Directionality in English noun/verb conversion: A sense-based study

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Contents

1. Theoretical background
2. Aims of the study
3. Methods
4. Results and discussion
5. Conclusions

Theoretical background

1.1 Relevance of the issue of directionality

Examples of N/V conversion in English:

(1) *attempt*^{N} [EVENT] / *attempt*^{V} [ACTION]

(2) *smile*^{N} [GESTURE] / *smile*^{V} [ACTION]

(3) *cover*^{N} [INSTRUMENT] / *cover*^{V} [ACTION]

Various issues surrounding conversion have been a source of disagreement among authors, since the early works by Sweet (1891/1898), Koziol (1937), Biese (1941), Nida (1949), Zandvoort (1975), Marchand (1969), Kastovsky (1969), or Lipka (1971).

Theoretical background

1.1 Relevance of the issue of directionality

Directionality in conversion has received **renewed scholarly attention** over the past years (cf., among others, Umbreit 2010; Bram 2011; Kopecka 2013; Lohmann 2017; Kisselew et al. 2016; Valera 2017, 2023; Iordăchioaia et al. 2020; Tribout 2020; Ševčíková 2021; Don 2023), however, it remains unresolved:

"[W]e seem to have reached **an impasse**, with neither of [the] two main approaches being capable of proving its correctness across the board. Where the two contradict each other (which happens not infrequently) we have no way to choose between them – which means, in effect, that **the question of directionality is currently unresolved and irresolvable**" (Bauer & Valera 2005: 11)

Theoretical background

1.2 Conversion as a directional lexeme-creation process

Conversion as a dynamic or asymmetrical word-formation process whereby a **base lexeme** is used for the formation of a **derivative** (cf. among others, Leech 1974: 214; Lieber 1980: 187 et passim; Bauer 1983: 32; Quirk et al. 1985: 1520, 1558; Don 1993; Štekauer 1996: 15 et passim; Vogel 1996: 258 et passim; Bauer & Huddleston 2002: 1640; Manova 2011: 55 et passim; Bauer et al. 2013: 562–563; Valera 2014, 2015).

The conditions for canonical conversion are understood as follows (cf. Marchand 1963a: 176; Cetnarowska 1993; Kerleroux 1999; Valera 2014, 2015, among others):

i. It involves at least **two lexemes**, which belong to two **different word-class categories**.
ii. There is **formal identity** (Bauer 1983: 32) between the lexemes.
iii. The lexemes are **morphologically related** (base ⟶ derivative).
iv. There is a **semantic relation** between the lexemes or the senses they express.
v. There is **directionality** between the lexemes or their senses (cf. Plank 2010).

Theoretical background

1.3 Directionality criteria

i. Historical criteria

ii. Intuition criteria

iii. Morphological or phonological criteria

iv. Structural criteria

v. Contextual or paradigmatic criteria

iv. Semantic criteria

v. External quantitative criteria

Theoretical background

1.3 Directionality criteria (selected in this study)

iv. Semantic criteria (cf. Marchand 1963a, 1963b, 1964, 1969, as *content criteria*):

- **a. Semantic dependence (SD):** "[t]he word that for its analysis is dependent on the content of the other pair member is necessarily the derivative" (Marchand 1964: 12), e.g. *knife*^{N} ⟶ *knife*^{V} 'to cut with a knife'
- **b. Restrictions of usage (RU):** "[i]f one word has a smaller range of usage than its pair member, it must be considered the derivative" (Marchand 1964: 13), e.g. restrictions to some forms, poetic, slang, etc.
- **c. Semantic range (SR):** "[o]f two homophonous words exhibiting similar sets of semantic features the one with the smaller field of reference is the derivative" (Marchand 1964: 14), e.g. *convert*^{V} ⟶ *convert*^{N} 'one who has been converted to a religion/belief'
- **d. Semantic pattern (SP):** "[c]ertain words have characteristic meanings which mark them as derivatives" (Marchand 1964: 15), e.g. 'to act as N', 'one who Vs', 'to make ADJ'

v. External quantitative criteria (Marchand 1964: 13): **Frequency of occurrence (FO)** and the **range of registers (RR)** covered by the pairs (based on corpus data).

Theoretical background

1.4 Key differences with previous empirical studies

The relevance of the (semantic) criteria has been discussed in the literature (cf., among others, Trnka 1969; Aronoff 1976; Cetnarowska 1993; Katamba 1993; Rainer 1993; Kerleroux 1996; Plag 1999, 2003; Iacobini 2000). For English, however, **semantic or quantitative-distributional criteria** were not put to test until quite recently.

Previous empirical studies which test semantic criteria alongside other criteria are e.g. Balteiro (2007), Bram (2011), or Kisselew et al. (2010). These:

i. Take **historical information as the standard of directionality** and then apply other criteria to investigate whether they indicate the same direction.

ii. Do so **at the level of lexeme**.

Aims of the study

i. To test the applicability of Marchand's (1964) semantic criteria and quantitative-distributional criteria for directionality in a sample of noun/verb English conversion.

ii. To see how measurable the criteria are when applied at the level of sense, and which methodological challenges arise.

Directionality should be studied **by word senses** and not by lexemes (Plank 2010).

Contents

1. Theoretical background
2. Aims of the study
3. Methods
4. Results and discussion
5. Conclusions

Methods

3.1 Data sampling: Noun/verb conversion

1. CQPWeb: retrieval of the entire **lemmatized frequency list** of the BNC. (https://cqpweb.lancs.ac.uk)
2. A matching test/list crossing to generate **a list of all lemmas tagged both as noun and verb** in the lemmatized frequency list, alongside their frequency of occurrence.
3. Terms which are **not actual words** were **discarded** using Excel searches and conditional formatting rules, e.g. p4/t3 (1/2).
4. **Manual screening:** to discard terms not attested in the BNC, those wrongly tagged as noun or verb, misspellings, acronyms, among others.

Methods

3.1 Data sampling: Noun/verb conversion

5. Decision to **restrict the frequency to 1,000** in the BNC, as one word class or the other.

Table 1. Raw frequency distribution of the terms attested both as noun and verb in the BNC up to frequency 1,000

Frequency distribution (raw)	**Noun**	**%**	**Verb**	**%**
Freq. 1	26	1.3%	104	5.1%
Freq. 2–5	127	6.2%	245	12.0%
Freq. 6–10	109	5.3%	196	9.6%
Freq. 11–50	375	18.4%	502	24.6%
Freq. 51–100	285	14.0%	244	11.9%
Freq. 101–250	484	23.7%	366	17.9%
Freq. 251–500	330	16.2%	238	11.7%
Freq. 501–750	243	11.9%	120	5.9%
Freq. 751–1,000	63	3.1%	27	1.3%
Total	2,042	100%	2,042	100%

Methods

3.1 Data sampling: Noun/verb conversion

Table 2. First stratified sample

List No.	BNC screened frequency list (Frequency range 1–1,000)					
	Ordered by the noun freq.			Ordered by the verb freq.		
	Pair	N_FREQ	V_FREQ	Pair	N_FREQ	V_FREQ
5	*whap*$^{N/V}$	1	1	*whomp*$^{N/V}$	1	1
165	*blather*$^{N/V}$	6	10	*hank*$^{N/V}$	368	2
325	*holler*$^{N/V}$	15	54	*jaunt*$^{N/V}$	92	5
485	*swoon*$^{N/V}$	28	58	*dybbuk*$^{N/V}$	40	9
645	*lisp*$^{N/V}$	52	24	*spasm*$^{N/V}$	282	15
805	*whimper*$^{N/V}$	74	174	*curtsy*$^{N/V}$	41	26
965	*skid*$^{N/V}$	110	213	*scythe*$^{N/V}$	97	55
1125	*bayonet*$^{N/V}$	149	10	*bluster*$^{N/V}$	32	65
1285	*sludge*$^{N/V}$	201	21	*clot*$^{N/V}$	109	99
1445	*hoover*$^{N/V}$	272	101	*jot*$^{N/V}$	71	150
1605	*paw*$^{N/V*}$	351	91	*swerve*$^{N/V}$	27	219
1765	*fatigue*$^{N/V}$	532	38	*retail*$^{N/V}$	21	335
1925	*saddle*$^{N/V}$	748	256	*piss*$^{N/V}$	251	572

6. First **stratified sample** of the list (52 lexemes, 26 pairs):

- The sampling interval started at an aleatory number (5)
- One lexeme every 160 was selected from a list ordered by the frequency of the noun
- One lexeme every 160 was selected from a list ordered by the frequency of the verb

Methods

3.1 Data sampling: Noun/verb conversion

7. Sample was enlarged by **systematic doubling,** so that it remains representative.

Table 3. Number of pairs/terms sampled from the BNC screened frequency list per sample extraction stage

Sample	Number of pairs/terms sampled from the BNC screened list			
1st sample	26/52			
1st doubling		26/52		
2nd doubling			50/100	
3rd doubling				102/204
Total sample	204/408			

Methods

3.2 Resources: Dictionary and Corpus

The study combines the use of dictionary and corpus data:

i. The ***Oxford English Dictionary*** **(OED2 and OED3):** used for retrieval of semantic information.

ii. The ***British National Corpus*** **(BNC)** (ca. 100 million words; 1960–1993): used to collect all concordances available for each of the lexemes included in the sample.

Methods

3.2 Sense classification of the concordances

2. **Manual classification** of the concordances according to the information in the OED.

CONCORDANCES BNC									OED
BNC | BNC DATA DISTRIBUTION REGISTER									
V	Reference								SENSE
	bncd	bncdoc.g	bncd	bncd	bncd	bncd	Left	Kwic	Right	NUMBER
1	Leisu	Written |	W_p	1985	===N	Infor	g enough to absorb extra duties. </s><s> However, to further `	soak	' the motorist and the company car driver would be risky. </s>	7f
2	Socia	Written |	W_n	1985	===N	Infor	, noun, foundling, cow, slough. </s><s> OA as in old, goat, boat,	soak	, poke, Oates, voter. </s><s> Naturally you will practise such w	EXTRAL
3	Imag	Written |	W_fi	1985	===N	Imag	e bathroom, which was not a place to sit and read or to lie and	soak	, but a chill green glassy place, glittering with cleanness, huge	1b
4	Appli	Written |	W_m	1985	===N	Infor	ems that do not respond to immediate cleaning are placed in to	soak	, rather than holding up progress, and dealt with later during s	1
5	Leisu	Written |	W_p	1985	===N	Infor	ly cleaned by pouring boiling water over them and allowing to	soak	, scrubbing between the folds. </s><s> Young Arrowana should	1
6	Arts	Written |	W_p	1985	===N	Infor	><s> Rabbit skin glue (one part glue to 12 parts water, leave to	soak	, then warm in a double boiler), can be used in place of the gum	1
7	Leisu	Written |	W_p	1985	===N	Infor	rants and pecans and add half of the bourbon. </s><s> Leave to	soak	- do this a day in advance, so that the currants swell. </s><s> 2	1
8	Leisu	Written |	W_m	1985	===N	Infor	ing in this annoying behaviour. </s><s> Finally, heavy rain will	soak	- and render useless - any bowstrings, gunpowder and loaded f	4
9	Appli	Written |	W_ir	1985	===N	Infor	ber has shrunk away, leaving an ugly gap into which water can	soak	. </s><s> Dig out all loose and damaged timber and strip away	2
10	Imag	Written |	W_fi	1960	===N	Imag	's a good shirt,' I said. </s><s> `You needn't wash it, leave it to	soak	.' </s><s> `Until he was called to set a bone in the back of the C	1
11	Imag	Written |	W_fi	1985	===N	Imag	she could get started. </s><s> Then she put the salad greens to	soak	. </s><s> There was only half a loaf left. </s><s> Oh, too bad, sh	1
12	Imag	Written |	W_fi	1975	===N	Imag	she could get started. </s><s> Then she put the salad greens to	soak	. </s><s> There was only half a loaf left. </s><s> Oh, too bad, sh	1
13	Leisu	Written |	W_m	1985	===N	Infor	s too far down at the sides. </s><s> 3 </s><s> To soak or not to	soak	? </s><s> Although manicurists in salons often do, the new thir	5
14	Imag	Written |	W_fi	1985	===N	Imag	r-knight signified. </s><s> `But, Brother,' said one, `suppose you	soak	a finger-bone in hot paraffin after the fine-sanding stage - once	5
15	Appli	Written |	W_m	1985	===N	Infor	s : Treat as ovens. </s><s> Either spray apply caustic cleaner or	soak	after which acid cleaner, rather than vinegar, should be used w	5
16	Appli	Written |	W_ir	1985	===N	Infor	s><s> Because they are heavy, unpasted flocks should be left to	soak	after coating with a fungicidal adhesive. </s><s> Once up, the p	1
17	Leisu	Written |	W_p	1985	===N	Infor	s of the basin. </s><s> Strain the fruit, reserving the juice then	soak	all the break in the fruit juice in a shallow bowl. </s><s> Line th	5
18	Leisu	Written |	W_p	1985	===N	Infor	g magic about guitars. </s><s> Certain people will tell you `We	soak	all our pick-ups in beeswax and that makes 'em sweeter-soundi	5
19	Leisu	Written |	W_p	1985	===N	Infor	pH or even release toxic nasties into your tank. </s><s> Always	soak	and scrub rocks before use. </s><s> Never use `green' wood as	5
20	Imag	Written |	W_fi	1985	===N	Imag	</s><s> As they tramped up the hill, Elizabeth's hair started to	soak	and drip down her neck, under her silk-lined hood. </s><s> She	1c

Methods

3.2 Sense classification of the concordances

2. **Manual classification** of the concordances according to the information in the OED.

CONCORDANCES BNC

BNC | BNC DATA DISTRIBUTION REGISTER

V	Reference						Left	Kwic	Right	OED SENSE NUMBER
	bncd	bncdoc.g	bncd	bncd	bncd	bncd				
1	Leisu	Written	W_p	1985	===N	Infor	g enough to absorb extra duties. </s><s> However, to further `	soak	' the motorist and the company car driver would be risky. </s>	7f
2	Socia	Written	W_n	1985	===N	Infor	, noun, foundling, cow, slough. </s><s> OA as in old, goat, boat,	soak	, poke, Oates, voter. </s><s> Naturally you will practise such w	EXTRAL
3	Imag	Written	W_fi	1985	===N	Imag	e bathroom, which was not a place to sit and read or to lie and	soak	, but a chill green glassy place, glittering with cleanness, huge	1b
4	Appli	Written	W_m	1985	===N	Infor	ems that d		ater during s	1
5	Leisu	Written	W_p	1985	===N	Infor	ly cleaned		wana should	1
6	Arts	Written	W_p	1985	===N	Infor	><s> Rabbit		ce of the gum	1
7	Leisu	Written	W_p	1985	===N	Infor	rants and p		ell. </s><s> 2	1
8	Leisu	Written	W_m	1985	===N	Infor	ing in this		and loaded f	4
9	Appli	Written	W_in	1985	===N	Infor	ber has shr		d strip away	2
10	Imag	Written	W_fi	1960	===N	Imag	's a good s		back of the C	1
11	Imag	Written	W_fi	1985	===N	Imag	she could g		h, too bad, sh	1
12	Imag	Written	W_fi	1975	===N	Imag	she could g		h, too bad, sh	1
13	Leisu	Written	W_m	1985	===N	Infor	s too far do		the new thir	5
14	Imag	Written	W_fi	1985	===N	Imag	r-knight sig		stage - once	5
15	Appli	Written	W_m	1985	===N	Infor	s : Treat as		ld be used w	5
16	Appli	Written	W_in	1985	===N	Infor	s><s> Beca		nce up, the p	1
17	Leisu	Written	W_p	1985	===N	Infor	s of the ba		/s><s> Line th	5
18	Leisu	Written	W_p	1985	===N	Infor	g magic about guitars. </s><s> Certain people will tell you `We	soak	all our pick-ups in beeswax and that makes 'em sweeter-soundi	5
19	Leisu	Written	W_p	1985	===N	Infor	pH or even release toxic nasties into your tank. </s><s> Always	soak	and scrub rocks before use. </s><s> Never use `green' wood as	5
20	Imag	Written	W_fi	1985	===N	Imag	</s><s> As they tramped up the hill, Elizabeth's hair started to	soak	and drip down her neck, under her silk-lined hood. </s><s> She	1c

7. colloquial or slang.

a. **to soak one's clay (or †face)**, to drink (heavily).

b. To ply with liquor. Also in passive.

c. To spend (money) in drink.

d. To put (something) in pawn.

e. U.S. slang. To punish, beat, pummel, strike hard, etc.; to criticize harshly, to 'knock'; **to soak it to** (one) = to sock it to at sock v.2 1c(b) (one).

f. slang (originally U.S.). To impose upon (a person, etc.) by an extortionate charge or price; to charge or tax heavily; to borrow or extort money from; to cost a high price. Frequently const. for or with indirect object expressing a sum of money. Hence **soak-the-rich** phr. attributive applied to a policy of progressive taxation (progressive adj. 2d); also in similar phrases, as **soak-the-poor**, etc.

Methods

3.3 Semantic classification of the senses: Derivational semantics

Table 4. The semantic categories for noun-to-verb conversion (adapted from Plag 1999: 9; Bauer et al. 2013: 285, plus EFFECTIVE and DIRECTIONAL from Rainer 1993: 239; Valera 2023: 158–161; and DURATION from Clark & Clark 1979: 773)

Semantic category	**Paraphrase**	**Examples**
CAUSATIVE	'to make N, to cause to become N'	*orphan*
INCHOATIVE	'to become N'	*gel*
INSTRUMENTAL	'to use N, to perform an action with N'	*hammer*
LOCATIVE	'to make sthg to go to/in/on N'	*archive*
DURATION	'to carry an action during N'	*summer*
ORNATIVE	'to make N go to/in/on sthg, to provide with N'	*marmalade*
PERFORMATIVE	'to do N'	*tango*
PRIVATIVE	'to remove N'	*skin*
RESULTATIVE	'to make into N'	*package*
SIMILATIVE	'to do/act/make in the manner of or like N'	*chauffeur*
STATIVE	'to be, act as N'	*landmark*
EFFECTIVE	'to create, produce or bring about N'	*kitten*
DIRECTIONAL	'to go or move towards N'	*nightclub*

Methods

3.3 Semantic classification of the senses: Derivational semantics

Table 5. The semantic categories for verb-to-noun conversion (Plag 1999; Bauer et al. 2013: 286; and PROCESS in Bauer 1983: 185, for nominalizations in *-ation*)

Semantic category	**Paraphrase**	**Examples**
EVENT	'the act/event of V-ing'	*surrender*, *catch*
ACTION	'the action of V-ing'	*fight*, *review*
INSTANCE	'an instance of V-ing'	*belch*, *frown*
PROCESS	'the process of V-ing or being V-ed'	*rot*
PRODUCT	'the thing that is created/comes into being by V-ing'	*tear*, as in '[…] making the *tear* worse'
RESULT	'the outcome of V-ing'	*divorce*
STATE	'the state of V-ing or being V-ed'	*regret*, *hope*
INSTRUMENT/MEANS	'the thing used for V-ing'	*cure*, *clog*
LOCATION	'the place where one/sthg V-s or is V-ed'	*dump*, *seat*
DIRECTION	'the direction or path of V-ing'	*decline*, *ascent*
AGENT	'one who V-s'	cook, flirt
PATIENT	'the thing V-ed, thing affected or moved by V-ing but not created'	*purchase*, *kill*
MEASURE	'how much is V-ed', 'measure of the degree to which sthg in V-ed'	*pinch*, *weight*

Methods

3.3 Semantic classification of the senses: Base semantics

Ontological categories:

i. Base verb senses: Dixon ([1991] 2005) and Levin (1993).

ii. Base noun senses: Szymanek (1988), Dixon ([1991] 2005), Lieber (2004), Murphy (2010), Haselow (2011), and Schulte (2015).

As claimed in Schulte (2015: 4.1), ontological categories have been used in linguistic research from very different backgrounds and are candidates for universally accepted classifications.

Methods

3.4 Application of Marchand's (1964) semantic criteria: SD

Table 6. Analysis of the criterion of SD at the level of sense for the conversion-related pair *fuss*$^{N/V}$

Lexeme	(OED) sense	Semantic Category	SD (+/–/?/+?)	Related Sen
fuss^{N2}	1. a. *A bustle or commotion out of proportion to the occasion; a needless or excessive display of concern about anything; ostentatious or officious activity.* […]	ABSTRACT CONCEPT	–	
fuss^{N2}	2. *A state of (more or less ludicrous) consternation or anxiety.*	STATE	–	
fuss^{N2}	3. [< ***fuss*** *v.*] *One who* ***fusses****.*	**AGENT**	+	V, 1, 2
fuss^{V}	1. *intransitive. To make a* ***fuss****; to be in a bustle; to busy oneself restlessly about trifles; to move fussily (about, up and down, etc.).*	**EFFECTIVE**	+	N2, 1
fuss^{V}	Added sense: 1 ext. *Said of other things, not people.*	TRANSF. NATURE SIMILATIVE		
fuss^{V}	Added sense: 1b. *'To* ***fuss*** *over': to pay excessive attention to or concern for something.*	EXT_SIMILATIVE MANNER		
fuss^{V}	2. *transitive. To put into a* ***fuss****; to agitate, worry; to bother about trifles. Also to fuss up (? dialect): to flatter, treat with fussy politeness.*	**CAUSATIVE/ RESULTATIVE**	+	N2, 2

SD analysis

Each sense was marked as:

i. Showing SD to a conversion related sense (+)

ii. Not showing SD (–)

iii. Unclear (?)

Methods

3.4 Application of Marchand's (1964) semantic criteria: RU

Table 7. Restrictions of usage (in grey font) in the pair *skive*$^{N3/V3}$

Lexeme	OED sense no. and definition	Semantic category	RU (+/–)	RU type	nSen +RU
skive^{N3}	*2. colloquial (chiefly British). b. An instance of avoiding work or a duty by staying away or leaving early. Frequently in on the skive.*	INSTANCE	+	RU1	1/1
skive^{V3}	*2. transitive. Originally U.S. College slang. To avoid (work or a duty) by leaving or being absent; (now) esp. to play truant from (school). Now chiefly British colloquial.*	V_ACTION_AVOID	+	RU1	2/2
skive^{V3}	*3. colloquial (chiefly British). a. intransitive. Originally Military slang. To avoid work or a duty by staying away or leaving early; to shirk; (sometimes) spec. to play truant from school. Also with off (in prepositional phrase specifying the activity, duty, etc.).*	V_ACTION_AVOID	+	RU1	

RU analysis

i. Showing RU (+)

ii. Not showing RU (–)

Methods

3.4 Application of Marchand's (1964) criteria: SR (qualitative analysis)

Table 8. Semantic range (SR) for the pair *whimper*$^{N/V}$

Lexeme	OED senses	Sense	SR
whimper^{N}	1. a. A feeble, broken cry, as of a child about to burst into tears; a fretful cry expressive of complaint or grief.	1	≈
	b. A similar cry of dogs, etc.	2	
	c. transferred. Of inanimate things.	3	
	2. not with a bang but a whimper: see bang n.1 2b.	4	
whimper^{V}	1. a. intransitive. To utter a feeble, whining, broken cry, as a child about to burst into tears; to make a low complaining sound. / b. figurative. To complain pulingly; to 'whine': esp. for, after, †to something. / c. transitive. To utter or express in a whimper.	1	
	2. intransitive. Of an animal, esp. a dog: To utter a feeble querulous cry.	2	
	3. Of running water or the wind: To make a continuous plaintive murmur. Also transitive.	3	

Qualitative analysis of SR

≈ : similar

> : wider

< : narrower

≲ : narrower/close to similar

? : unclear

Methods

3.4 Application of Marchand's (1964) semantic criteria: SP

Table 9. Analysis of the criterion of SP at the level of sense for the conversion-related pair *fuss*$^{N/V}$

Lexeme	OED sense no. and definition	Semantic category	Paraphrase	SP (+/–/?/+?)
fuss^{N2}	1. a. *A bustle or commotion out of proportion to the occasion; a needless or excessive display of concern about anything; ostentatious or officious activity.* […]	ABSTRACT CONCEPT		–
fuss^{N2}	2. *A state of (more or less ludicrous) consternation or anxiety.*	STATE		–
fuss^{N2}	3. [< ***fuss v.***] *One who* ***fusses.***	**AGENT**	One who Vs	+
fuss^{V}	1. *intransitive. To make a* ***fuss****; to be in a bustle; to busy oneself restlessly about trifles; to move fussily (about, up and down, etc.).*	**EFFECTIVE**	To make a N	+
fuss^{V}	Added: 1 ext. *Said of other things, not people.*	TRANSF. NATURE SIMILATIVE		
fuss^{V}	Added: 1b. '*To* ***fuss*** *over': to pay excessive attention to or concern for something.*	EXT_SIMILATIVE MANNER		
fuss^{V}	2. *transitive. To put into a* ***fuss****; to agitate, worry; to bother about trifles. Also to fuss up (? dialect): to flatter, treat with fussy politeness.*	**CAUSATIVE/ RESULTATIVE**	To put into a N (STATE)	+

SP analysis

i. Showing SP (+)

ii. Not showing SP (–)

iii. Unclear (?)

Methods

3.4 Application of the quantitative-distributional criteria: FO

Table 11. Raw frequency of occurrence (RF) for *whimper*$^{N/V}$ at the level of sense (BNC)

Lexeme	OED senses	Sense	RF
whimper^{N}	1. a. A feeble, broken cry, as of a child about to burst into tears; a fretful cry expressive of complaint or grief.	1	57
	b. A similar cry of dogs, etc.	2	3
	c. transferred. Of inanimate things.	3	1
	2. not with a bang but a whimper: see bang n.1 2b.	4	11
whimper^{V}	1. a. intransitive. To utter a feeble, whining, broken cry, as a child about to burst into tears; to make a low complaining sound. / b. figurative. To complain pulingly; to 'whine': esp. for, after, †to something. / c. transitive. To utter or express in a whimper.	1	155
	2. intransitive. Of an animal, esp. a dog: To utter a feeble querulous cry.	2	8
	3. Of running water or the wind: To make a continuous plaintive murmur. Also transitive.	3	2

FO analysis

A Chi-squared test (χ^2) was performed using the Excel function CHISQ.TEST.

Aim: to statistically assess whether the observed differences between related pairs of senses are significant ($P < 0.05$) or due to random variation ($P > 0.05$).

Methods

3.4 Application of the quantitative-distributional criteria: FO

Table 12. Analysis of FO for *dupe*$^{N2/V2}$, *lesion*$^{N/V}$, *scythe*$^{N/V}$, and *skid*$^{N/V}$ based on a Chi-squared test. An asterisk is used for repeated senses, i.e. related to more than one sense in the pair lexeme

Pair	N^0 sense	Raw freq.	V^1 sense	Raw freq.	N^2 sense	Raw freq.	Chi^2 (p-value)	Significant difference	Direction
dupe$^{N2/V2}$	1	5	1	1			0.10	No	N>V
lesion$^{N/V}$	1	189	1	2			1.02E-41	Yes	N>V
scythe$^{N/V}$	1	67	1b	24			6.56E-06	Yes	N>V
			1b	24	2b	2	1.60E-05	Yes	$V^1>N^2$
	1*	67	2	28			6.23E-05	Yes	N>V
skid$^{N/V}$	3	9	3	196			5.53E-39	Yes	V>N
			3	196	4	48	2.67E-21	Yes	$V^1>N^2$

Methods

3.4 Application of the quantitative-distributional criteria: RR

Table 13. Register classification of *sledge*^{V} by senses. The absolute frequency of each register is under column number four *Freq*.

W-class	Mode	David Lee's classification	Freq.	Lee's (2001) classification	Sense	OED entry, sense
V	Written	W_fict_prose	1	W_fict	2	V1, 2
V	Written	W_fict_prose	5	W_fict	4	V2, 2
V	Written	W_misc	3	W_other	4	V2, 2
V	Spoken	S_conv	1	S_other	4	V2, 2
V	Written	W_ac_nat_science	1	W_ac	4	V2, 2
V	Spoken	S_brdcast_discussn	1	S_brdcast	4	V2, 2
V	Written	W_misc	1	W_other	6	V3, 1
V	Written	W_newsp_other_report	2	W_newsp	6	V3, 1
V	Written	W_pop_lore	2	W_other	6	V3, 1

RR analysis

According to two classifications:

i. David Lee's corpus retrieval classification: 71 categories

ii. Lee's (2001) grouping: 12 categories

Fisher's Exact Test was used to test whether the difference in RR between the pairs is significant: more reliable for the estimation of statistical significance (p-values) for small-size categorical data, where a Chi-squared test could be inaccurate (Brezina 2018: 113).

Contents

1. Theoretical background
2. Aims of the study
3. Methods
4. Results and discussion
5. Conclusions

Results and discussion

4.1 The influence of methodological decisions

Methodological decisions may have an impact on the results, among others:

i. The use of criteria of dissimilar nature yield dissimilar results (e.g. diachronic vs. synchronic).

ii. The sources selected for the analysis of the criteria (lexicographic and corpus), or different samples being selected.

iii. The level of analysis: **lexeme vs. sense.**

iv. An analysis of senses in use vs. one that examines all senses, including those no longer in use.

v. The **interpretation** of the criteria. There is a need to:

   i. Provide a more **precise description** of the criteria when applied to conversion and elsewhere.

   ii. Establish **significance levels** when distributional criteria are studied.

Results and discussion

4.2 Sense distribution into orders of derivation

Although it may admittedly introduce bias as semantic criteria are primed (SD, SP), sense distribution into orders of derivation is used because:

i. The identification of directionality by considering other methods, e.g. counting the total number of senses following one criterion would lead to unreliable results.

ii. It accounts for **polysemy**.

iii. It allows for representation of **subsequent derivation** between senses.

iv. A more detailed analysis is allowed, as well as exclusion of senses which are extended or figurative, and for which no related converted sense is found.

Results and discussion

4.3 Individual applicability of the criteria

Table 15. Directionality of the semantic criteria for the pairs by senses in D1.
Not applicable includes cases where the differences found between the senses are not significant (N) for the criteria of FO and RR

Criterion	Not applicable/Unclear		Applicable						Total applicable	
			Noun-to-Verb		Verb-to-Noun		Two groups			
	nP	%	nP	%	nP	%	nP	%	nP	%
SD	33	14.61%	125	55.31%	67	29.65%	1	0.44%	193	85.39%
SP	35	15.49%	121	53.54%	69	30.53%	1	0.44%	191	84.51%
SR (N)	79	34.96%	84	37.17%	63	27.87%			147	65.04%
SR (Y)	114	50.44%	67	29.65%	45	19.91%			112	49.56%
RU	157	69.47%	34	15.04%	35	15.49%			69	30.53%
FO	43	19.03%	121	53.54%	62	27.43%			183	80.97%
RR	110	48.67%	76	33.63%	40	17.70%			116	51.33%

Results and discussion

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Results and discussion

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Results and discussion

4.4 Cross-criteria consistency: SD

Table 16. Consistency between SD and the rest of criteria in D1.
(Y) and (N) stand for senses for which SR, FO, and RR signal a direction, even if the difference is not significant (N)

Criteria analysis (D1)	Consistent direction		Inconsistent direction		Unclear direction	
	nPairs	%	nPairs	%	nPairs	%
SD/SP	188	83.19%	6	2.65%	32	14.16%
SD/SR(N)	103	45.58%	112	49.56%	11	4.87%
SD/SR(Y)	85	37.61%				
SD/RU	48	21.24%	153	67.70%	25	11.06%
SD/FO(N)	147	65.04%	78	34.51%	1	0.44%
SD/FO(Y)	127	56.19%				
SD/RR(N)	135	59.73%	88	38.94%	3	1.33%
SD/RR(Y)	85	37.61%				

Results and discussion

4.4 Cross-criteria consistency: RU

Table 17. Consistency between RU and the rest of criteria in D1.
(Y) significant (N) not significant

Criteria analysis (D1)	Consistent direction		Inconsistent direction		Unclear direction	
	nPairs	%	nPairs	%	nPairs	%
RU/SD	48	21.24%	153	67.70%	25	11.06%
RU/SP	45	19.91%	157	69.47%	24	10.62%
RU/SR(N)	35	15.49%	134	59.29%	57	25.22%
RU/SR(Y)	31	13.72%				
RU/FO(N)	51	22.57%	171	75.66%	4	1.77%
RU/FO(Y)	47	20.79%				
RU/RR(N)	50	22.12%	165	73.01%	29	12.83%
RU/RR(Y)	34	15.04%				

Results and discussion

4.4 Cross-criteria consistency: RU

Table 18. Individual applicability of RU by senses in D1

RU by sense pairs		D1	
		nPairs senses	%
Applicable	Shows a direction	90	22.56%
Not applicable	Both + RU	76	19.05%
	Both – RU	233	58.40%

Results and discussion

4.4 Cross-criteria consistency: SR

Table 18. Consistency between SR and the rest of criteria in D1.
(Y) significant (N) not significant

Criteria	Consistent direction		Inconsistent direction		Unclear direction	
	nPairs	%	nPairs	%	nPairs	%
SR(N)/SD	103	45.58%	112	49.56%	11	4.87%
SR(Y)/SD	85	37.61%				
SR(N)/SP	102	45.13%	112	49.56%	12	5.31%
SR(Y)/SP	84	37.17%				
SR(N)/RU	35	15.49%	134	59.29%	57	25.22%
SR(Y)/RU	31	13.72%				
SR(N)/FO(N)	109	48.23%	116	51.33%	1	0.44%
SR(Y)/FO(Y)	78	34.51%				
SR(N)/RR(N)	101	44.69%	117	51.77%	8	3.54%
SR(Y)/RR(Y)	50	22.12%				

Results and discussion

4.4 Cross-criteria consistency: SP

Table 19. Consistency between SP and the rest of criteria in D1.
(Y) and (N) stand for senses for which SR, FO, and RR signal a direction, even if the difference is not significant (N)

Criteria analysis (D1)	Consistent direction		Inconsistent direction		Unclear direction	
	nPairs	%	nPairs	%	nPairs	%
SP/SD	188	83.19%	6	2.65%	32	14.16%
SP/SR(N)	102	45.13%	112	49.56%	12	5.31%
SP/SR(Y)	84	37.17%				
SP/RU	45	19.91%	157	69.47%	24	10.62%
SP/FO(N)	145	64.16%	80	35.40%	1	0.44%
SP/FO(Y)	126	55.75%				
SP/RR(N)	133	58.85%	91	40.27%	2	0.88%
SP/RR(Y)	83	36.73%				

Results and discussion

4.4 Cross-criteria consistency: FO

Table 20. Consistency between FO and the rest of criteria in D1.
(Y) significant (N) not significant

Criteria analysis (D1)	Consistent direction		Inconsistent direction		Unclear direction	
	nPairs	%	nPairs	%	nPairs	%
FO(N)/SD	147	65.04%	78	34.51%	1	0.44%
FO(Y)/SD	129	57.08%				
FO(N)/SP	145	64.16%	80	35.40%	29	12.83%
FO(Y)/SP	126	55.75%				
FO(N)/SR(N)	109	48.23%	116	51.33%	1	0.44%
FO(Y)/SR(Y)	78	37.17%				
FO(N)/RU	51	22.57%	171	75.66%	4	1.77%
FO(Y)/RU	47	20.80%				
FO(N)/RR(N)	195	86.28%	28	12.83%	3	1.33%
FO(Y)/RR(Y)	107	47.35%				

Results and discussion

4.4 Cross-criteria consistency: RR

Table 21. Consistency between RR and the rest of criteria in D1.
(Y) significant (N) not significant

Criteria analysis (D1)	Consistent direction		Inconsistent direction		Unclear direction	
	nPairs	%	nPairs	%	nPairs	%
RR(N)/SD	135	59.73%	88	38.94%	3	1.33%
RR(Y)/SD	85	37.61%				
RR(N)/SP	133	58.85%	91	40.27%	2	0.88%
RR(Y)/SP	83	36.73%				
RR(N)/SR(N)	101	44.69%	117	51.77%	8	3.54%
RR(Y)/SR(Y)	50	22.12%				
RR(N)/RU	50	22.12%	165	73.01%	29	12.83%
RR(Y)/RU	34	15.04%				
RR(N)/FO	194	85.84%	29	12.83%	3	1.33%
RR(Y)/FO(Y)	107	47.35%				

Results and discussion

4.4 Cross-criteria consistency

Table 21. Consistency between FO and SP where both are applicable. (Y) and (N) stand for senses for which FO signals a direction, even if the difference is not statistically significant (N)

FO vs SP	Consistent direction		Inconsistent direction	
	nPairs	%	nPairs	%
FO (Y)	120	53.10%	28	12.39%
FO (N)	19	8.41%	8	3.54%
FO (UND Y)	6	2.65%	4	1.77%
FO (UND N)	1	0.44%	2	0.88%

Contents

1. Theoretical background
2. Aims of the study
3. Methods
4. Results and discussion
5. Conclusions

Conclusions

5.1 Unexpected results

Higher consistency between the results of the criteria tested was expected.

The results were not as expected in that:

i. **Low applicability** was found for some of the criteria (SR, RR, and RU) for various reasons and, consequently, also **low consistency** was found between these and other criteria.

ii. Even if the criteria focus on the use of the pairs synchronically, the results across criteria point to **opposite directions** in some cases, which casts doubts on the applicability of the criteria **as a set**.

Conclusions

5.2 Applicability of the criteria

Overall applicability of the criteria:

i. SD and SP give the best results in a sense-based analysis of directionality.

ii. Distributional criteria (FO and RR) may not be as reliable for the study of directionality in conversion as previously thought. The derived sense is not necessarily always the less widely used one.

iii. The applicability of SR to study directionality is questioned, partly because it is a criterion which is best applied by lexemes, thus not allowing the identification of multiple directions at the sense level, and partly because it is argued that a wider semantic range does not necessarily point to a consistent derivational direction, even between monosemous pairs.

iv. RU is highlighted as a secondary criterion, and one which is applicable for very specific cases and only at the level of sense.

Conclusions

5.3 Directionality types

Directionality identified as:

i. **Unidirectional**: a single direction can be found between some pairs. However, as new senses may emerge for the lexemes, the possibility for multiple conversion remains open.

ii. **Multiple**: various directions may be found between pairs of lexemes in polysemous lexemes, according to specific senses. For most cases, a direction can be established, which is typically best decided according to SD or SP.

iii. **Ambiguous**: cases where both directions are possible based on a semantic analysis, might need to be described as ambiguous or bidirectional.

Conclusions

5.4 Overall conclusions

Overall, this thesis shows that:

i. The criteria can be applied **at the level of sense** and the results obtained by a sense analysis are undoubtedly closer to how the derivational process may have operated in each case.

ii. **The relevance of the criteria when applied by sense varies**. While the semantic criteria of SD or SP seem to give the best results, misleading cases arise in the application of other criteria:

   i. the derivative sense is used less frequently than the base sense, or

   ii. the semantic range of the derivative is narrower.

Conclusions

5.4 Overall conclusions

The proposal in this thesis is, thus, in line with Plank (2010): **directionality is a property of senses** between lexemes and should be studied at the sense level.

The identification of **recursive sense derivation** in conversion as in subsequent orders of derivation is argued to be an effective method for the identification of directionality in conversion between polysemous pairs.

However, the results show that directionality in conversion can hardly be ascertained according to Marchand's (1964) criteria viewed as a unitary set of criteria, even less when run according to senses instead of by lexemes.

Directionality in English noun/verb conversion: A sense-based study

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