Temporal Focus

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Abstract

Prepositional phrases, when they are used to specify the temporal aspect of the matrix in which they occur, are ambiguous. They can indicate any of the temporal features: the position on the time axis, the absolute duration, the duration related to the time of reference, some special feature, e.g. rate, or be used idiomatically.

In this paper we make an empirical study of 11 prepositions that can be used temporally. We examine over 90% of the 5,000 sentences in the Brown corpus in which these prepositions occur used for giving temporal information. From this we provide a set of rules that determine, in almost all cases, which is the intended temporal feature, based on the preposition itself, the determiner and the class of the noun in its NP.

Prepositions are semantically highly ambiguous as any dictionary will show, c.f. the semantics to be attributed to IN in the following: *in the morning, in five minutes, in the office, in a hurry, in the following* etc., and which the extensive study of OVER in particular has highlighted. This ambiguity, however, is never remarked upon by a listener. So there must be a few simple mechanisms for focusing on the meaning of the preposition intended by the speaker. What are these mechanisms? We have established the mechanism for detecting when a temporal meaning is intended and also for deciding which of 6 possible temporal features is intended by a speaker. The essence of these mechanisms resides in three parts of the prepositional phrase: the preposition itself, the determiner and the class of the noun in the prepositional phrase (PP), as well as some interactions between these three parts. The exact rules are reproduced at the end of this paper.

We have focussed on 10 prepositions that can be given a temporal meaning: AT, ON, THROUGH, THROUGHOUT, BY, DURING, IN, WITHIN, OVER, FOR and one postposition AGO which is semantically similar. Temporal prepositions that were not included for want of space, were those that can be used also as subordinating conjunctions (AFTER, BEFORE, SINCE, UNTIL - see Brée, D.S. (1985)) and those that specify an interval by indicating its two end points, (BETWEEN ... AND, FROM ... TO). These prepositions (in what follows when we speak of prepositions, we include AGO) indicate either a temporal position, which itself can be either a point or an interval, or a duration of time, which may be attached to the time axis. It is no the intention here to formally specify the temporal meaning given by these prepositions; we have done that elsewhere (Brée, 1992; Brée, Feddag and Pratt, 1993; Pratt and Brée, 1994). Rather we are concerned with rules for choosing between the temporal features.

Sentences containing the 11 prepositions were extracted from the Brown corpus of American English (Kučera and Francis, 1967). Temporal uses of these prepositions were selected from the total sample by hand. In general the noun in the PP determines that the PP is given a temporal interpretation. However, some prepositions are always used temporally irrespective of the noun in their PP; these are DURING, AGO. Example sentences from the corpus are indicate by a code of the form a12:034, which indicates that the sentence is the 34th sentence in the 12th text of sub corpus 'a'.

1 Temporal features

Some prepositional phrases add a temporal feature to the semantics of the matrix (phrase or sentence) in which they occur. The two principal temporal features are to give either the position of the matrix on the time axis or to

give the extent of time occupied by the matrix, i.e. its duration. This duration is sometimes associated with the time of reference (ToR) as defined by Reichenbach (1947), the PP indicating a period on the time axis before or after the ToR, i.e. assigning position as well as duration to the matrix. This gives us four main temporal features that can be assigned to a matrix by a temporal PP:

position in which the matrix time is located at a unique point or interval on the time axis or at a recurring point/interval on the time axis:

k02:037 If Joe doesn't show up, we'll all be back here AT 0600 hours.

a33:069a He would come home IN the evening tired and discouraged.

duration in which the length of time that the matrix lasts is given:

a10:013 "The countries are trying to build IN a decade the kind of society we took a century to build"

ToR+ in which the time of the matrix is located in (or at the end of) the interval that begins at the ToR and lasts for a length of time given by the PP:

a16:103 Bill Veeck's…medics insist he rest FOR several more months before getting back into the baseball swim.

ToR- in which the time of the matrix is located in (or at the beginning of) the interval that ends at the ToR and lasts for a length of time given by the PP:

a39:009 Whatever the reasons, not IN 30 years has a single season produced such thunderous assaults upon the bureau of baseball records, home-run division.

Only the first of these four features is **positional** in the sense that it directly places the matrix time onto one or more positions on a time axis. The rest are **durational** in the sense that their nouns indicate a length of time rather than a position.

Some further temporal features are indicated by only one or two prepositions. They have been classified as being **special**. Each preposition has only one special interpretation, except for BY. The specials for each preposition are:

AT, BY in which the activity in the matrix occurs at a certain rate given by the length of time in the PP:

l03:029 She sidled along the booths one step AT a time.

d10:039 and the number is growing BY the year.

BY in which a verb in the matrix requires a length of time to be specified:

f21:036 The waves are separated BY intervals of 15 minutes to an hour or more.

THROUGH in which the PP gives the time position ending an interval beginning at the ToR for which the matrix holds (this only occurs in American English):

c12:064 The current exhibition, which remains on view THROUGH October 1955.

Note that this is different from the ToR+ category as the noun in the PP indicates a temporal position not a duration.

OVER in which a comparison is made between the value of a variable at two time positions, the second of which is given in an OVER PP:

h27:001 Sales and net income for the year ended December 31, 1960 showed an improvement OVER 1959.

FOR in which the PP does not give the position at which the activity of the matrix verb occurs, but rather the time position of its result:

a32:002 The guest assignments are scheduled FOR November 14 and 18, …

Here it is not the scheduling activity that is being done on November 14 and 18 but rather the result of the scheduling is an assignment on November 14 and 18. Contrast this with a position feature using FOR:

a19:080 The cumulative total of construction contracts FOR the first ten months of 1961 amounted to $ 634,517,000 …

In addition there are several uses of the temporal prepositions which have been classified as idiomatic as it is difficult to compute the meaning of the PP from its parts:

AT (166 occurrences in the Brown corpus): AT *first* (52 occurrences), AT *last* (52), AT *once* (7), AT *length* (6), AT *short notice* (2) and, finally, AT *the same time* in the sense of concession (47):

g12:133 AT the same time, he is plainly sympathetic, clearly friendly.

While AT *the same time* is not temporal, it has been included as any automatic system for allocating temporal versus spatial meaning to prepositions will almost certainly indicate that this is a temporal use of AT!

IN (133 occurrences): IN *turn* (44), IN *the end* (25), IN *the first/second place* (25), IN *advance* (16), IN *the long run* (7), *once* IN *a while* (7), IN *the first/second instance* (2), IN *due course* (1), *year* IN *year out* (1) and, finally, IN *M N time* indicating a musical tempo.

BY has only two idiomatic uses: BY *day/night* (4) and repetitive to indicate continuity (5), e.g.

d06:047b I am kept from all danger BY night and BY day, …

k17:036 Day BY day, week BY week, month BY month, the betrayal gnawed at Andrei's heart.

FOR (2 occurrences): FOR *ever* (1), FOR *such length* (1),

Each of the sampled temporal PPs was assigned one of the features above, by hand. In some cases this was not trivial. Certain situations were ambiguous and classified according to rules determined after inspection of the data. In particular PP's containing *the last, the past, recent, the next*, e.g.

a07:031 A succession of highly publicized scandals has aroused the public WITHIN the last year.

f31:046 he had been there on two previous visits DURING the past three or four months alone.

a05:065 Martinelli has, IN recent weeks, been of the opinion that …

a34:037 Developments OVER the next two months, however, caused the President to reconsider …

were classified as indicating a position rather than a duration related to the ToR+ or ToR- on the grounds that the NP in itself indicated a position. The ToR+ and ToR- NPs were all durations which only become linked to the ToR through information from the rest of the matrix (see below).

The numbers of PPs in the sample from the Brown corpus assigned to each category are shown in Table 1. Indicating the temporal position of the matrix is by far the most frequent use, followed by the durational uses.

The main question that will be addressed in this paper is: what indicates that the temporal PP is being used to indicate one or another temporal feature? Clearly the answer will depend upon the preposition itself, but this is not sufficient. We consider also items from within the PP's noun phrase, in particular its determiner and the class of its noun. As each of these items is introduced, evidence is sought not only for its possible contribution to selecting the appropriate feature for the PP, but also for any interactions it may have with the others in interactively indicating the feature, e.g. when the determiner is examined, the possible contribution to the PP's temporal feature of the preposition and the determiner, over and above their separate contributions, is sought.

2 The preposition

The prepositions that can be used for each features are shown in Table 1. They are:

Table 1: Numbers of PPs with the same Meaning for each preposition

Meaning	Total	at	on	through	thru'out	by	during	in	within	over	for	ago
position	3830	980	430	41	26	108	415	1720	16	35	59	.
special	70	38	.	13	.	9	.	.	.	4	6	.
duration	243	.	.	**1**	.	.	**7**	98	3	35	99	.
ToR+	154	.	.	.	.	.	.	86	28	.	40	.
ToR-	336	.	.	.	.	.	.	36	.	.	54	246
idiomatic	315	166	3	.	.	9	.	135	.	.	2	.
Totals	4948	1184	433	55	26	126	422	2075	47	74	260	246
From:												
sample of	48222	5332	6703	970	141	5289	580	21224	359	1236	6142	246
Extracted	10%	22%	6%	5%	18%	2%	72%	9%	13%	5%	4%	100%
Tokens:												
Total	51530	5332	6703	970	141	5289	580	21224	359	1236	9450	246
% corpus	93%	100%	100%	100%	100%	100%	100%	100%	100%	100%	65%	100%

position can be indicated by all the prepositions except AGO.

duration can only be indicated by certain prepositions, which we will call the '+duration' prepositions to show that they can not only indicate a position, but also a duration. They are: IN, WITHIN, OVER, FOR.

e27:081 Caution: Do not feed to dairy cows and do not feed WITHIN 60 days of slaughter.

c12:061 All belong to the collection being given to Wilmington OVER a period of years …

e26:027 From Gottingen (1801) where he stayed FOR 10 days, he wrote, …

However, occasionally DURING (7 instances) and THROUGH (once) indicate a duration:

g27:045 After a sort of death march DURING four days without food, …

h11:006 The accuracy of measuring the total electrical energy entering an exploding wire DURING a few microseconds, …

k08:082 And thus torn between …, Rousseau suffered THROUGH several painful weeks.

Here a description is added to a duration (*several weeks*) in a way which could be considered to turn it into a position (*a painful period*)

ToR+ is also indicated by some of the +duration prepositions: IN, WITHIN, FOR, but not by OVER.

p03:027 "Wait for me, Laban, I'll be dressed IN/OVER* half a second"

j09:021 The red cells were used WITHIN/OVER* 2 days after donation …

d17:034 Len LeSourd went and lived in the slums as a sidewalk derelict FOR/OVER* ten days.

ToR- is again indicated by some of the +duration prepositions: IN, FOR but not by WITHIN, OVER. In addition the post-position AGO is used only with this feature:

a08:051a …with the first Democratic president IN/WITHIN?/OVER* eight years in the White House.

d10:043 …some of which had been lying in slumber FOR/WITHIN*/OVER* centuries.

d03:038 A century AGO, Newman saw that …

The preposition influences the choice of temporal feature by:

- all the 11 prepositions, except AGO, can be used to indicate a position;
- the +duration prepositions IN, WITHIN, OVER and FOR can also indicate duration;
- of these +duration prepositions, both IN and FOR can indicate both ToR+ and ToR-; ToR+ can also be indicated by WITHIN and ToR- by the post-position AGO
- certain prepositions may also have special features: AT a rate, THROUGH upto, BY a rate or an extent, OVER a comparison and FOR a goal.
- exceptions to these restrictions occur occasionally with DURING, THROUGH by adding a vivid description to a duration that makes it acceptable as a position, e.g. *painful weeks*.

The exceptional cases, i.e. those not conforming to the constraints specified in the text, are indicated in bold face in Table 1. Note that in all tables, a distinction is made between a zero entry, "0", and a dot entry, ".". Both indicate that there were no such instances found in the sample. A zero entry indicates that an example could have occurred according to the constraints we have specified but did not. A dot indicates that no entry should have occurred according to the constraints specified in this text. A **bold** entry indicates that instances were found that should not have occurred, according to the same constraints.

We turn first to those prepositions that can indicate both positional and durational features, where the question of interest is: how can the appropriate temporal feature be assigned? One possible indicator is the determiner in the preposition's NP.

3 The determiner

One possible means of assigning the correct temporal feature for a temporal PP could be the PP's determiner. If it is definite, then it is likely to be positional; if it is indefinite then it would be durational.

All the temporal PPs were coded as having a definite or indefinite determiner. The rules for doing this are quite simple in most cases. A PP was classified as having an indefinite determiner if the PP began with an indefinite article: *a, an*, a numerical quantifier or an existential quantifier: *any, many, some*. It was classified as definite if:

- the PP began with the definite article *the*; a demonstrative: *this, that*; a possessive: *hers, his, its, our, your, their*, or a universal quantifier: *all, every*.
- the noun in the PP is a proper noun, e.g. *World War 2*,
- the noun is one which cannot take a determiner. These were nouns that:
  - indicate a relationship to the ToR: *now, present, future, eternity, history, then, which*,
  - indicate the cycle of a person's life: *adolescence, birth, infancy, career, childhood, retirement, life*,
  - other: *advance of, instance of, halftime*;
- the preposition governs a gerund referring to an event/state that has a specific location on the time axis, rather than one that can occur at any time.
- there was no noun at all.

Everything else was classified as indefinite. Two thirds of the sample were classified as having a definite determiner.

3.1 The relationship between determiner and temporal features

One would expect that all the PPs with durational features to have an indefinite determiner and all with a positional to have a definite one. This is partly the case - see Table 2. Durationals do, indeed, have an indefinite determiner, with only two exceptions:

f04:096 …by methods which use very little water and cook IN the shortest time possible.

j11:022 …there being a possible slight difference between males and females IN the time required.

These examples are of interest only in that they show how semantic generalizations can not be expected to be as rigid as syntactic ones. More important is that many PPs indicating a position can have an indefinite instead of a definite determiner, e.g.:

b12:057 (the Old Testament and Apocrypha will be published AT a future date)

where the PP gives a description of a time position that is insufficient to indicate a definite position on the time axis, rather indicating some properties it must have (in this case being in the future). So, at first sight, an indefinite determiner gives little help in deciding between positional and durational features. However, if we look at the preposition as well, then we may find an interaction that constrains the temporal feature of the PP - see Table 2.

Table 2: Numbers of PPs with the same Meaning and Determiner for each preposition

Meaning	Det	Total	at	on	through	thru'out	by	during	in	within	over	for	ago
position	def	3434	788	379	35	25	108	354	1635	16	35	59	.
	indef	396	192	51	**6**	**1**	.	61	85	.	.	.	.
special	def	27	.	.	13	.	4	.	.	.	4	6	.
	indef	43	38	.	.	.	5	.	.	.	.	.	.
duration	def	2	.	.	.	.	.	.	**2**	.	.	.	.
	indef	241	.	.	**1**	.	.	**7**	96	3	35	99	.
ToR+	indef	154	.	.	.	.	.	.	86	28	.	40	.
ToR-	indef	336	.	.	.	.	.	.	36	.	.	54	246
idiomatic	def	290	164	.	.	.	.	.	125	.	.	1	.
	indef	25	**2**	3	.	.	9	.	10	.	.	1	.
Totals		4948	1184	433	55	26	126	422	2075	47	74	260	246

3.2 The determiner and the preposition

Sometimes the determiner and preposition do not interact in determining the feature:

ON, DURING: the feature is position, irrespective of the determiner (with some exceptions with DURING which will be examined below).

n06:088 I could consult this personage ON any weekday morning, though not before ten o'clock.

g15:027 That this abandonment takes place on a stage, DURING an "artistic" performance, …

AT: the feature is usually position, irrespective of the determiner:

e30:118 And so deadheads on the payroll can be eased out AT the earliest possible age.

However there is an idiomatic feature with definite determiner and a special (rate) feature with an indefinite:

r01:025 AT first Barco was evasive and shifty.

j26:091 It is proposed that in the future complete sampling censuses be carried out AT five-year intervals.

Happily, more often the determiner and the preposition interact do in indicating the temporal feature:

THROUGH, THROUGHOUT: a definite determiner indicates a position or cycle. An indefinite NP must have some qualification to turn it into a unique or unusual item, thus making it behave as a definite NP:

g14:031 I have more than once sat cross-legged in the grass THROUGH a long summer morning …

g44:049 …the ideas that have motivated human behavior THROUGHOUT a given period …

BY: a definite determiner indicates a position or a special feature (rate):

g51:072 …BY nine-thirty the restaurants are beginning to fill.

n14:068 …his desperate hope waning BY the moment.

An indefinite NP always indicates a special feature (extent) or is idiomatic:

f21:036 The waves are separated BY intervals of 15 minutes to an hour or more …

h29:036 the steady growth in the market for replacement parts continues year BY year.

WITHIN, OVER, FOR, AGO: with these +durative prepositions an indefinite determiner always indicates one of the durational features, as can be seen in previous examples.

IN: with an indefinite determiner, surprisingly, can be used to indicate a position. There are several typical expressions in which this occurs:

j48:076 IN each instance the plaintiff was a private citizen.

g14:058 The lazy sing-song was spaced IN time like the drone of a bumble-bee.

j74:003 IN earlier years, the preservation of food was essentially related to survival.

Influence of the preposition and the determiner on the temporal feature:

- a definite NP indicates position, a special feature (THROUGH upto, BY rate, OVER comparison, FOR result) or, with AT and IN, an idiomatic feature;
- an indefinite NP with the +durative prepositions IN, WITHIN, OVER, FOR and AGO indicates one of the durational features (except sometimes with IN when it is qualified);
- an indefinite NP with non +durative prepositions:

  ON, DURING indicates a position;

  AT indicates a position or a special feature (rate)

  BY indicates a special feature (extent) or is idiomatic;

  THROUGH, THROUGHOUT cannot occur unless the indefinite NP is qualified;

- an adjectival qualifier in an indefinite NP can make it behave as definite, especially with THROUGH and IN;

So the determiner together with the preposition is almost always sufficient to distinguish between a positional and a durational feature.

4 The noun class

We turn next to the noun itself as a contributor in determining the temporal feature of the PP. For this initial analysis some of the nouns, in particular in the proper noun class, were coded. The following codes were used:

Hour for all times, e.g. *7.30, midnight, noon*;

Date for all dates, e.g. *1 April*;

Partday specifically for the parts of the day other than *night* (which was handled separately because it does not function as the other parts of the day in English) which were: *morning, afternoon, evening*;

Age always indicated simply by a numeral, e.g. *24*;

Day for days of the week and some special days: *Monday, Tuesday, …Sunday, New Year's day*;

Epoch for historical periods: *Christ, Middle Ages, Restoration*

Holyday for holy days: *Easter, Whitsun, Christmas, Thanksgiving*;

mid-Month for the middle of all months, e.g. *mid-July*;

Month for all the months: *January, February, …December*;

Year for any year, e.g. *1993*

X for nouns which were not inherently temporal, the most frequent being *World War 2*

Xing for gerunds, e.g. *hearing*

Note that capitalisation indicates a code rather than the noun found in the PP itself. The only nouns in the sample that begin with a capital letter are classified either under X, e.g. *World War 2*, or as a Holyday.

To bring some order into these nouns (and their codes), each noun (or noun code) was assinged to a noun class. The selection of noun classes was made after inspecting the nouns. Some classes are quite clear cut:

seasons of the year: *spring(time), summer(time), autumn, fall, winter*;

calendar nouns: *second, minute, moment, hour, morning, night, day, date, week(end), lunation, moon, month, quarter, semester, year, decade, generation, century, epoch, instant, interval, period, while, time, cycle* and *long* being short for *a long time*.

proper nouns indicating a time. These correspond loosely with the calendar nouns above, being references to specific rather than general calendar times. They include all the codes given above, except Age and X, and in addition: *dawn(ing), sunrise, daybreak, daylight, daytime, bedtime, sundown, sunset, dusk, nightfall, dark, eve, payday, holiday, vacation, interregnum, era, millennium, antiquity*.

life both somebody's Age and phases in life: *birth(day), childbirth, childhood, infancy, adolescence, youth, career, heyday, maturation, maturity, retirement, age, life*;

Other noun classes are not so clear cut. They include:

adverbial *past, once, recently, now, present, today, tomorrow, future, eternity, ever, history, interim, meantime, meanwhile, then, which, when*.

complex nouns used **only** in conjunction with *of* plus an NP: *advance, course, duration, event, part, remainder, span*. Other nouns can be used in complex constructions, but these appear to require it. Some expression fall in between (Quirk at al, 1985, pp 669-673); they have here been classified under other classes;

idiom: this is an open category, which includes nouns only found in idiomatic uses. Presently it includes: *first, last, length, longer, notice, place, turn, run, another*;

etcetera nouns which refer to time but not in any of the above categories: *half(time), instance, juncture, interval, middle, nadir, phase, point, inning, round* (of a game)*, season, schedule, stage* (of a process);

X class: a gerund, Xing, or any non-temporal noun, X,

4.1 The relationship between the noun class and temporal features

Turning to the relationship between the noun and the temporal feature, one would expect that certain nouns, such as *Sunday*, would be used to indicate a positional, and others, such as *minute*, would be used to indicate a durational. There are, indeed, a few nouns that only occurred with durationals and many that occurred only with positionals. However, some classes of noun could be used to indicate either a positional or a durational.

The only nouns that were found to be used with all the features were the calendar nouns, including *interval, period, time* and *cycle*:

interval can be used to point to a particular position, e.g. DURING *the interval*, or to a duration AT *yearly intervals*

period can be used both as a holder for a duration, e.g. *OVER a period of months/years*, or for a named temporal position, e.g. *DURING the period before/of…, DURING the Jacobean/Elizabethan period*

time in the durative expressions such as *FOR a time, IN time* or very frequently (10% of the sample!) as a position: *AT the same time, AT a/the time of, BY that time*

cycle only two instances: *the 24-hour daily cycle, three lunar cycles*

This is why *interval, period, time* and *cycle* have been included in the calendar noun class. None of the other noun classes are used to indicate any of the durational features.

All the noun classes can indicate a position feature. In addition roper temporal nouns can indicate a special feature and the adverbial, complex and etcetera classes of nouns can be used in idiomatic expressions.

Table 3: Numbers of PPs with the same class of the Noun, for each Meaning

Noun class	Total	position	special	duration	ToR+	ToR-	idiomatic
adverbial	253	245	.	.	.	.	8
complex	39	20	.	**2**	.	.	17
etcetera	369	344	.	.	.	.	25
life	138	137	**1**	.	.	.	.
season	103	103	.	.	.	.	.
X	164	161	**1**	.	.	**2**	.
proper	1540	1518	21	.	.	**1**	.
calendar	2148	1302	47	241	154	333	71
idiom	194	.	.	.	.	.	194
Totals	4948	3830	70	243	154	336	315

We look briefly at the exceptions to these general rules, shown in Table 3 by boldface digits. These are, by noun class:

complex: both cases involve the complex *a span of* indicating, not surprisingly, a duration:

a13:074b …six other sluggers who walloped four home runs IN a span of nine innings.

e26:001 Oersted's boyhood represented a minimal chance of either attaining greatness or serving his people so well and OVER so long a span of life.

X: there are three exceptions to the rule that this class only occurs with DURING, and each of them has an unexpected temporal feature: *a few paragraphs AGO, two issues AGO, THROUGH World War 1*. Like DURING, AGO is always temporal, so in this case *paragraph/issue* are readily given a temporal reading. That THROUGH is given a temporal meaning with an event such as *World War 1* suggests that it would be given a temporal reading with any event - a point requiring further consideration.

proper: only one instance, indicating ToR- with FOR: *FOR two afternoons*. Some other proper temporal nouns could be used with FOR to indicate a duration, i.e. Day: *FOR two Sundays*; Holyday: *FOR two Easters*; Month: *FOR two Aprils*. However, these must always be in the plural, otherwise a meaning of goal is indicated: *FOR Sunday*.

In summary:

Constraints from the noun class on the temporal feature:

- all noun classes can be used to indicate a position feature
- calendar nouns are the only class that can be used for durational features
- proper and calendar nouns are the only ones used for special features
- idiom nouns can only indicate an idiomatic use, by definition
- adverbial, complex, etcetera and calendar classes nouns can also indicate idiomatic use;

4.2 Interactions of the preposition and determiner with the noun class

We have found above that an interaction between the preposition and the determiner is useful in constrain the temporal feature that can be allocated to the PP. Here we look at their interactions with the noun class. We turn first to investigate the interaction between the preposition and the noun class in determining the temporal feature of the PP. Before doing so, we must first determine if there are any constraints on the co-occurrence of prepositions with noun classes. This turns out to be the case - see Table 4.

Table 4: Numbers of PPs with the same class of Noun for each preposition

Noun class	Total	at	on	through	thru'out	by	during	in	within	over	for	ago
adverbial	253	99	.	1	3	13	9	119	.	.	9	.
complex	39	.	.	.	**1**	.	4	29	**1**	3	1	.
etcetera	369	192	29	2	0	0	10	135	.	.	1	.
life	138	68	**1**	4	1	1	23	38	.	.	2	.
season	103	.	.	9	2	4	9	75	.	1	3	.
X	164	.	.	**1**	.	.	161	.	.	.	.	**2**
proper	1540	144	325	15	3	60	39	941	.	4	9	.
calendar	2148	569	77	23	16	48	167	658	46	66	234	244
idiom	194	112	1	.	.	.	.	80	.	.	**1**	.
Totals	4948	1184	433	55	26	126	422	2075	47	74	260	246

The main constraints are:

complex class can not occur with the prepositions: AT, ON, THROUGH, BY and AGO, e.g. **at/on/through/by the duration of*, i.e. only with the +durational prepositions.

X noun class only occurs with the DURING which is always used temporally. The other preposition which is only used temporally, AGO, practically never has a noun from this class.

idioms were only found with AT, IN.

THROUGH, THROUGHOUT, BY, DURING, IN, FOR have no further restrictions. The following combinations with the etcetera class were not present in the data but are permissible: THROUGHOUT as in *throughout the season*, and BY as in *by that stage*.

AT cannot occur with season nouns, e.g. **at the summer*.

ON always has a proper or a calendar noun and it is only certain nouns within these categories that occur with ON. ON can also occur with *completion* from the etcetera class.

WITHIN always has a calendar noun.

OVER usually has a calendar noun, but may take the complex OVER *the course of*:

AGO always has a calendar noun.

Constraints on the co-occurrence of prepositions and noun classes:

calendar nouns have no restrictions and WITHIN and AGO only take calendar nouns;

proper nouns have no further restrictions;

X nouns are only found with DURING;

idiom nouns are only found with AT, IN;

complex nouns are only found with the +durational prepositions;

season nouns cannot occur with AT, ON;

adverbials cannot occur with ON, OVER;

An inspection of the listing of the noun classes and features for each preposition shows that:

Over and above the co-occurrence constraints that exist between the noun classes and the prepositions themselves, and the constraints that each of these has independently upon the temporal feature of the PP, there is no additional interaction between the preposition and the noun class in indicating the temporal feature of the PP.

Table 5: Numbers of PPs with the same Noun class and Determiner, for each Meaning

Noun class	Determiner	Total	position	special	duration	ToR+	ToR-	idiomatic
adverbial	def	239	231	.	.	.	.	8
	indef	14	14	.	.	.	.	0
complex	def	37	20	.	.	.	.	17
	indef	2	.	.	**2**	.	.	.
etcetera	def	311	286	.	.	.	.	25
	indef	58	58	.	.	.	.	.
life	def	121	120	**1**	.	.	.	.
	indef	17	17	.	.	.	.	.
season	def	101	101	.	.	.	.	.
	indef	2	**2**	.	.	.	.	.
X	def	119	118	1	.	.	.	.
	indef	45	43	.	.	.	**2**	.
proper	def	1523	1502	21	.	.	.	.
	indef	17	16	.	.	.	**1**	.
calendar	def	1112	1056	4	**2**	.	.	50
	indef	1036	246	43	239	154	333	21
idiom	def	190	.	.	.	.	.	190
	indef	4	.	.	.	.	.	4
Totals		4948	3830	70	243	154	336	315

We look now at the interaction of the determiner and the noun class. A detailed analysis of the co-occurrences, which are summarised in Table 5, shows that:

Over and above the co-occurrence constraints that exist between the determiner and the noun classes, and the constraints that each of these has independently upon the temporal feature of the PP, there is no additional interaction between the determiner and the noun class in indicating the temporal feature of the PP.
Over and above the occurrence constraints that exist between the preposition or the determiner on the one hand and the noun classes on the other, and the constraints that each of these three have independently and pairwise upon the temporal feature of the PP, there is no additional interaction between the preposition, the determiner and the noun class in indicating the temporal feature of the PP.

Taken together the above constraints yield the combinations shown in Table 6. Inspection of the data shows that:

Table 6: Permitted Meanings for each combination of Determiner, Preposition and Noun class

		Noun class:								
Det	Preposition	adverbial	complex	etcetera	life	season	X	proper	calendar	idiom
def	at	posi idio		posi	posi			posi	posi idio	
	on			posi				posi	posi	
	through	posi		posi	posi	posi		posi spec	posi	
	thru'out	posi		posi	posi	posi		posi	posi	
	by	posi		posi	posi	posi		posi	posi spec	
	during	posi	posi	posi	posi	posi	posi	posi	posi	
	in	posi	posi idio	posi idio	posi	posi		posi	posi idio	idio
	within								posi	
	over		posi			posi		spec	posi	
	for	posi	posi	posi	posi	posi		posi spec	posi spec	
	ago									
indef	at			posi	posi			posi	posi spec	
	on							posi	posi idio	idio
	through									
	thru'out									
	by								spec idio	
	during			posi	posi		posi	posi	posi	
	in			posi	posi			posi	posi dura ToR+ ToR-	
	within								dura ToR+	
	over								dura	
	for								dura ToR+ ToR- idio	
	ago								ToR-	

Legend: Det = determiner; posi = position; spec = special; dura = duration; idio = idiomatic;

5 Summary

Drawing the threads together we see that generally, the temporal feature is position or special, except when the determiner is indefinite and the preposition is one of IN, WITHIN, OVER, FOR, AGO, when it is durational (duration, ToR+, ToR-, extent, rate). In more detail:

preposition

- all the 11 prepositions, except AGO, can be used to indicate a position;
- the prepositions IN, WITHIN, OVER and FOR can also indicate duration;
- of these prepositions, both IN and FOR can indicate both ToR+ and ToR-; ToR+ can also be indicated by WITHIN and ToR- by the post-position AGO
- certain prepositions may also have a special feature: AT a rate, THROUGH upto, BY a rate or an extent, OVER a comparison and FOR a goal.

determiner
- a definite NP indicates position, a special feature (THROUGH upto, BY rate, OVER comparison, FOR result) or, with AT and IN, an idiomatic feature;
- an indefinite NP with the +durative prepositions IN, WITHIN, OVER, FOR and AGO indicates one of the durational features (except sometimes with IN when it is qualified);
- an indefinite NP with non +durative prepositions:

  ON, DURING indicates a position;

  AT indicates a position or a special feature (rate)

  BY indicates a special feature (extent) or is idiomatic;

  THROUGH, THROUGHOUT cannot occur unless the indefinite NP is qualified;
- an adjectival qualifier in an indefinite NP can make it behave as definite, especially with THROUGH and IN;

noun class
- all noun classes can be used to indicate a position feature
- calendar nouns are the only class that can be used for durational features
- proper and calendar nouns are the only ones used for special features
- idiom nouns can only indicate an idiomatic use, by definition
- adverbial, complex, etcetera and calendar classes nouns can also indicate idiomatic use;

interactions Over and above the occurrence constraints that exist between the preposition or the determiner on the one hand and the noun classes on the other and the constraints that each of these three have independently upon the temporal feature of the PP, it is only the interaction between the preposition and the determiner that helps in indicating the temporal feature.

Exceptions to these restrictions occur occasionally, e.g. with DURING being used to indicate a duration.

Having now specified a workable set of rules for selecting which temporal feature is being indicated by a temporal PP, the next task is to test these rules on a different data set and then to explain them in terms of a semantic framework.

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