-*, *sn-*, etc. Phonesthemes are sublexical units that resemble affixes in that they don't exist independently from the elements they combine with. They are however distinguishable from affixes in that they are not systematic nor are they considered to be morphemic. This is the main limitation of phonesthemes in traditional morphology, if we accept the traditional view of word formation as composition into morphemes. Phonesthemes are therefore viewed as sublexical associations of meaning and form which are not systematic and call into question the traditional building block vision of the lexicon. The second limitation and difficulty pertaining to phonesthemes is the difficulty in identifying the semantic associations of the form-meaning pairing. Phonesthemes are very hard to pin down, despite many attempts to identify a core "sense" (Abramova/Fernandez 2016; Abramova/Fernandez/Sangati 2013).

1.2.2 The function of phonesthemes in the lexicon

Firth (1930, p. 184) defines phonesthemes as "[p]airings of sound-meaning that are not componential or systematic". The role of phonesthemes has been identified by Firth as early as 1930, and has been recently rediscovered via psycholinguistic research (Bergen 2004). According to Bergen (2004, p. 293) "[F]orm-meaning pairings that crucially are better attested in the lexicon of a language than would be predicted, all other things being equal". Experimental studies have shown that phonesthemes affect mental processing, that is that they have a quantifiable effect in structuring the mental lexicon. This discovery has sparked computational studies into phonesthemes, with Otis/Sagi (2008, p. 65) defining a phonestheme as: "a submorphemic unit that has a predictable effect on the meaning of a word as a whole". However, this computational perspective has come under criticism from cognitive semiotics. For Pleyer et al (2017), phonesthemes should not be viewed as a purely statistical phenomenon and are to be related to cognitive transmodality in that they are **transmodal** signs (ie).

Etymologist Anatoly Liberman (2008, 2010a, 2010b) recognizes that phonesthemes **regulate etymology**. According to Liberman (2010a, p. 251) etymological ties are affected by analogical attractions; for instance *sleazy* and *glaive* have evolved due to analogy with phonesthemes *sl-* and *gl-*: "*sleazy* may have acquired its present day meaning under the influence of *sl-*, whereas *glaive* may have come to mean 'sword' rather than 'spear' because glâ•, suggests glistening". Other instances of these shifts can be traced to words carrying the phonesthemes *fl-* such as *flatter*, *flute*, cited by Liberman 2013).[2] Liberman (2010a, p. 257)

[2] The origin of *flatter* has been hotly contested. I support the hypothesis that the word was coined in Germanic and meant "flutter around the person whose favors one wishes to obtain," with the French verb having been borrowed from Middle English. *Flutter*, *flitter*, and *flatter* begin with the

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argues that the lexicon is affected by a multitude of such paradigmatic ties which render impossible the tracing back to a single etymological source word:

> Finally, the period of "first words" is an uninspiring construct. There have always been many words that influenced one another, people have always had neighbors from whom they borrowed words, and conflicting impulses have always been at crosspurposes. There never was a beginning. After all, we are not characters in Kipling's *Just So Stories*.

Lexicographic studies of phonesthemes have been carried out based on the Oxford English Dictionary (Smith 2016, 2019).

1.2.3 Phonesthemes in a constructional view of the lexicogrammatical continuum

An alternative framework is provided by constructionist morphology (Goldberg 2006; Audring/Booij/Jackendoff 2017) which views associations of form and meaning as constructions. Constructions can be purely motivational schemas rather than generational schemas, thus accounting for the non-systematicity of form-meaning pairings.

This recent framework is therefore attractive for the description and formal analysis of form-meaning pairings that are either phraseological or sublexical. Constructional theory allows for the existence of constructions of different sizes and complexity throughout the lexicogrammatical continuum. Such constructions represent different sizes of constructions (from single word to multiword and from single word to sublexical layer). Kwon/Round (2015, p. 2) argue it is necessary to reevaluate the status of phonesthemes and to question whether they are actually different to morphemic units: "according to what criteria, if any, do phonaesthemes distinguish themselves from non-phonaesthemic, stem-building elements?".

1.3 Purpose of this paper

From a usage-based perspective, the role of phonesthemes in organising the mental lexicon is likely to carry over into the institutionalised lexicon. According to language change theories, change is affected by the usage based combinatorial behaviour of words in discourse (Bybee 2013). The assumption is that the phonesthetic attraction (Bolinger 1965) via analogical remodelling or remotivation over time is likely to affect semantic change in the lexicon itself. A historical dictionary such as the OED provides a usable database. Corpus studies have shown there is evidence of synonym **clustering** of phonesthemic words, as well as collocational clustering.

There are two confounding issues to the question of what drives change: 1) what is the role of repetition and frequency? and 2) what is the role of qualitative salience (the relative position of a word within the field of its competitors)? **Is change driven by the overall frequency of lexical items only, or is it driven by frequency within a form-meaning paradigm (onomasiological space)?** A third question is if clustering leads to chunking of

group *fl-* that we find in *flute*. In English, contrary to German, *flute* left a jeering echo. Rather probably, *flout* has been taken over from Middle Dutch. In Modern Dutch, *fluiten* has the expected sense "whistle; play the flute," but many centuries ago it also meant "mock, jibe" (Liberman 2013) https://blog.oup.com/2013/07/flute-word-origin-etymology/.

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these forms (sublexical and phraseological)? In other words, if phonesthemes do not simply exist but develop, emerge through usage, how can we track this process? Does the lexicon require a sublexical/submorphemic layer, of which there are already signs of acknowledgment in the OED, notably in the role of assigning sources of semantic shift and analogical change in the lexicon.

2. Studying *fl-* and *sw-* words in the OED and semantic shift

2.1 Protocol for the lexicographic analysis of phonesthemes

2.1.1 Key word analysis in the OED and conceptual categories

Smith 2016 initiated the protocol for the analysis of fl- monomorphemes using the OED. The protocol has also since been applied to morphemic affixes (*-age*, *-some*) in an effort to parareplicate the experiment (Smith 2018, 2020). This protocol has now been applied to *sw-* words in an effort to test the results on further phonesthemes. The objective of the protocol is not to assume key words are directly correlated to the meaning of the phonestheme, but relies on **key words** as an indicator of lexicographic cohesion. Instead of using key words as absolute indicators, they function as relative indicators in the analysis of change. Of course, one of the main drawbacks in the inconsistency in the definitions as the OED review process continues, thereby creating fluctuation in the revised entries versus the non-revised entries as mentioned previously.

In table 3 we provide the lexicographic treatment applied to *sweep* first attested [1300] and its many senses based on the key word analysis. This strategy was applied to all *sw-* monomorphemic words in the OED.

sweep, v.	**date**	**Definition**	**key words**
sweep, v.	1300	Senses with that which is removed or moved along as the object, and derived uses. To remove, clear away, off (etc.) with a broom or brush, or in a similar way by friction upon a surface; to brush away or off.	SWAY BRUSH IMPETUS
sweep, v.	1400	To cut down or off with a vigorous swinging stroke. Now rare or Obsolete.	SWING
sweep, v.	1920	Cricket. To hit (the ball) with a sweep (sweep n. 5b). Also absol. or intransitive, to play a sweep.	SWING
sweep, v.	1577	To remove with a forcible continuous action; to brush off, away, aside.	BLOW STRIKE
sweep, v.	1560	Chiefly with away: To remove forcibly or as at one blow from its position or status, or out of existence; to do away with, destroy utterly.	BLOW STRIKE
sweep, v.	1635	a. To gather in or up, collect wholesale or at one stroke; esp. in to sweep the stakes (cf. sweepstake n.).	GATHER
sweep, v.	1942	U.S. To win every event in (a series of sporting events, etc.), or to take each of the main places in (a contest or event).	GATHER
sweep, v.	1616	To carry or trail along in a stately manner, as a flowing garment.	FLOWING MOTION

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sweep, v.	date	Definition	key words
sweep, v.	1538	To pass over the surface of (something) in the manner of a broom or brush; to move over and in contact with; to brush, rub like (or as with) a brush.	BRUSH
sweep, v.	1892	To achieve widespread popularity throughout (a town, country, etc.). Also spec. in Politics, to gain control of by an overwhelming margin.	IMPETUS COVER
sweep, v.	1788	To range over (a region of sea or land), esp. to destroy, ravage, or capture; to scour. Also spec. with an aircraft as subject.	BLOW STRIKE WIPE OUT
sweep, v.	1638	To pass the fingers over the strings of a musical instrument so as to cause it to sound. (With the strings, or the instrument, as object.) Chiefly poetic.	BRUSH
sweep, v.	1744	To direct the eyes, or an optical instrument, to every part of (a region) in succession; to take a wide survey of, to survey or view in its whole extent, esp. with a glass or telescope. Also absol. or intransitive; in Astronomy to make systematic observations of a region of the heavens (cf. sweep n. 7).	SURVEY

Table 3: The senses of sweep [1300] in the OED

In column 2 the approximate date of attestation of the sense is given, in column 3 the OED definition used for analysis, in column 4 the key words in the definition, and in the column 5 the broader conceptual feature of the sense. As can be seen in the final column the senses of *sweep* tend to all trigger the same conceptual feature, with a few minor adaptations. There is no sign of major semantic shift from one feature to another.

2.1.2 Comparing *fl-* and *sw-* conceptual categories

There are 103 *fl-* monomorphemes, 180 senses in total which fit into 11 conceptual categories based on definition key words, and 270 combinations of features (see table 4). On the other hand, there are 217 *sw-* monomorphemes, and 330 senses out of 469 fit into the 18 conceptual categories based on definition key words. All words and senses were included if they were monomorphemic and consistent with recurring key words. A fair proportion (40%) carry labels such as obsolete, rare, and regional. As our purpose is to track change in behaviour rather than determine absolute behaviour, this methodology is considered suitable.

Feature abbr.	Conceptual categories	Examples
1 MTA	Move through air	*flap, flop, flick, flounce, flip, flit, fly, flee, flirt*
2 SV	Sudden violent	*flounce, flash, flit, flick*
3 FSC	Fail struggle confuse	*flop, flunk, flump, flummox,, flounder, flag (slacken), flivver*
4 SBT	Strike blow throw	*flick, flog, flail*
5 CJH	Clumsy jerky heavy (unsteady/awkward)	*fluster, flounder*
6 FLL	Flaccid limp loose	*flag, flop, flump*

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Feature abbr.	Conceptual categories	Examples
7 APF	Agitated panic fitful	*flurry, fluster, flicker*
8 MTL	Move through liquid (water)	*flash, flush, flow, flux, fleet, float, flask, flodder, flotter*
9 LDS	Light downy soft	*fluff, fleece, flake, floss, fleck*
10 DFF	Display flaunt flatter	*flatter, flutter, flare, flirt*
11 JS	Jeer sneer	*fleer, flout, flounce, flirt*

Table 4: Key words grouped into 11 conceptual categories for *fl-* words

Whereas there are 11 features for *fl-* words, there are 18 recurring features for *sw-* words in Table 5.

Feature abbr.	Feature	Examples
SSS	sway sweep swish	*Swimble, swabble, swaver*
SBS	strike blow swipe	*Switch, swash*
PSG	pressure swell grow	*Swivet, swench*
PSw	pressure swathe	*Swench, swaddle*
SSB	sway swagger boast	*Swell, swank, swagger*
CCA	compact cluster agitated	*swarm*
BF	big fellow	*Swad, swaddy*
FBW	flame burn waste	*Swither, swind, sweal*
DSS	deceive sway swindle	*Swike, swikel*
FSA	faint swoon agitated	*Sweer, swim, swarf*
CD	cool dark	*Swerk, swart, swale*
Dr	drink	*Swipe, swizzle, swoop, swill, swig*
Surf	surface	*Swarth, sward*
Hol	hollow	*Swire, swilly, swallow*
ExSw	exchange swap	*Switch, swap*
LTS	labour toil sweat	*Swat, sweat*
DD	deviate deflect	*Swerve, switch*
Sound	sound	*Swan, swear, swoosh*

Table 5: Key words grouped into 18 conceptual categories for *sw-* monomorphemes in the OED

Some of the features appear to show little relation to the more frequent features which are the 3 top lines in Table 5 (sway sweep swish, strike blow swipe, pressure grow swell). The green lines will be shown to be considered primary, whereas the grey lines correspond to what we have considered secondary features.

2.1.3 Combination of features, emergence of features and roots

The features themselves don't hold any specific meaning beyond the lexicographic cohesion of the definitions. However, it is possible to test the features based on four factors, 2 quan-

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titative factors and 2 qualitative factors. The quantitative factors in Table 6 are 1) the frequency of a feature and 2) the combinatorial properties of the feature. The qualitative factors are 3) the dates of emergence and post-emergence of a feature, and 4) the etymological roots of a feature. Results for *fl-* showed the existence of 3 primary features occurring frequently with strong form-meaning correlations: MTA, SBT, SV. In addition, there was some evidence of semantic shift towards secondary features such as FSC fail struggle confuse. The etymological roots of *fl-* are also consistent with a degree of **convergence** towards these primary features.

FEATURES	single feature	combination of 2	comb of 3	comb of 3 or more
Move through air	24	34	16	1
Sudden violent	7	20	12	2
fail struggle confuse	11	8	1	1
strike blow throw	9	12	8	1
clumsy jerky heavy	4	5	5	1
flaccid limp loose	3	7	1	0
agitated panic fitful	5	2	3	1
move through liquid	18	4	0	1
light downy soft	18	0	0	0
display flaunt flatter	7	11	0	0
jeer sneer	4	2	1	0
RAW TOTALS	110	105	47	9
FREQUENCY	40.74%	38.89%	17.41%	2.96%

Table 6: Combination of features for *fl-*

As opposed to *fl-*, the combination of features for *sw-* is very rare, contrary to the results for *fl-* words. The results for *sw-* showed that 3 primary features account for 57% of all senses: *sway*, *sweep swish*, *strike blow swipe*, and *pressure swell grow*. Categories with few tokens tend to be filled with the same lexeme and its senses, or even homonyms. Strikingly, the senses of *sw-* words (330 senses) appear to exhibit far less semantic shift between key conceptual features, indicating that *sw-* does not jump from one key conceptual feature to another to the same degree as *fl-* words. Polysemic words usually don't attract new conceptual features, like *swag* [1527] for instance. Sense 1 of *swag* [1527] which coincides with the first attested meaning activates sway sweep swish, and later senses don't activate new features coinciding with recurring key words.

Word	Date	OED definition	key words	feature 1
swag, v.	1527	To move unsteadily or heavily from side to side or up and down; to sway without control. of a pendulous part of the body, or of the whole person.	SWAY LURCH+ BIG CHUNKY	SWAY SWEEP SWISH
swag, v.	1611	of a structure or something erected or set in position, a boat, or the like. (Also occasionally of a rigid body, to get out of line.)	SWAY	SWAY SWEEP SWISH

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Word	Date	OED definition	key words	feature 1
swag, v.	1630	To sink down; to hang loosely or heavily; to sag. Also with down.	SINK	SINK
swag, v.	1846	To steal; to make away with (stolen property). Obsolete.	STEAL	STEAL
swag, v.	1861	To pack up (one's effects) in a 'swag'; to carry in a 'swag'; also, to wander about (the land) as a swagman.	WANDER	WANDER
swag, v.	1958	To push (a person) forcefully, to 'shove'; to take or snatch away roughly.	PUSH	PUSH

Table 7: Polysemy of *swag* [1527]

Incidentally, the correlation between roots of *sw-* also shows less consistency than for *fl-* words, where both Romance and Germanic roots tend to correlate with MTA (move through air).

2.2 Tracking change with dates of emergence

2.2.1 Evidence of shift; accounting for polysemy in the sense definitions

The OED definitions are central in identifying semantic change in the lexicon, the lexicographers rely on drawing analogical ties between etymological evidence and evidence of semantic shift. Awareness of anogical remotivation is sometimes explicit in the OED entries, although it is sometimes combined with a critical normative commentary ("contagion"). As Brewer (2016, p. 491) underlines: "it is clear that in a small number of instances both Murray and his fellow-*OED* lexicographers sought to impose their own views on the impropriety or undesirability of certain usages, even when these were amply attested by their quotation."

> All this means that the labels and usage notes in the first edition of the *OED* are a fine tool to identify and discriminate culturally significant vocabulary on the one hand, and/or lexicographical attitudes towards such vocabulary on the other, especially in view of *OED's* seminal status in English lexicography and its role as a cultural icon. (Brewer 2016, p. 493)

2.2.2 Do phonesthemes drive change?

The senses of *fl-* and *sw-* words were tracked using the feature analysis detailed above. Co-emergence of a feature with the first attestation is assumed to correlate with original etymological senses. Post-emergence of a new feature is assumed to correlate with semantic shift towards the new feature. Do phonesthemes affect semantic change? The data for *fl-* words in the OED in Table 8 provide some evidence of a shift of features.

	Sense 1	Feature 1	Sense 2	Feature 2
fleer [1400]	[1440] to flatter	DFF	[1549] to sneer, mock	JS
flounce [1542]	[1542] agitated, clumsy, violent	MTA and SV	[1751] n. a quick movement of the body expressing impartience or disdain	JS

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	Sense 1	Feature 1	Sense 2	Feature 2
flourish [1303]	[1384] to display ostentatiously, to brandish	MTA	[1674] boast, brag, swagger	DFF
flummox [1837]	To bring to confusion, to do for, cause to fail, to confound	FSC	[1839] U.S. to give in, give up, collapse	FSC
flummer [1563]	To mumble, speak indistinctly	NONE	[1674] to deceive through flattery	DFF

Table 8: *Fl-* words exhibiting new senses

Although a shift has taken place, it is difficult to attribute the shift to the phonestheme only. It is generally thought that pathways of change are combined pathways rather than a single pathway. It is the combinatorial tendencies which may affect semantic change via analogical associations. However, compared to *fl-*, *sw-* words show hardly any shift, which seems to suggest that *fl-* and *sw-* have different behaviours.

We now look at combinatorial corpus patterns of a selection of *fl-* and *sw-* words in the OEC. The objective is to assess if behaviours do diverge, providing evidence of a different organising function.

3. Collocational behaviour in the OEC and phraseological patterns

3.1 Protocol and corpus collexeme analysis

3.1.1 Protocol and collexeme analysis in the OEC

The previous section showed that 1) *sw-* and *fl-* words do not share the same cohesion in the OED definition, and that 2) *sw-* words appear to undergo less semantic change than *fl-* words.

In this section I will use a collexeme analysis to track the behaviour of a sample of *sw-* words and *fl-* words in the Oxford English Corpus, using Sketch Engine (Kilgarrif et al. 2004). The driving question behind this test is to determine how collocational behaviour is able to track the semantic "cohesion" (the meaning of a phonestheme). To do this we ask**:** is there evidence of phonesthemic or sound symbolic clustering in the synonym set, and in the collocational context? The visual thesaurus function of Sketch Engine provides the candidates with the most similar lexicogrammatical collexemes. This provides a set of candidates for semantic proximity, The Sketch function of Sketch Engine provides the lexicogrammatical patterns of use of the target word in the corpus. Both of these tools help to determine paradigmatic semantic clustering as well as syntagmatic clustering. Using both tools should give evidence of the pressure or attraction of phonesthemic senses. This will be a preliminary test verifying if a small sample of common *fl-* and *sw-* words have different behaviours.

3.1.2 The OEC corpus and selection of lexemes

The Oxford English Corpus is a very large contemporary corpus of 2,1 billion words, combining spoken, written and computer-mediated (CMC) discourse. We know that phones-

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themic senses are triggered by surrounding context and type of discourse, so we do expect to find phraseological convergence. We have selected a group of central and frequent *sw-* and *fl-* words to test the results comparatively. We select *sweep*, *swish* and *sway* in the *sw-* category, and *fling*, *flip*, *flounce* for *fl-*words. The selected words are all essentially verbs (and nouns, but we are considering the verbs), and have varying levels of frequency (Table 9). Frequency affects entrenchment and therefore storage pathways in the mental lexicon. The more frequent a lexeme, the more likely it is to be selectively preferred by a speaker (Bybee 2013).

Word	Sweep	swish	Sway	Fling	Flip	Flounce
Frequency in OEC	60,000	1,215	13,325	10,119	19,446	535

Table 9: Compared frequencies of 6 target verbs in the OEC

3.2 Results for sway sweep and swish

3.2.1 sweep

Figure 1 shows the thesaurus of the highly frequent verb *sweep* followed by collexemes of *sweep* in lexicogrammatical positions in the OEC. The synonym candidates are based on the similarity of collocational behaviour and compared frequency: as figure 1 shows *sweep* is associated mainly with the metaphorical sense of *hit*, *blow*, *destroy*, *push*, *spread*. There are however few very close candidates, indicating that *sweep* appears to play a central role in the lexicon (as a potential foundation word).

Fig. 1: Thesaurus of sweep in the OEC

Sweep seems to have the most collocational behaviours, as the most frequent and widespread of the *sw-* words. The collexeme patterns in Table 10 show a number of specific subpatterns in contemporary discourse, which all trigger the same conceptual feature of *sw-*, whether used in its primary physical sense (*scrub*, *clean*, *mop*, *dust*) as in (2), or in its figurative sense (*sweep the board*, *sweep America*) as in (1).

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Sweep								
and/or	**Freq**	**score**	**V* obj N**	**Freq**	**score**	**X* mod N**	**Freq**	**score**
mop	44	10.8	floor	495	8.6	generalization	392	9.5
sweep an mop			board	379	7.9	sweeping generalizations		
vacuum	26	9.9	swept the board			overhaul	165	7.9
dust	28	9.2	nation	345	7.5	a sweeping overhaul of the		
swept and dusted			sweeping the nation			vista	111	7.6
garnish	10	8.7	street	276	7.4	sweeping vistas of		
swept an garnished			sweep the streets			staircase	88	7.1
clean	59	8.2	Europe	138	7.1	a sweeping staircase		
sweeping and cleaning			sweeping Europe			reform	546	7
rake	8	8.2	globe	88	6.9	sweeping reforms		
scrub	9	7.9	sweeping the globe			change	1,369	6.9
sweep	8	7.6	country	651	6.9	sweeping changes		
wash	19	7.1	swept the countrys			move	275	6.7
sweeping and washing			fire	247	6.7	a sweeping move		
ignore	16	6.3	fire swept through the			bend	62	6.7
ignored or swept			region	156	6.5	sweeping bends		
damage	9	5.8	death as famine sweeps the region are a wake-up			panorama	52	6.7
pick	7	5.4	world	441	6.5	a sweeping panorama of		
			swept the world			driveway	51	6.6
			America	131	6.5	a sweeping driveway		
			swept Amerika			statement	422	6.4
			East	70	6.5	sweeping statements		
			sweeping the Middle East			epic	57	6.4
						a sweeping epic		

Table 10: Collexemes for sweep in the OEC

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(1) Still, the growth likely would have been even bigger had it not been for the low-carbohydrate diet phenomenon that has been **sweeping** the country. (*Dairy Field*, May 2004)

(2) Over time I have helped design and mount exhibits, built exhibit furniture, given tours, taught school classes, designed and implemented a simple financial reporting system, vacuumed and **swept** the floors, fixed the plumbing, changed light bulbs, and even served as acting Director when the real Director was off having a baby. (*The Chronicle of the Early American Industries Association*, September 2001)

3.2.2 swish

Swish is the least frequent of the three *sw-* lexemes selected with 1,215 tokens. The thesaurus of *swish* shown in figure 2 shows *swish* to have far more candidates exhibiting the same collocational behaviour. The candidates are also all cohesive in terms of sound symbolic features, with most having some ties to phonesthemes or sound symbolic elements (*swirl*, *swish*, *flutter*, *flap*, *slosh*, *wag*, *whirl*).

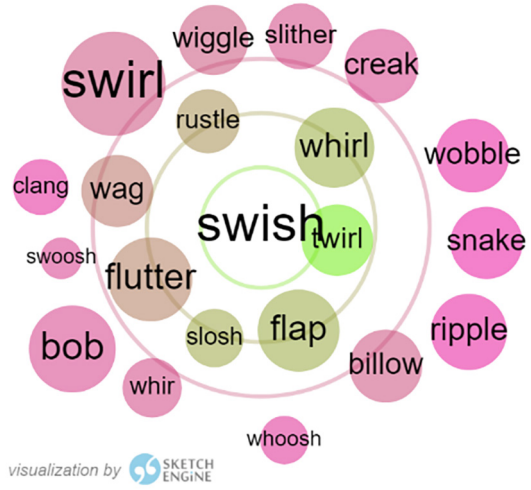

Fig. 2: Thesaurus of *swish* in the OEC

The collexemes of *swish* seem to correlate with this higher propensity for sound-meaning association (see table 11). *Swish* is used in tandem with other *sw-* verbs *swipe* and *sway* which have the highest co-occurrence scores.

swish								
and/or	**Freq**	**score**	**N subj V***	**Freq**	**score**	**V* obj N**	**Freq**	**score**
swipe	3	9.5	tail	33	8.8	tail	46	7.6
sway	10	8.3	tail swishing			jumper	6	6.2
Rundgren while I swished and swayed an occassionally tilted			ponytail	3	8.1	throw	5	5.5
brush	5	7.9	skirt	8	7.9	skirt	5	5.1
spit	3	6.3	cape	3	7.9	bat	3	4.1
swallow	3	6.2	dress	6	6.7	past	8	3.7

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swish								
and/or	**Freq**	**score**	**N subj V***	**Freq**	**score**	**V* obj N**	**Freq**	**score**
spin	3	5.7	surfer	4	6.4	blade	3	3.6
			hair	16	5.7	hair	8	2.4
			hair swishing			clothes	4	2.3
			Kirby	3	5.5	finger	3	1.2
			curtain	3	5.4	sound	3	1.2
			door	10	4.8	shot	4	0.9
			horse	3	3.2			
			money	4	2.2			

Table 11: Collexemes of *swish* in the OEC

Swish is always associated with sound correlations, either explicitly in (3) or implicitly as in (4):

(3) Bamboo – one of the most popular materials because its very lightweight. They also add an audible dimension with the **swishing** sound they produce. (*Alley: Home and Family articles*, 2005)

(4) But later in the season, after the flowers fade, grasses assume starring roles as their foliage turns shades of gold and red and their seed heads become kinetic sculptures, swaying and **swishing** in the breeze. (*Sunset Magazine*, October 2002)

3.2.3 sway

With 13,325 tokens, the verb *sway* has a number of polysemic extensions that do not correlate with sound symbolic associations; instead candidates with similar collocational behaviour coincide with a metaphoric sense of *sway*, such as *intimidate*, *persuade*, *prompt*, *influence* (see fig. 3).

Fig. 3: Thesaurus of *sway* in the OEC

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sway								
and/or	**Freq**	**score**	**V* obj N**	**Freq**	**score**	**N subj V***	**Freq**	**score**
swing	30	9.1	hip	74	8.1	hip	45	8.5
swinging and swaying			voter	266	8.1	hips swaying		
bob	18	8.7	to sway voters			argument	101	7.6
bobbed and swayed			palm	39	7.5	opinion	43	7
rock	24	8.6	swaying palms and			swayed by public opinion		
rocked and swayed			opinion	330	7.3	consideration	28	6.9
roar	17	8.5	to sway public opinion			tree	59	6.9
robotic giants that sway and roar · Deinonychus Dash			jury	55	6.5	trees sway		
stagger	14	8.4	sway the jury			emotion	25	6.7
clap	28	8.4	scepter	10	6.3	swayed by emotion		
creak	13	8.3	undecided	9	6.2	prejudice	13	6.6
swish	10	8.3	Vote	148	6	they are swayed by prejudice, rely on		
Rundgren while I swished and swayed and occassionally tilted			juror	15	5.9	promise	15	6.5
bounce	17	8.3	lawmaker	17	5.8	rhetoric	16	6.5
bend	27	8	to sway lawmakers			be swayed by rhetoric		
bend and sway			electorate	13	5.8	grass	14	6.4
lurch	9	8	sway the electorate			palm	10	6.3
jiggle	8	7.9	judge	50	5.7	sentiment	13	6.2

Table 12: Collexemes of *sway* in the OEC

The collexemes in Table 12 show that in addition to the metaphorical sense of pressure, *sway* is associated with erratic manners of walking like *stagger* in (5) and also *swish* or *jiggle* in (6):

(5) A witness heard the crash and spotted a man getting out of the car, staggering and **swaying**, and heading away from the scene of the accident. (*This Is Wiltshire news stories*, October 2004 editions)

(6) The jiggling and **swaying** of the cab along with the gasoline smell leaking through the vent was getting to me and, for a while, I thought I might be carsick. (*The Boston Review*, April-May 2002)

These senses are associated with a sound-symbolic clustering, as can been seen in verbs like *jiggle* or *bounce*.

3.3 Results for flip, flounce, fling

3.3.1 flip

As far as *fl-* words are concerned, they appear more cohesive from the OED analysis. The three lexemes selected have different frequencies, *Flip* having the highest 19,446 number of tokens in the OEC, followed by *fling* 10,119, and the relatively infrequent *flounce* 535 tokens. The thesaurus for *flip* in figure 4 shows that candidates exhibiting similar collocational behaviour are quite far off at the periphery, similarly to *sweep*.

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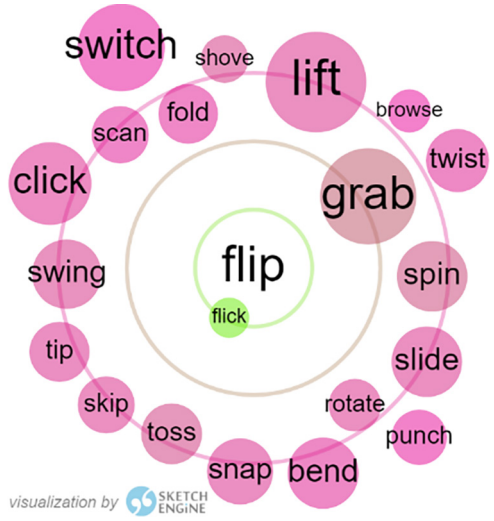

Fig. 4: Thesaurus for *flip*

The table of collexemes in table 13 shows that collexemes tend to be more cohesive with other phonesthemic or sound symbolic words (*flip*, *twist*, *spin*, *twist*) in the category *and/or*.

flip								
and/or	**Freq**	**score**	**V* obj N**	**Freq**	**score**	**N subj V***	**Freq**	**score**
flop	28	10.2	pancake	445	10.7	switch	20	7.3
flipped and flopped			posted by flipping pancades at			Oxide switch flips on . you		
rotate	27	9.3	switch	737	10.5	coin	16	7.2
rotate and flip			coin	492	10.2	coin flips		
flip	14	8.7	flip a coin			wig	9	6.7
flipped and flipped			burger	168	9.2	stomach	15	6.6
land	11	7.5	flipping burgers			stomach flipped		
flipped and landed			lid	93	7.9	calendar	8	6.2
spin	11	7.2	channel	180	7.8	back	14	6.2
toss	7	6.8	flipping channels			back flips		
twist	15	6.7	flop	47	7.7	boat	24	6.2
roll	11	6.7	flip flop			the boad flipped		
crash	8	6.7	page	283	7.2	seat	11	6
reverse	6	6.5	disc	82	6.9	car	69	5,9
jump	11	6.4	flip the disc for			car flipped over		
cook	11	6.2	bird	105	6.8	screen	10	5.5
flip an cook			flipping the bird			Kate	9	5.2
			wig	31	6.8	vehicle	16	5.2
			script	83	6.7	the vehicle flipped		
			flip the script					

Table 13: Collexemes of *flip* in the OEC

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In the category Object of V, there are a number of specific subpatterns of *flip*; cooking metaphors (*flip pancakes*, *burgers*), *flip a coin*, and extended metaphors (*flipping channels*, *flip the script*, *flip the bird*, *flip your wig*).

(7) She thought she had gotten over her infatuation with him, because she didn't think of him as much anymore, though when she did, her stomach twisted and **flipped** inside. (Arurisonu, *A New*, 2004)[3]

(8) First up 'Hey Joe' made famous by Hendrix and reclaimed back to the Leaves, the Suzuki kids give it a complete lean and mean detox workout, drenched with retro keyboards the initially sombre rendition soon **flips** its wig to get down and dirty in fine style. (*Losing Today: Mark's Tales,* 2005)

3.3.2 fling

The thesaurus for *fling* in Figure 5 shows a number of lexemes with similar collocational behaviours, *toss*, *hurl*, *swing*, *grab dump*.

Fig. 5: Thesaurus of *fling* in the OEC

The collexeme analysis of *fling* shows a tendency towards a transitive pattern with an object realised by a noun referring to something undesirable and dysphemistic (*feces*, *excrement*, *insult*, *stones*), with more positive some subpatterns (*fling pillow*, *fling your arms*).

[3] https://www.fictionpress.com/s/1633584/1/A-New (last access: 11-04-2022).

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fling								
V* obj N	**Freq**	**score**	**N subj V***	**Freq**	**score**	**V* Part**	**Freq**	**score**
mud	32	7.4	Blast	9	6.2	aside	59	5
arm	349	7.3	Nick	5	4.7	flung aside		
flung her arms			And	5	4.5	together	8	4.1
feces	19	7.1	wave	6	4.3	around	70	3.4
pooh	17	7	arm	6	4.2	being flung around		
insult	30	6.7	wind	7	3.7	away	36	3.4
insults flung			opponent	5	3.5	flung away		
door	240	6.3	war	6	2.7	back	24	3.3
Amos	9	6.2	Darcy	5	2.6	flung back		
excrement	9	6.1	boy	6	2.4	about	47	2.9
cloak	11	5.9	girl	7	2.2	flung about		
spear	10	5.9	car	5	2.2	forward	25	2.8
pillow	12	5.8				when Amos was flung forward by the blast		
stone	37	5.7				off	97	2
flinging stones						flung off		
						down	105	1.9
						flung down		
						out	287	1.8
						flung out		
						up	114	0.2
						flung up		

Table 14: Collexemes of *fling* in the OEC

(9) Swan Dive, a figure we see hovering on tiptoe on a pedestal, his arms **flung** wide and his tie fluttering over his shoulder, may moments later land on his back like Poor Paul, who lies on the floor with one knee bent and his arms outstretched as if imploring. (*Art in America*, October 2001)

(10) If there were even a speck of dirt in the courtyard, if he **flung** a stone into the well or drummed a bit on the copper water pot, Valiamma would scold him unceasingly. **(***The Little Magazine*, 2004)

3.3.3 flounce

Most of the synonym candidates in the thesaurus (see figure 8) are verbs of motion with similar frequencies (*scamper*, *totter*, *skulk*, *prance*, *waddle*) as well as *stomp* with a higher frequency. All candidates appear to have an expressive nature.

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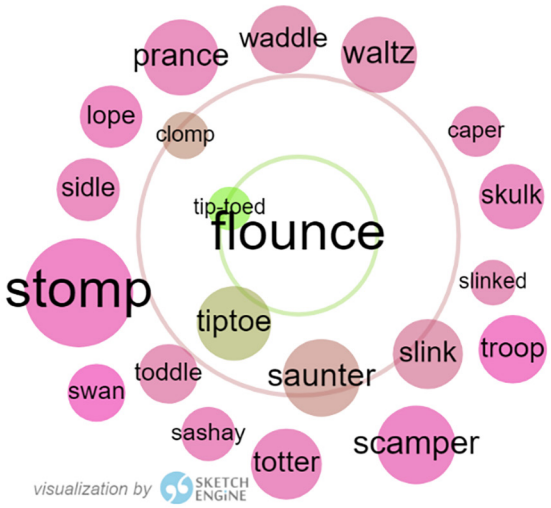

Fig. 6: Thesaurus of *flounce* in the OEC

The collexemes for *flounce* in Table 15 confirm the lack of data for the very small data set.

flounce								
V* obj N			**X* mod N**			**V* Part**		
noun	2	6.1	skirt	4	3.3	around	33	2.4
skirt	4	4.9	dress	7	2.3	flounce around		
						off	93	1.9
						flounced off		
						about	15	1.3
						flounce about		
						by	3	0.7

Table 15: Collexemes of the verb *flounce* in the OEC

4. Conclusion

This paper set out to answer a question; are phonesthemes evidence of a sublexical organising layer in the lexicon? We first compared the lexicographic behaviours of fl- and sw- monomorphemes in the OED. Then, a preliminary test based on collocational behaviour in a contemporary corpus showed that there is likely a divergence in behaviour based on the prevalence of phonosymbolic patterning, and also on the frequencies of usage of the lexemes in question. The highest frequency doesn't necessarily correlate with the greatest cohesion (*sweep* and *flip*),

Submorphemic layers are clearly present in the OED to varying degrees, and this variation in the acknowledgment of phonesthemes may be related to several factors, amongst which we can name two not necessarily conflicting phenomena:

1) the irregular treatment by OED lexicographers

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2) the existence of distinct types of phonesthemes in the lexicon. These different types may themselves be tied to the words origins, as well as the frequency and salience of words carrying those phonesthemes in the lexicon.

We believe that further study focusing on the feedback between usage-based semantic analysis and usage-based lexicography is a worthwhile constructive way forward for improving the representation of the emergent nature of the historical lexicon, and for understanding the role of phonesthemes in the organisation of the lexicon.

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