

Verbal and mental process words in academic writing

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1. Background

- BAWE corpus
- "chains of reasoning" (Halliday 1998)

2. Method

- 1,129 assignments (2.7M tokens); 61 (160,000 tokens) in sciences; 73 (210,000 tokens) in history
- FrameNet categories: communication; opinion; awareness; regard; evidence; coming_to_believe; becoming_aware:- 315 words (edited to 130)
- WordSmith 4 keyword search

3. Findings

Key word	Freq.	%	RC. Freq.	RC. %	P
FOUND	263	0.1611	1947	0.0719	1E-15
SHOWN	146	0.0894	1078	0.0398	2E-14
KNOWN	113	0.0692	828	0.0306	1E-13
DEMONSTRATED	46	0.0282	230		2E-12
DETERMINED	65	0.0398	412	0.0152	2E-12
OBSERVED	62	0.038	405	0.0149	2E-11
SHOWED	53	0.0325	382	0.0141	3E-07
DETERMINE	57	0.0349	429	0.0158	4E-07
UNKNOWN	32	0.0196	177		5E-07
SAID	10		593	0.0219	6E-07
MEANT	3		373	0.0138	4E-07
BELIEVE	6		458	0.0169	2E-07
ARGUMENT	5		464	0.0171	1E-07
KNOW	8		586	0.0216	5E-08
ARGUED	6		593	0.0219	4E-11
VIEW	15		969	0.0358	8E-13

key verbal/mental process words in Biological Sciences and Physics

1) Through transplating experimentation, Jeon **found** that the nucleus of the amoebas now could not live without the once pathogenic bacteria. [BioSci/0006c]

2) Two other molecules are also **known** to disrupt hagolysosome formation. [BioSci/0009e]

3) Although the data we collected **showed** this phase to be quite inactive, if we had collected data for protein ... [BioSci/0009b]

4) This is **shown** in section five of our graph on the additional page. [BioSci/0009b]

- 1st participant: sayer/perceiver (*found, known...*); evidence (*shown, shows, determine*)
- 2nd participant: proposition/percept

Key word	Freq.	%	RC. Freq.	RC. %	P
ARGUES	114	0.0533	465	0.0172	4E-15
MEANT	90	0.0421	373	0.0138	2E-14
BELIEF	61	0.0285	273	0.0101	1E-12
ARGUED	100	0.0467	593	0.0219	2E-12
WROTE	38	0.0178	138		9E-11
ARGUING	25	0.0117	70		1E-08
ARGUMENT	77	0.036	464	0.0171	3E-08
BELIEVED	64	0.0299	388	0.0143	6E-07
OPINION	48	0.0224	258		8E-07
KNOWN	30	0.014	828	0.0306	2E-06
SHOWS	41	0.0192	1107	0.0409	7E-08
DETERMINE	6		429	0.0158	5E-09
SHOW	28	0.0131	972	0.0359	7E-12
SHOWN	21		1078	0.0398	2E-14
FOUND	61	0.0285	1947	0.0719	2E-14

key verbal/mental process words in History

5) Peter Burke **believes** that 'this more liberal policy, which exposed local tradition to stimuli from outside, may help to explain Florence's cultural lead'. Burke, The Italian Renaissance, p.68. [History/0013c]

6) The Education Minister, Alan Johnson, recently bemoaned an 'obscene social class gap' in British Universities, **arguing** that 'we need to get rid of the rope ladder and build a substantial staircase', in order to allow working class children to attend higher-achieving Universities. [History/0005a]

7) They support this claim by **arguing** that the support of the masses can best be seen in the quick and largely peaceful transition of power to the Bolsheviks all over the country after the Revolution. [History/0029b]

- 1st participant: sayer/perceiver
- 2nd participant: proposition/percept; evidence (*argues, arguing*)

4. Significance

- discipline/genre
- "chains of reasoning"

8) Wave-like behaviour was investigated by using electron diffraction to **determine** the interplanar spacings of graphite crystals. [Physocs/0083a]

- other disciplines

Philosophy	lexpro	Sociology	Classics
PERCEPTION	ARGUMENT	CONCEPTION	VIEW
ARGUMENT	ARGUMENTS	ARGUED	SAYS
THINKING	MEANING	REVEALS	BELIEVED
KNOW	NOTED	VIEW	ARGUE
PERCEIVED	DETERMINED	CONCEPTIONS	SHOWS
KNOWING	NOTICE	CLAIMS	VIEWED
THINK	DETERMINES	ARGUE	SAYING
UNDERSTAND	SHOWN		REGARD
SAY	SHOW		OPINION
PERCEIVE	CLAIM		IMPRESSION
CLAIM	OUTLINED		RESPONSE
VIEW	SHOWS		FOUND
ARGUES	KNOWN		
KNOWS	FIND		
CONSCIOUS	FOUND		
BELIEF	LEARNING		
ARGUE	CONCLUSION		
ASSERTS			
IMAGINATION			
SUGGESTS			
SAYING			

BELIEFS
PERCEIVING
ARGUMENTS

key verbal/mental process words in other texts

➤ participants

9) Jackson believes that it is possible to **argue** from one effect (qualia) back to its cause (brain states etc) and out again.

[Philosophy/0038b]

10) I **argue** below that other cases of the causative alternation show the opposite directionality, and use this as evidence against the procedural analysis presented here [lexpro]

11) As (2) **shows**, each verb permits only two of the three kinds of object. [lexpro]

12) Chilver has **argued** that "the Flavians were the only contestants who were able to control the records for any length of time, and the story which they allowed to emerge about their rising must therefore be treated with especial care", and points out that the time between Vitellius' arrival in Rome and the proclamation of Vespasian as emperor could not have been long enough for the troops to become sufficiently discontent with Vitellius' rule (Chilver 1957: 34). Therefore we must look at how Vespasia...

[Classics/6053d]

5. Shortcomings

both **State** and Church authorities.

17 on *Legionella pneumophila* is a motile, gram negative, aerobic rod commonly **found** in fresh water supplies where it prevails as an intracellular parasite of

28 f pluripotent cells ES cells, are derived from the three to five day old embryo **known** as the blastocyst which consists of a hollow microscopic ball of around 15

Although it is **arguably** harder to identify, class remains a useful measurement of social hierarchies.

interest of the immense majority'. In this sense, it can be **argued** that for Marx and Engels,

geographically **determined** by the causal factors he laid forth;