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THE FRACAS TEXTUAL INFERENCE PROBLEM SET

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The textual inference problems contained in this file are derived from the FraCaS project undertaken in the mid-1990s. The source document is:

"Using the Framework"
 The FraCaS Consortium
 Cooper et al.
 January 1996
<ftp://ftp.cogsci.ed.ac.uk/pub/FRACAS/del16.ps.gz>

There are 346 problems. Each problem contains one or more premises and one question. There are a total of 536 premises, or an average of 1.55 premises per problem. The premise counts are distributed as follows:

# premises	# problems	% problems
-----	-----	-----
1	192	55.5 %
2	122	35.3 %
3	29	8.4 %
4	2	0.6 %
5	1	0.3 %

Conversion to XML by Bill MacCartney (wcmac@cs.stanford.edu). If you benefit from my work, please give me appropriate credit.

Some notes on the XML representation:

The 'p' and 'q' elements:

These contain the premises and the question from the original source problem. Note that four problems are missing questions altogether.

I have made some very minor corrections here and there, such as adding missing sentence-final periods. But I've generally been reluctant to make other edits, even when the original is not perfectly grammatical.

The 'h' element:

The original problems included questions, not hypotheses. But in my work, I prefer to work with declarative hypotheses. I've therefore introduced the 'h' element, containing a sentence which is, as nearly as possible, the declarative equivalent to the question posed in the 'q' element. The transformation from question form to declarative form was initially performed automatically, but all the results were manually reviewed and edited for correctness. Note that in a few questions (specifically, those containing "any", "anyone", or "either"), it was necessary to change some key words to achieve grammaticality. "Any" and "anyone" were replaced by "some" and "someone", while "either" was replaced by "one of the". Problems 38, 46, 54, 55, 62, 70, 71, 78, 107, 108, 141, 344 were affected in this way.

The 'a' element:

Most problems in the source document included an answer, marked in square brackets. The 'a' element shows that answer. Most answers are "Yes", "Don't know", or "No", but some are longer phrases containing qualifications or elaborations such as "Yes, on one reading". The answer distribution is roughly as follows:

180	52%	Yes
94	27%	Don't know

31	9%	No
41	12%	[other / complex]

The 'why' element:

These elements contain text from the source document intended to explain or justify the answer.

The 'note' element:

I've added notes to a number of problems in order to explain issues which arose during translation to XML.

The 'fracas_answer' attribute:

To remedy the fact that the answers given in the source document are not restricted to a set of canonical values, most problems include a 'fracas_answer' attribute, having one of the values {'yes', 'no', 'unknown', 'undef'}. In most cases, this attribute value was generated by the obvious mapping from the 'a' element, but for complex 'a' elements I used my own judgment in generating the 'answer' value.

The 'fracas_nonstandard' attribute:

If the answer given in the source document is not one of {'Yes', 'No', or 'Don't know'}, then the problem will include the 'fracas_nonstandard' attribute with value 'true'. 41 problems have this annotation.

Here's the outline of the problem set:

1 GENERALIZED QUANTIFIERS

- 1.1 Conservativity
- 1.2 Monotonicity (upwards on second argument)
- 1.3 Monotonicity (downwards on second argument)
- 1.4 Monotonicity (upwards on first argument)
- 1.5 Monotonicity (downwards on first argument)

2 PLURALS

- 2.1 Conjoined Noun Phrases
- 2.2 Definite Plurals
- 2.3 Bare Plurals
- 2.4 Dependent Plurals
- 2.5 Negated Plurals
- 2.6 Collective and Distributive Plurals

3 (NOMINAL) ANAPHORA

- 3.1 Intra-Sentential
- 3.2 Inter-Sentential
- 3.3 Plural Anaphora
- 3.4 E-type and Donkey Pronouns
- 3.5 Functional and Subsectional
- 3.6 Simple Reflexives

4 ELLIPSIS

- 4.1 VP Ellipsis
- 4.2 Gapping
- 4.3 One Anaphora
- 4.4 Sluicing
- 4.5 Phrasal Ellipsis
- 4.6 Antecedent Contained Deletion
- 4.7 Configurational Effects
- 4.8 Ellipsis and Anaphora
- 4.9 Ellipsis and Quantification

5 ADJECTIVES

- 5.1 Affirmative and Non-Affirmative
- 5.2 No Comparison Class

- 5.3 Opposites
- 5.4 Extensional Comparison Classes
- 5.5 Extensional and Intensional Comparison Classes
- 5.6 Default Comparison Classes

6 COMPARATIVES

- 6.1 Phrasal Comparatives
- 6.2 Clausal Complement
- 6.3 Measure Phrases
- 6.4 Differential Comparatives
- 6.5 Attributive Comparatives
- 6.6 Comparatives and Quantifiers

7 TEMPORAL REFERENCE

- 7.1 Standard Use of Tenses
- 7.2 Temporal Adverbials
 - 7.2.1 Indexicals
 - 7.2.2 "Before", "After" (Temporal Subordinate Clauses)
 - 7.2.3 "In", "For" and "On" Temporal Adverbials
 - 7.2.4 Quantificational Adverbials
- 7.3 Anaphoric Dimension
- 7.4 Adverbs of Quantification
- 7.5 Some more Complex Examples

8 VERBS

- 8.1 Aspectual Classes
- 8.2 Distributive and Collective Predication

9 ATTITUDES

- 9.1 Epistemic, Intentional and Reportive Attitudes
- 9.2 Preceptive Attitudes: "See" with Bare Infinitive Complements
 - 9.2.1 Inferences we do not get
 - 9.2.2 Veridicality
 - 9.2.3 Substitution
 - 9.2.4 Existential instantiation
 - 9.2.5 Conjunction distribution
 - 9.2.6 Disjunction distribution

Here's the breakdown by topic:

sec	topic	start	count	%	single-premise
1	Quantifiers	1	80	23 %	50
2	Plurals	81	33	10 %	24
3	Anaphora	114	28	8 %	6
4	Ellipsis	142	55	16 %	25
5	Adjectives	197	23	7 %	15
6	Comparatives	220	31	9 %	16
7	Temporal	251	75	22 %	39
8	Verbs	326	8	2 %	8
9	Attitudes	334	13	4 %	9

1 GENERALIZED QUANTIFIERS

1.1 Conservativity

Q As are Bs == Q As are As who are Bs

fracas-001 answer: **yes**

P1 An Italian became the world's greatest tenor.

Q Was there an Italian who became the world's greatest tenor?

H There was an Italian who became the world's greatest tenor.

fracas-002 answer: **yes**

P1 Every Italian man wants to be a great tenor.

P2 Some Italian men are great tenors.

Q Are there Italian men who want to be a great tenor?

H There are Italian men who want to be a great tenor.

Note *Note that second premise is unnecessary and irrelevant.*

fracas-003 answer: **yes**

P1 All Italian men want to be a great tenor.

P2 Some Italian men are great tenors.

Q Are there Italian men who want to be a great tenor?

H There are Italian men who want to be a great tenor.

Note *Note that second premise is unnecessary and irrelevant.*

fracas-004 answer: **yes**

P1 Each Italian tenor wants to be great.

P2 Some Italian tenors are great.

Q Are there Italian tenors who want to be great?

H There are Italian tenors who want to be great.

Note *Note that second premise is unnecessary and irrelevant.*

fracas-005 answer: **yes**

P1 The really ambitious tenors are Italian.

Q Are there really ambitious tenors who are Italian?

H There are really ambitious tenors who are Italian.

fracas-006 answer: **no**

P1 No really great tenors are modest.

Q Are there really great tenors who are modest?

H There are really great tenors who are modest.

fracas-007 answer: **yes**

P1 Some great tenors are Swedish.

Q Are there great tenors who are Swedish?

H There are great tenors who are Swedish.

fracas-008 answer: **yes**

P1 Many great tenors are German.

Q Are there great tenors who are German?

H There are great tenors who are German.

fracas-009 answer: **yes**

P1 Several great tenors are British.

Q Are there great tenors who are British?

H There are great tenors who are British.

fracas-010 answer: **yes**

P1 Most great tenors are Italian.

Q Are there great tenors who are Italian?

H There are great tenors who are Italian.

fracas-011 answer: **yes**

P1 A few great tenors sing popular music.

P2 Some great tenors like popular music.

Q Are there great tenors who sing popular music?

H There are great tenors who sing popular music.

Note *Note that second premise is unnecessary and irrelevant.*

fracas-012 answer: **undef ****

P1 Few great tenors are poor.

Q Are there great tenors who are poor?

H There are great tenors who are poor.

A Not many

fracas-013 answer: **yes**

P1 Both leading tenors are excellent.

P2 Leading tenors who are excellent are indispensable.

Q Are both leading tenors indispensable?

H Both leading tenors are indispensable.

fracas-014 answer: **no**

P1 Neither leading tenor comes cheap.

P2 One of the leading tenors is Pavarotti.

Q Is Pavarotti a leading tenor who comes cheap?

H Pavarotti is a leading tenor who comes cheap.

fracas-015 answer: **yes**

P1 At least three tenors will take part in the concert.

Q Are there tenors who will take part in the concert?

H There are tenors who will take part in the concert.

fracas-016 answer: **undef ****

P1 At most two tenors will contribute their fees to charity.

Q Are there tenors who will contribute their fees to charity?

H There are tenors who will contribute their fees to charity.

A At most two

1.2 Monotonicity (upwards on second argument)

Q As are Bs and all Bs are Cs < Q As are Cs

fracas-017 answer: **yes**

P1 An Irishman won the Nobel prize for literature.

Q Did an Irishman win a Nobel prize?

H An Irishman won a Nobel prize.

fracas-018 answer: **yes**

P1 Every European has the right to live in Europe.

P2 Every European is a person.

P3 Every person who has the right to live in Europe can travel freely within Europe.

Q Can every European travel freely within Europe?

H Every European can travel freely within Europe.

fracas-019 answer: **yes**

P1 All Europeans have the right to live in Europe.

P2 Every European is a person.

P3 Every person who has the right to live in Europe can travel freely within Europe.

Q Can all Europeans travel freely within Europe?

H All Europeans can travel freely within Europe.

fracas-020 answer: **yes**

P1 Each European has the right to live in Europe.

P2 Every European is a person.

P3 Every person who has the right to live in Europe can travel freely within Europe.

Q Can each European travel freely within Europe?

H Each European can travel freely within Europe.

fracas-021 answer: **yes**

P1 The residents of member states have the right to live in Europe.

P2 All residents of member states are individuals.

P3 Every individual who has the right to live in Europe can travel freely within Europe.

Q Can the residents of member states travel freely within Europe?

H The residents of member states can travel freely within Europe.

fracas-022 answer: unknown

P1 No delegate finished the report on time.

Q Did no delegate finish the report?

H No delegate finished the report.

Why *can't drop adjunct in negative context*

fracas-023 answer: **yes**

P1 Some delegates finished the survey on time.

Q Did some delegates finish the survey?

H Some delegates finished the survey.

Why *OK to drop adjunct in positive context*

fracas-024 answer: **yes**

P1 Many delegates obtained interesting results from the survey.

Q Did many delegates obtain results from the survey?

H Many delegates obtained results from the survey.

Why *OK to drop adjunct in positive context*

fracas-025 answer: **yes**

P1 Several delegates got the results published in major national newspapers.

Q Did several delegates get the results published?

H Several delegates got the results published.

Why *OK to drop adjunct in positive context*

fracas-026 answer: **yes**

P1 Most Europeans are resident in Europe.

P2 All Europeans are people.

P3 All people who are resident in Europe can travel freely within Europe.

Q Can most Europeans travel freely within Europe?

H Most Europeans can travel freely within Europe.

fracas-027 answer: **yes**

P1 A few committee members are from Sweden.

P2 All committee members are people.

P3 All people who are from Sweden are from Scandinavia.

Q Are at least a few committee members from Scandinavia?

H At least a few committee members are from Scandinavia.

fracas-028 answer: unknown

P1 Few committee members are from Portugal.

P2 All committee members are people.

P3 All people who are from Portugal are from southern Europe.

Q Are there few committee members from southern Europe?

H There are few committee members from southern Europe.

fracas-029 answer: **yes**

P1 Both commissioners used to be leading businessmen.

Q Did both commissioners used to be businessmen?

H Both commissioners used to be businessmen.

fracas-030 answer: unknown

P1 Neither commissioner spends a lot of time at home.

Q Does neither commissioner spend time at home?

H Neither commissioner spends time at home.

Why *Not OK to drop [qualifier] in negative context*

fracas-031 answer: **yes**

P1 At least three commissioners spend a lot of time at home.
 Q Do at least three commissioners spend time at home?
 H At least three commissioners spend time at home.
 Note *Typo in original problem: premise was "A least three..."*

fracas-032 answer: unknown

P1 At most ten commissioners spend a lot of time at home.
 Q Do at most ten commissioners spend time at home?
 H At most ten commissioners spend time at home.

1.3 Monotonicity (downwards on second argument)

Q As are Bs and all Cs are Bs < Q As are Cs

fracas-033 answer: unknown

P1 An Irishman won a Nobel prize.
 Q Did an Irishman win the Nobel prize for literature?
 H An Irishman won the Nobel prize for literature.

fracas-034 answer: unknown

P1 Every European can travel freely within Europe.
 P2 Every European is a person.
 P3 Every person who has the right to live in Europe can travel freely within Europe.
 Q Does every European have the right to live in Europe?
 H Every European has the right to live in Europe.

fracas-035 answer: unknown

P1 All Europeans can travel freely within Europe.
 P2 Every European is a person.
 P3 Every person who has the right to live in Europe can travel freely within Europe.
 Q Do all Europeans have the right to live in Europe?
 H All Europeans have the right to live in Europe.

fracas-036 answer: unknown

P1 Each European can travel freely within Europe.
 P2 Every European is a person.
 P3 Every person who has the right to live in Europe can travel freely within Europe.
 Q Does each European have the right to live in Europe?
 H Each European has the right to live in Europe.

fracas-037 answer: unknown

P1 The residents of member states can travel freely within Europe.
 P2 All residents of member states are individuals.
 P3 Every individual who has the right to live anywhere in Europe can travel freely within Europe.
 Q Do the residents of member states have the right to live anywhere in Europe?
 H The residents of member states have the right to live anywhere in Europe.

fracas-038 answer: **no**

P1 No delegate finished the report.

Q Did any delegate finish the report on time?

H Some delegate finished the report on time.

fracas-039 answer: unknown

P1 Some delegates finished the survey.

Q Did some delegates finish the survey on time?

H Some delegates finished the survey on time.

fracas-040 answer: unknown

P1 Many delegates obtained results from the survey.

Q Did many delegates obtain interesting results from the survey?

H Many delegates obtained interesting results from the survey.

fracas-041 answer: unknown

P1 Several delegates got the results published.

Q Did several delegates get the results published in major national newspapers?

H Several delegates got the results published in major national newspapers.

fracas-042 answer: unknown

P1 Most Europeans can travel freely within Europe.

P2 All Europeans are people.

P3 All people who are resident in Europe can travel freely within Europe.

Q Are most Europeans resident in Europe?

H Most Europeans are resident in Europe.

fracas-043 answer: unknown

P1 A few committee members are from Scandinavia.

P2 All committee members are people.

P3 All people who are from Sweden are from Scandinavia.

Q Are at least a few committee members from Sweden?

H At least a few committee members are from Sweden.

fracas-044 answer: **yes**

P1 Few committee members are from southern Europe.

P2 All committee members are people.

P3 All people who are from Portugal are from southern Europe.

Q Are there few committee members from Portugal?

H There are few committee members from Portugal.

fracas-045 answer: unknown

P1 Both commissioners used to be businessmen.

Q Did both commissioners used to be leading businessmen?

H Both commissioners used to be leading businessmen.

fracas-046 answer: **no**

- P1 Neither commissioner spends time at home.
 Q Does either commissioner spend a lot of time at home?
 H One of the commissioners spends a lot of time at home.

fracas-047 answer: unknown

- P1 At least three commissioners spend time at home.
 Q Do at least three commissioners spend a lot of time at home?
 H At least three commissioners spend a lot of time at home.
 Note *Typo in original problem: premise was "A least three..."*

fracas-048 answer: **yes**

- P1 At most ten commissioners spend time at home.
 Q Do at most ten commissioners spend a lot of time at home?
 H At most ten commissioners spend a lot of time at home.

1.4 Monotonicity (upwards on first argument)

Q As are Bs and all As are Cs < Q Cs are Bs

fracas-049 answer: **yes**

- P1 A Swede won a Nobel prize.
 P2 Every Swede is a Scandinavian.
 Q Did a Scandinavian win a Nobel prize?
 H A Scandinavian won a Nobel prize.

fracas-050 answer: unknown

- P1 Every Canadian resident can travel freely within Europe.
 P2 Every Canadian resident is a resident of the North American continent.
 Q Can every resident of the North American continent travel freely within Europe?
 H Every resident of the North American continent can travel freely within Europe.

fracas-051 answer: unknown

- P1 All Canadian residents can travel freely within Europe.
 P2 Every Canadian resident is a resident of the North American continent.
 Q Can all residents of the North American continent travel freely within Europe?
 H All residents of the North American continent can travel freely within Europe.

fracas-052 answer: unknown

- P1 Each Canadian resident can travel freely within Europe.
 P2 Every Canadian resident is a resident of the North American continent.
 Q Can each resident of the North American continent travel freely within Europe?
 H Each resident of the North American continent can travel freely within Europe.

fracas-053 answer: unknown

P1 The residents of major western countries can travel freely within Europe.
P2 All residents of major western countries are residents of western countries.
Q Do the residents of western countries have the right to live in Europe?
H The residents of western countries have the right to live in Europe.

fracas-054 answer: unknown

P1 No Scandinavian delegate finished the report on time.
Q Did any delegate finish the report on time?
H Some delegate finished the report on time.

fracas-055 answer: **yes**

P1 Some Irish delegates finished the survey on time.
Q Did any delegates finish the survey on time?
H Some delegates finished the survey on time.

fracas-056 answer: unknown

P1 Many British delegates obtained interesting results from the survey.
Q Did many delegates obtain interesting results from the survey?
H Many delegates obtained interesting results from the survey.

Note *This answer seems dubious to me. Apparently the FraCaS people interpret "many" as denoting a large proportion, whereas I interpret it as denoting a large absolute number. That is, if "many" is regarded as a binary generalized quantifier, they want to say it's non-monotone in the first argument (and upward-monotone in the second), whereas I would say it's upward-monotone in both arguments. Note that this problem is exactly the inverse of problem fracas-72.*

fracas-057 answer: **yes**

P1 Several Portuguese delegates got the results published in major national newspapers.
Q Did several delegates get the results published in major national newspapers?
H Several delegates got the results published in major national newspapers.

fracas-058 answer: unknown

P1 Most Europeans who are resident in Europe can travel freely within Europe.
Q Can most Europeans travel freely within Europe?
H Most Europeans can travel freely within Europe.

fracas-059 answer: **yes**

P1 A few female committee members are from Scandinavia.
Q Are at least a few committee members from Scandinavia?
H At least a few committee members are from Scandinavia.

fracas-060 answer: unknown

P1 Few female committee members are from southern Europe.
Q Are few committee members from southern Europe?
H Few committee members are from southern Europe.
Note *Note that this problem is exactly the inverse of problem fracas-76.*

fracas-061 answer: **undef** **

P1 Both female commissioners used to be in business.

Q Did both commissioners used to be in business?
 H Both commissioners used to be in business.
 A Yes, if both commissioners are female; otherwise there are more than two commissioners.

fracas-062 answer: **undef** **

P1 Neither female commissioner spends a lot of time at home.
 Q Does either commissioner spend a lot of time at home?
 H One of the commissioners spends a lot of time at home.
 A No, if both commissioners are female; otherwise there are more than two commissioners.

fracas-063 answer: **yes**

P1 At least three female commissioners spend time at home.
 Q Do at least three commissioners spend time at home?
 H At least three commissioners spend time at home.
 Note *Typo in original problem: premise was "A least three..."*

fracas-064 answer: unknown

P1 At most ten female commissioners spend time at home.
 Q Do at most ten commissioners spend time at home?
 H At most ten commissioners spend time at home.

1.5 Monotonicity (downwards on first argument)

Q As are Bs and all Cs are As < Q Cs are Bs

fracas-065 answer: unknown

P1 A Scandinavian won a Nobel prize.
 P2 Every Swede is a Scandinavian.
 Q Did a Swede win a Nobel prize?
 H A Swede won a Nobel prize.

fracas-066 answer: **yes**

P1 Every resident of the North American continent can travel freely within Europe.
 P2 Every Canadian resident is a resident of the North American continent.
 Q Can every Canadian resident travel freely within Europe?
 H Every Canadian resident can travel freely within Europe.
 Note *NB: in the original, "travel" was missing from the question.*

fracas-067 answer: **yes**

P1 All residents of the North American continent can travel freely within Europe.
 P2 Every Canadian resident is a resident of the North American continent.
 Q Can all Canadian residents travel freely within Europe?
 H All Canadian residents can travel freely within Europe.

fracas-068 answer: **yes**

- P1 Each resident of the North American continent can travel freely within Europe.
P2 Every Canadian resident is a resident of the North American continent.
Q Can each Canadian resident travel freely within Europe?
H Each Canadian resident can travel freely within Europe.

fracas-069 answer: **yes**

- P1 The residents of western countries can travel freely within Europe.
P2 All residents of major western countries are residents of western countries.
Q Do the residents of major western countries have the right to live in Europe?
H The residents of major western countries have the right to live in Europe.

fracas-070 answer: **no**

- P1 No delegate finished the report on time.
Q Did any Scandinavian delegate finish the report on time?
H Some Scandinavian delegate finished the report on time.

fracas-071 answer: unknown

- P1 Some delegates finished the survey on time.
Q Did any Irish delegates finish the survey on time?
H Some Irish delegates finished the survey on time.

fracas-072 answer: unknown

- P1 Many delegates obtained interesting results from the survey.
Q Did many British delegates obtain interesting results from the survey?
H Many British delegates obtained interesting results from the survey.
Note *Note that this problem is exactly the inverse of problem fracas-56.*

fracas-073 answer: unknown

- P1 Several delegates got the results published in major national newspapers.
Q Did several Portuguese delegates get the results published in major national newspapers?
H Several Portuguese delegates got the results published in major national newspapers.

fracas-074 answer: unknown

- P1 Most Europeans can travel freely within Europe.
Q Can most Europeans who are resident outside Europe travel freely within Europe?
H Most Europeans who are resident outside Europe can travel freely within Europe.

fracas-075 answer: unknown

- P1 A few committee members are from Scandinavia.
Q Are at least a few female committee members from Scandinavia?
H At least a few female committee members are from Scandinavia.

fracas-076 answer: **yes**

- P1 Few committee members are from southern Europe.
Q Are few female committee members from southern Europe?
H Few female committee members are from southern Europe.
Note *Note that this problem is exactly the inverse of problem fracas-60. If the answer is "yes", then apparently the*

FraCaS people interpret "few" as denoting a small absolute number, rather than a small proportion. That is, if "few" is regarded as a binary generalized quantifier, they want to say it's downward-monotone in the first argument, rather than non-monotone. Contrast this with the treatment of "many" in fracas-56 and fracas-72, which is apparently interpreted to be non-monotone in its first argument.

fracas-077 answer: **undef** **

P1 Both commissioners used to be in business.

Q Did both female commissioners used to be in business?

H Both female commissioners used to be in business.

A Yes, if both commissioners are female; otherwise there are more than two commissioners.

fracas-078 answer: **undef** **

P1 Neither commissioner spends a lot of time at home.

Q Does either female commissioner spend a lot of time at home?

H One of the female commissioners spends a lot of time at home.

A No, if both commissioners are female; otherwise there are more than two commissioners.

fracas-079 answer: unknown

P1 At least three commissioners spend time at home.

Q Do at least three male commissioners spend time at home?

H At least three male commissioners spend time at home.

Note *Typo in original problem: premise was "A least three..."*

fracas-080 answer: **yes**

P1 At most ten commissioners spend time at home.

Q Do at most ten female commissioners spend time at home?

H At most ten female commissioners spend time at home.

2 PLURALS

A number of inferences pertaining to plurals are covered under the headings of generalized quantifiers and elsewhere. Here we concentrate on conjoined NPs; bare, existential and definite plurals; dependent plurals; and collective and distributive readings and scope ambiguity.

2.1 Conjoined Noun Phrases

fracas-081 answer: **yes**

P1 Smith, Jones and Anderson signed the contract.

Q Did Jones sign the contract?

H Jones signed the contract.

fracas-082 answer: **yes**

P1 Smith, Jones and several lawyers signed the contract.

Q Did Jones sign the contract?

H Jones signed the contract.

fracas-083 answer: unknown

P1 Either Smith, Jones or Anderson signed the contract.

Q Did Jones sign the contract?

H Jones signed the contract.

fracas-084 answer: **yes**

P1 Either Smith, Jones or Anderson signed the contract.

Q If Smith and Anderson did not sign the contract, did Jones sign the contract?

H If Smith and Anderson did not sign the contract, Jones signed the contract.

fracas-085 answer: **no**

P1 Exactly two lawyers and three accountants signed the contract.

Q Did six lawyers sign the contract?

H Six lawyers signed the contract.

Why *No scope relations between the two conjoined NPs.*

fracas-086 answer: **no**

P1 Exactly two lawyers and three accountants signed the contract.

Q Did six accountants sign the contract?

H Six accountants signed the contract.

Why *No scope relations between the two conjoined NPs.*

Conjoined Nbars

Nbar conjunction tends to be quite ambiguous. This may be the result of a syntactic ambiguity between (i) genuine Nbar conjunction, and (ii) NP conjunction where the determiner of one of the NPs is ellided.

fracas-087 answer: **yes** **

P1 Every representative and client was at the meeting.

Q Was every representative at the meeting?

H Every representative was at the meeting.

A Yes, on one reading

Why *Arguably NP conjunction: every representative and every client.*

fracas-088 answer: unknown **

P1 Every representative and client was at the meeting.

Q Was every representative at the meeting?

H Every representative was at the meeting.

A Don't know, on one reading

Why *NBar conjunction: everyone who is both a representative and a client.*

Note *Note that this is formally identical with preceding.*

fracas-089 answer: **yes**

P1 Every representative or client was at the meeting.

- Q Was every representative and every client at the meeting?
- H Every representative and every client was at the meeting.
- Why *With disjunction, NP conjunction seems unavailable.*

2.2 Definite Plurals

Definite plurals can often be non-anaphoric and behave like universally quantified noun phrases (90). However, as with (generic) bare plurals, the force of the quantification can also be less than universal (91). Whether this lessening of quantificational force is due to the noun phrase or to the predicate of which the NP is an argument is unclear (92, 93).

fracas-090 answer: **yes**

- P1 The chairman read out the items on the agenda.
- Q Did the chairman read out every item on the agenda?
- H The chairman read out every item on the agenda.

Non-anaphoric, universal plural definite

fracas-091 answer: unknown

- P1 The people who were at the meeting voted for a new chairman.
- Q Did everyone at the meeting vote for a new chairman?
- H Everyone at the meeting voted for a new chairman.
- Why *Some people may have abstained from the vote*

fracas-092 answer: **yes**

- P1 All the people who were at the meeting voted for a new chairman.
- Q Did everyone at the meeting vote for a new chairman?
- H Everyone at the meeting voted for a new chairman.

fracas-093 answer: **yes**

- P1 The people who were at the meeting all voted for a new chairman.
- Q Did everyone at the meeting vote for a new chairman?
- H Everyone at the meeting voted for a new chairman.

Closely related to this, plural definites can have a collective/institutional or even generic interpretation:

fracas-094 answer: unknown

- P1 The inhabitants of Cambridge voted for a Labour MP.
- Q Did every inhabitant of Cambridge vote for a Labour MP?
- H Every inhabitant of Cambridge voted for a Labour MP.

fracas-095 answer: unknown

P1 The Ancient Greeks were noted philosophers.
Q Was every Ancient Greek a noted philosopher?
H Every Ancient Greek was a noted philosopher.

fracas-096 answer: **yes**

P1 The Ancient Greeks were all noted philosophers.
Q Was every Ancient Greek a noted philosopher?
H Every Ancient Greek was a noted philosopher.

2.3 Bare Plurals

Bare plurals can exhibit existential, (quasi) universal, generic or dependent plural behaviour.

The circumstances giving rise to these different behaviours are poorly understood, so we only give a few illustrative examples.

fracas-097 answer: **yes**

P1 Software faults were blamed for the system failure.
Q Was the system failure blamed on one or more software faults?
H The system failure was blamed on one or more software faults.
Why *Existential bare plural*

fracas-098 answer: unknown

P1 Software faults were blamed for the system failure.
P2 Bug # 32-985 is a known software fault.
Q Was Bug # 32-985 blamed for the system failure?
H Bug # 32-985 was blamed for the system failure.
Why *Existential interpretation: not every software fault contributed to the failure.*

fracas-099 answer: **yes**

P1 Clients at the demonstration were all impressed by the system's performance.
P2 Smith was a client at the demonstration.
Q Was Smith impressed by the system's performance?
H Smith was impressed by the system's performance.
Why *(Quasi) universal bare plural*

fracas-100 answer: **yes**

P1 Clients at the demonstration were impressed by the system's performance.
Q Were most clients at the demonstration impressed by the system's performance?
H Most clients at the demonstration were impressed by the system's performance.
Why *(Quasi) universal bare plural*

fracas-101 answer: **yes**

P1 University graduates make poor stock-market traders.

P2 Smith is a university graduate.
Q Is Smith likely to make a poor stock market trader?
H Smith is likely to make a poor stock market trader.
Why *Generic interpretation*

fracas-102 answer: unknown

P1 University graduates make poor stock-market traders.
P2 Smith is a university graduate.
Q Will Smith make a poor stock market trader?
H Smith will make a poor stock market trader.
Why *Generic interpretation*

2.4 Dependent Plurals

fracas-103 answer: **yes**

P1 All APCOM managers have company cars.
P2 Jones is an APCOM manager.
Q Does Jones have a company car?
H Jones has a company car.

fracas-104 answer: unknown

P1 All APCOM managers have company cars.
P2 Jones is an APCOM manager.
Q Does Jones have more than one company car?
H Jones has more than one company car.

2.5 Negated Plurals

fracas-105 answer: **no**

P1 Just one accountant attended the meeting.
Q Did no accountants attend the meeting?
H No accountants attended the meeting.

fracas-106 answer: **no**

P1 Just one accountant attended the meeting.
Q Did no accountant attend the meeting?
H No accountant attended the meeting.

fracas-107 answer: **yes**

P1 Just one accountant attended the meeting.
Q Did any accountants attend the meeting?
H Some accountants attended the meeting.

fracas-108 answer: **yes**

P1 Just one accountant attended the meeting.
Q Did any accountant attend the meeting?

H Some accountant attended the meeting.

fracas-109 answer: **no** **

P1 Just one accountant attended the meeting.

Q Did some accountants attend the meeting?

H Some accountants attended the meeting.

A No, just one

fracas-110 answer: **yes**

P1 Just one accountant attended the meeting.

Q Did some accountant attend the meeting?

H Some accountant attended the meeting.

2.6 Collective and Distributive Plurals

fracas-111 answer: **yes** **

P1 Smith signed one contract.

P2 Jones signed another contract.

Q Did Smith and Jones sign two contracts?

H Smith and Jones signed two contracts.

A Yes, on a collective/cumulative reading of the conclusion.

fracas-112 answer: **yes** **

P1 Smith signed two contracts.

P2 Jones signed two contracts.

Q Did Smith and Jones sign two contracts?

H Smith and Jones signed two contracts.

A Yes, on a distributive reading of "Smith and Jones".

fracas-113 answer: **yes**

P1 Smith signed two contracts.

P2 Jones also signed them.

Q Did Smith and Jones sign two contracts?

H Smith and Jones signed two contracts.

3 (NOMINAL) ANAPHORA

In the examples below we make the assumption (unless otherwise indicated) that there is no context beyond that provided by the mini-discourse. This is so that we can do away with explicit co-indexing of pronouns with their antecedents, on the grounds that context will provide only (or sometimes a strictly limited number) of possible antecedents.

3.1 Intra-Sentential

fracas-114 answer: **yes**

P1 Mary used her workstation.

Q Was Mary's workstation used?

H Mary's workstation was used.

fracas-115 answer: **yes**

P1 Mary used her workstation.

Q Does Mary have a workstation?

H Mary has a workstation.

fracas-116 answer: **yes**

P1 Mary used her workstation.

Q Is Mary female?

H Mary is female.

fracas-117 answer: **yes**

P1 Every student used her workstation.

P2 Mary is a student.

Q Did Mary use her workstation?

H Mary used her workstation.

fracas-118 answer: **yes**

P1 Every student used her workstation.

P2 Mary is a student.

Q Does Mary have a workstation?

H Mary has a workstation.

fracas-119 answer: **no**

P1 No student used her workstation.

P2 Mary is a student.

Q Did Mary use a workstation?

H Mary used a workstation.

3.2 Inter-Sentential

fracas-120 answer: **yes**

P1 Smith attended a meeting.

P2 She chaired it.

Q Did Smith chair a meeting?

H Smith chaired a meeting.

fracas-121 answer: **yes**

P1 Smith delivered a report to ITEL.

P2 She also delivered them an invoice.

P3 And she delivered them a project proposal.

Q Did Smith deliver a report, an invoice and a project proposal to ITEL?

H Smith delivered a report, an invoice and a project proposal to ITEL.

Why *Keeping track of same entities across more than two sentences.*

fracas-122 answer: **yes**

P1 Every committee has a chairman.

P2 He is appointed its members.

Q Does every committee have a chairman appointed by members of the committee?

H Every committee has a chairman appointed by members of the committee.

Why *Modal subordination.*

3.3 Plural Anaphora

fracas-123 answer: **yes**

P1 ITEL has sent most of the reports Smith needs.

P2 They are on her desk.

Q Are there some reports from ITEL on Smith's desk?

H There are some reports from ITEL on Smith's desk.

fracas-124 answer: **yes**

P1 Two out of ten machines are missing.

P2 They have been removed.

Q Have two machines been removed?

H Two machines have been removed.

fracas-125 answer: unknown

P1 Two out of ten machines are missing.

P2 They have been removed.

Q Have eight machines been removed?

H Eight machines have been removed.

Why *Set difference can't be used to construct plural antecedents*

fracas-126 answer: **yes**

P1 Two out of ten machines are missing.

P2 They were all here yesterday.

Q Were ten machines here yesterday?

H Ten machines were here yesterday.

fracas-127 answer: **yes** **

P1 Smith took a machine on Tuesday, and Jones took a machine on Wednesday.

P2 They put them in the lobby.

Q Did Smith and Jones put two machines in the lobby?

H Smith and Jones put two machines in the lobby.

A Yes, on a distributive reading of the question.

Why *Construction of plural antecedents from separate constituents.*

fracas-128 answer: **yes**

P1 John and his colleagues went to a meeting.

P2 They hated it.

Q Did John's colleagues hate the meeting?
 H John's colleagues hated the meeting.

fracas-129 answer: **yes** **

P1 John and his colleagues went to a meeting.
 P2 They hated it.
 Q Did John hate the meeting?
 H John hated the meeting.
 A Yes, on one possible reading
 Why *"They" can be resolved to John and his colleagues.*

fracas-130 answer: unknown **

P1 John and his colleagues went to a meeting.
 P2 They hated it.
 Q Did John hate the meeting?
 H John hated the meeting.
 A Don't know, on one possible reading
 Why *"They" can also be resolved to John's colleagues but not John.*
 Note *Note that this is formally identical with preceding.*

fracas-131 answer: **yes**

P1 Each department has a dedicated line.
 P2 They rent them from BT.
 Q Does every department rent a line from BT?
 H Every department rents a line from BT.
 Why *Dependent plural anaphora*

fracas-132 answer: **yes**

P1 Each department has a dedicated line.
 P2 The sales department rents it from BT.
 Q Does the sales department rent a line from BT?
 H The sales department rents a line from BT.
 Why *Paycheque pronoun*

3.4 E-type and Donkey Pronouns

fracas-133 answer: **yes**

P1 GFI owns several computers.
 P2 ITEL maintains them.
 Q Does ITEL maintain all the computers that GFI owns?
 H ITEL maintains all the computers that GFI owns.
 Why *E-type anaphora*

fracas-134 answer: **yes**

P1 Every customer who owns a computer has a service contract for it.
 P2 MFI is a customer that owns exactly one computer.
 Q Does MFI have a service contract for all its computers?
 H MFI has a service contract for all its computers.

Why *Donkey sentence*

fracas-135 answer: **yes**

P1 Every customer who owns a computer has a service contract for it.

P2 MFI is a customer that owns several computers.

Q Does MFI have a service contract for all its computers?

H MFI has a service contract for all its computers.

Why *This pattern of inference, unlike (134), tends to some theory dependence. Although the inference seems correct in this example, compare with (136)*

fracas-136 answer: unknown

P1 Every executive who had a laptop computer brought it to take notes at the meeting.

P2 Smith is a executive who owns five different laptop computers.

Q Did Smith take five laptop computers to the meeting?

H Smith took five laptop computers to the meeting.

Why *Similar to (135), except for tense and pragmatic plausibility.*

fracas-137 answer: **yes**

P1 There are 100 companies.

P2 ICM is one of the companies and owns 150 computers.

P3 It does not have service contracts for any of its computers.

P4 Each of the other 99 companies owns one computer.

P5 They have service contracts for them.

Q Do most companies that own a computer have a service contract for it?

H Most companies that own a computer have a service contract for it.

Why *Proportion problem*

3.5 Functional and Subsectional

Due to the heavy domain dependence of functional (or better perhaps, relational) anaphora, it is hard to state general inferences that don't assume considerable background knowledge unless this is given explicitly.

fracas-138 answer: **yes**

P1 Every report has a cover page.

P2 R-95-103 is a report.

P3 Smith signed the cover page.

Q Did Smith sign the cover page of R-95-103?

H Smith signed the cover page of R-95-103.

3.6 Simple Reflexives

fracas-139 answer: **yes**

P1 A company director awarded himself a large payrise.

Q Has a company director awarded and been awarded a payrise?

H A company director has awarded and been awarded a payrise.

fracas-140 answer: **yes**

P1 John said Bill had hurt himself.
 Q Did John say Bill had been hurt?
 H John said Bill had been hurt.

fracas-141 answer: unknown

P1 John said Bill had hurt himself.
 Q Did anyone say John had been hurt?
 H Someone said John had been hurt.

4 ELLIPSIS

In nearly all cases the inferences presented here have conclusions that are simply reconstructions of the ellided constituent. Unfortunately, an inference test suite is not well suited to illustrating prohibitions on ellipsis resolution. For example, an ill-formed discourse like

John was in Paris yesterday. *So did Bill.

doesn't even get as far as supporting any inferences.

4.1 VP Ellipsis

fracas-142 answer: **yes**

P1 John spoke to Mary.
 P2 So did Bill.
 Q Did Bill speak to Mary?
 H Bill spoke to Mary.
 Why *Basic example.*

fracas-143 answer: unknown

P1 John spoke to Mary.
 P2 So did Bill.
 P3 John spoke to Mary at four o'clock.
 Q Did Bill speak to Mary at four o'clock?
 H Bill spoke to Mary at four o'clock.
 Why *Temporal resolution of tense in antecedent is not carried across to ellipsis.*

fracas-144 answer: **yes**

P1 John spoke to Mary at four o'clock.
 P2 So did Bill.
 Q Did Bill speak to Mary at four o'clock?
 H Bill spoke to Mary at four o'clock.
 Why *Explicit temporal adverbials are carried across to ellipsis.*

fracas-145 answer: **yes**

P1 John spoke to Mary at four o'clock.

P2 And Bill did at five o'clock.
Q Did Bill speak to Mary at five o'clock?
H Bill spoke to Mary at five o'clock.
Why *Explicit temporal adverbials are not carried across if overridden.*

fracas-146 answer: **yes**

P1 John has spoken to Mary.
P2 Bill is going to.
Q Will Bill speak to Mary?
H Bill will speak to Mary.
Why *Tense agreement not necessary between ellipsis and antecedent.*

fracas-147 answer: **no**

P1 John spoke to Mary on Monday.
P2 Bill didn't.
Q Did Bill speak to Mary on Monday?
H Bill spoke to Mary on Monday.
Why *Polarity agreement not necessary between ellipsis and antecedent.*

fracas-148 answer: **yes**

P1 Has John spoken to Mary?
P2 Bill has.
Q Has Bill spoken to Mary?
H Bill has spoken to Mary.
Why *Mood agreement not necessary between ellipsis and antecedent.*
Note *Note unusual use of question as premise.*

fracas-149 answer: **yes**

P1 John has spoken to Mary.
P2 The students have too.
Q Have the students spoken to Mary?
H The students have spoken to Mary.
Why *Number agreement not necessary.*

4.2 Gapping

fracas-150 answer: **yes**

P1 John went to Paris by car, and Bill by train.
Q Did Bill go to Paris by train?
H Bill went to Paris by train.
Why *Basic example*

fracas-151 answer: **yes**

P1 John went to Paris by car, and Bill by train to Berlin.
Q Did Bill go to Berlin by train?
H Bill went to Berlin by train.
Why *Another basic example*

fracas-152 answer: **yes**

P1 John went to Paris by car, and Bill to Berlin.

Q Did Bill go to Berlin by car?

H Bill went to Berlin by car.

Why *Another basic example*

fracas-153 answer: **yes**

P1 John is going to Paris by car, and the students by train.

Q Are the students going to Paris by train?

H The students are going to Paris by train.

Why *Subject-verb agreement not necessary*

fracas-154 answer: **yes**

P1 John went to Paris by car.

P2 Bill by train.

Q Did Bill go to Paris by train?

H Bill went to Paris by train.

Why *Cross-sentential gapping*

4.3 One Anaphora

fracas-155 answer: **yes**

P1 John owns a car.

P2 Bill owns one too.

Q Does Bill own a car?

H Bill owns a car.

Why *Basic example*

fracas-156 answer: unknown

P1 John owns a car.

P2 Bill owns one too.

Q Is there a car that John and Bill own?

H There is a car that John and Bill own.

Why *It needn't be the same car that John and Bill own.*

fracas-157 answer: **yes**

P1 John owns a red car.

P2 Bill owns a blue one.

Q Does Bill own a blue car?

H Bill owns a blue car.

fracas-158 answer: unknown

P1 John owns a red car.

P2 Bill owns a blue one.

Q Does Bill own a red car?

H Bill owns a red car.

fracas-159 answer: **yes**

P1 John owns a red car.

P2 Bill owns a fast one.

Q Does Bill own a fast car?

H Bill owns a fast car.

fracas-160 answer: **yes** **

P1 John owns a red car.

P2 Bill owns a fast one.

Q Does Bill own a fast red car?

H Bill owns a fast red car.

A Yes, on one possible reading

Why *The "one" anaphor may be resolved via the property of being a red car.*

fracas-161 answer: unknown **

P1 John owns a red car.

P2 Bill owns a fast one.

Q Does Bill own a fast red car?

H Bill owns a fast red car.

A Don't know, on one possible reading

Why *Or the "one" anaphor may just be resolved via the property of being a car.*

Note *Note that this is formally identical with preceding.*

fracas-162 answer: **yes**

P1 John owns a fast red car.

P2 Bill owns a slow one.

Q Does Bill own a slow red car?

H Bill owns a slow red car.

Why *When semantically parallel (e.g. fast/slow) modifiers appear on the antecedent and one-anaphor, it appears that all non-parallel modifiers must form part of the resolution.*

4.4 Sluicing

fracas-163 answer: **no**

P1 John had his paper accepted.

P2 Bill doesn't know why.

Q Does Bill know why John had his paper accepted?

H Bill knows why John had his paper accepted.

4.5 Phrasal Ellipsis

fracas-164 answer: **yes**

P1 John spoke to Mary.

P2 And to Sue.

Q Did John speak to Sue?

H John spoke to Sue.

Why *PP ellipsis (subcategorized)*

fracas-165 answer: **yes**

P1 John spoke to Mary.

P2 On Friday.

Q Did John speak to Mary on Friday?

H John spoke to Mary on Friday.

Why *PP ellipsis: adds PP to antecedent*

fracas-166 answer: **yes**

P1 John spoke to Mary on Thursday.

P2 And on Friday.

Q Did John speak to Mary on Friday?

H John spoke to Mary on Friday.

Why *PP ellipsis: replaces PP in antecedent*

fracas-167 answer: **no**

P1 Twenty men work in the Sales Department.

P2 But only one woman.

Q Do two women work in the Sales Department?

H Two women work in the Sales Department.

Why *NP ellipsis*

fracas-168 answer: **yes**

P1 Five men work part time.

P2 And forty five women.

Q Do forty five women work part time?

H Forty five women work part time.

Why *NP ellipsis*

fracas-169 answer: **yes** **

P1 John found Mary before Bill.

Q Did John find Mary before Bill found Mary?

H John found Mary before Bill found Mary.

A Yes, on one possible reading

Why *NP ellipsis*

fracas-170 answer: **yes** **

P1 John found Mary before Bill.

Q Did John find Mary before John found Bill?

H John found Mary before John found Bill.

A Yes, on one possible reading

Why *NP ellipsis*

fracas-171 answer: **yes**

P1 John wants to know how many men work part time.

P2 And women.

Q Does John want to know how many women work part time?

H John wants to know how many women work part time.

Why *Nbar ellipsis*

fracas-172 answer: **yes**

P1 John wants to know how many men work part time, and which.

Q Does John want to know which men work part time?

H John wants to know which men work part time.

Why *Determiner ellipsis*

4.6 Antecedent Contained Deletion

Antecedent contained deletion is a notorious problem for copying approaches to ellipsis, since the antecedent clause contains the ellipsis and some way must be found of removing it from the copy.

fracas-173 answer: **yes**

P1 Bill spoke to everyone that John did.

P2 John spoke to Mary.

Q Did Bill speak to Mary?

H Bill spoke to Mary.

fracas-174 answer: unknown

P1 Bill spoke to everyone that John did.

P2 Bill spoke to Mary.

Q Did John speak to Mary?

H John spoke to Mary.

4.7 Configurational Effects

There are a number of syntactic and other configurational constraints on what can constitute the antecedent to an ellipsis. These constraints vary depending on the type of ellipsis (VP, phrasal, gapping, etc).

fracas-175 answer: **yes** **

P1 John said Mary wrote a report, and Bill did too.

Q Did Bill say Mary wrote a report?

H Bill said Mary wrote a report.

A Yes, on one possible reading/parse

fracas-176 answer: **yes** **

P1 John said Mary wrote a report, and Bill did too.

Q Did John say Bill wrote a report?

H John said Bill wrote a report.

A Yes, on one possible reading/parse

fracas-177 answer: unknown

P1 John said that Mary wrote a report, and that Bill did too.

Q Did Bill say Mary wrote a report?
 H Bill said Mary wrote a report.

Note that the first sentence in (175) and (176) is syntactically ambiguous, depending on whether the conjunctive clause conjoins with the main or subordinate clause of "John said Mary wrote a report". In (177) the conjunctive clause unambiguously conjoins with the subordinate clause, and only one interpretation of the ellipsis is possible. This appears to indicate that the antecedent clause to a VP ellipsis must be adjacent to the elliptical clause. However, as the examples below show, this is not correct.

fracas-178 answer: **yes**

P1 John wrote a report, and Bill said Peter did too.

Q Did Bill say Peter wrote a report?

H Bill said Peter wrote a report.

Why *Embedded elliptical clause*

fracas-179 answer: **yes**

P1 If John wrote a report, then Bill did too.

P2 John wrote a report.

Q Did Bill write a report?

H Bill wrote a report.

Why *Elliptical and antecedent clause embedded (in parallel)*

fracas-180 answer: **yes**

P1 John wanted to buy a car, and he did.

Q Did John buy a car?

H John bought a car.

Why *Embedded antecedent clause*

fracas-181 answer: unknown

P1 John needed to buy a car, and Bill did.

Q Did Bill buy a car?

H Bill bought a car.

Other configurational effects of the kinds illustrated in Deliverable 7 are hard to exemplify using inference suites.

4.8 Ellipsis and Anaphora

The following inferences illustrate differences between strict and sloppy interpretations of anaphors in elliptical clauses.

fracas-182 answer: **yes** **

P1 Smith represents his company and so does Jones.

Q Does Jones represent Jones' company?
H Jones represents Jones' company.
A Yes, on one reading
Why *Sloppy identity*

fracas-183 answer: **yes** **

P1 Smith represents his company and so does Jones.
Q Does Jones represent Smith's company?
H Jones represents Smith's company.
A Yes, on one reading
Why *Strict identity*

fracas-184 answer: unknown

P1 Smith represents his company and so does Jones.
Q Does Smith represent Jones' company?
H Smith represents Jones' company.

fracas-185 answer: **yes** **

P1 Smith claimed he had costed his proposal and so did Jones.
Q Did Jones claim he had costed his own proposal?
H Jones claimed he had costed his own proposal.
A Yes, on one reading
Why *Sloppy identity on both pronouns*

fracas-186 answer: **yes** **

P1 Smith claimed he had costed his proposal and so did Jones.
Q Did Jones claim he had costed Smith's proposal?
H Jones claimed he had costed Smith's proposal.
A Yes, on one reading
Why *Sloppy identity "he", strict on "his"*

fracas-187 answer: **yes** **

P1 Smith claimed he had costed his proposal and so did Jones.
Q Did Jones claim Smith had costed Smith's proposal?
H Jones claimed Smith had costed Smith's proposal.
A Yes, on one reading
Why *Strict identity on both pronouns*

fracas-188 answer: unknown

P1 Smith claimed he had costed his proposal and so did Jones.
Q Did Jones claim Smith had costed Jones' proposal?
H Jones claimed Smith had costed Jones' proposal.
Why *Can't have strict identity on "he" and sloppy identity on "his"*

fracas-189 answer: **yes** **

P1 John is a man and Mary is a woman.
P2 John represents his company and so does Mary.
Q Does Mary represent her own company?

H Mary represents her own company.
A Yes, on one reading
Why *Sloppy identity, gender agreement not necessary*

fracas-190 answer: **yes** **

P1 John is a man and Mary is a woman.
P2 John represents his company and so does Mary.
Q Does Mary represent John's company?
H Mary represents John's company.
A Yes, on one reading
Why *Strict identity, gender agreement not necessary*

fracas-191 answer: **yes**

P1 Bill suggested to Frank's boss that they should go to the meeting together, and Carl to Alan's wife.
Q If it was suggested that Bill and Frank should go together, was it suggested that Carl and Alan should go together?
H If it was suggested that Bill and Frank should go together, it was suggested that Carl and Alan should go together.
Why *Plural pronouns resolved in parallel*

fracas-192 answer: unknown

P1 Bill suggested to Frank's boss that they should go to the meeting together, and Carl to Alan's wife.
Q If it was suggested that Bill and Frank should go together, was it suggested that Carl and Alan's wife should go together?
H If it was suggested that Bill and Frank should go together, it was suggested that Carl and Alan's wife should go together.
Why *Plural pronouns resolved in parallel*

fracas-193 answer: **yes**

P1 Bill suggested to Frank's boss that they should go to the meeting together, and Carl to Alan's wife.
Q If it was suggested that Bill and Frank's boss should go together, was it suggested that Carl and Alan's wife should go together?
H If it was suggested that Bill and Frank's boss should go together, it was suggested that Carl and Alan's wife should go together.
Why *Plural pronouns resolved in parallel*

fracas-194 answer: unknown

P1 Bill suggested to Frank's boss that they should go to the meeting together, and Carl to Alan's wife.
Q If it was suggested that Bill and Frank's boss should go together, was it suggested that Carl and Alan should go together?
H If it was suggested that Bill and Frank's boss should go together, it was suggested that Carl and Alan should go together.
Why *Plural pronouns resolved in parallel*

fracas-195 answer: **yes**

P1 Bill suggested to Frank's boss that they should go to the meeting together, and Carl to Alan's wife.
Q If it was suggested that Bill, Frank and Frank's boss should go together, was it suggested that Carl, Alan and Alan's wife should go together?
H If it was suggested that Bill, Frank and Frank's boss should go together, it was suggested that Carl, Alan and Alan's wife should go together.
Why *Plural pronouns resolved in parallel*

4.9 Ellipsis and Quantification

Scope parallelism turns out to be rather tricky to illustrate through inference suites. This is because of the entailment relation: 98
j= 89.

fracas-196 answer: **yes**

P1 A lawyer signed every report, and so did an auditor.
P2 That is, there was one lawyer who signed all the reports.
Q Was there one auditor who signed all the reports?
H There was one auditor who signed all the reports.

5 ADJECTIVES

The inferences below carve up adjectives into (a by no means exhaustive) cross-cutting set of dimensions. Typical inferences are given for example adjectives.

5.1 Affirmative and Non-Affirmative

Affirmative adjectives map the denotation of the predicate they modify onto a subset of the denotation. So for example, an old man is a man. Most adjectives are affirmative, but a few like former and fake are not. Given that someone is a former student, one cannot conclude that they are now a student. But it is not entirely clear whether one can conclude that they are not now a student ... they may have become one again.

fracas-197 answer: **yes**

P1 John has a genuine diamond.
Q Does John have a diamond?
H John has a diamond.
Why *Affirmative adjectives: Adj N entails N*

fracas-198 answer: **no** **

P1 John is a former university student.
Q Is John a university student?
H John is a university student.
A No / don't know
Why *Non-affirmative: Adj N \neq => N (Opinions differ about whether "Adj N entails !N")*

fracas-199 answer: **yes** **

P1 John is a successful former university student.
Q Is John successful?
H John is successful.

A Yes (for a former university student)

Why *Ordering between affirmative and non-affirmative adjectives affects which adjectival predications are and aren't affirmed*

fracas-200 answer: unknown

P1 John is a former successful university student.

Q Is John successful?

H John is successful.

fracas-201 answer: unknown

P1 John is a former successful university student.

Q Is John a university student?

H John is a university student.

Why *John may currently be an unsuccessful university student*

5.2 No Comparison Class

Gradable adjectives (e.g. big, small) usually assume some form of comparison class (i.e. "big for an N"). But some others do not e.g. four-legged, or the adjectival phrase ten foot long. Adjectives not requiring a comparison class permit straightforward predication without reference to a nominal property providing a comparison class: a ten foot long alligator is ten foot long.

fracas-202 answer: **yes**

P1 Every mammal is an animal.

Q Is every four-legged mammal a four-legged animal?

H Every four-legged mammal is a four-legged animal.

Why *[N1 entails N2] entails [Adj(N1) entails Adj(N2)]*

fracas-203 answer: **yes**

P1 Dumbo is a four-legged animal.

Q Is Dumbo four-legged?

H Dumbo is four-legged.

Why *Adj(N)(x) entails Adj(x)*

5.3 Opposites

Large and small (applied to the same comparison class) are opposites. If something is a small N it cannot be a large N, and vice versa. Some things can be neither large nor small Ns.

fracas-204 answer: **no**

P1 Mickey is a small animal.

Q Is Mickey a large animal?

H Mickey is a large animal.

Why *Small(N) entails !Large(N)*

fracas-205 answer: **no**
 P1 Dumbo is a large animal.
 Q Is Dumbo a small animal?
 H Dumbo is a small animal.
 Why *Large(N) entails !Small(N)*

fracas-206 answer: unknown
 P1 Fido is not a small animal.
 Q Is Fido a large animal?
 H Fido is a large animal.
 Why *!Small(N) \neq \Rightarrow Large(N)*

fracas-207 answer: unknown
 P1 Fido is not a large animal.
 Q Is Fido a small animal?
 H Fido is a small animal.
 Why *!Large(N) \neq \Rightarrow Small(N)*

fracas-208 answer: **yes**
 P1 Mickey is a small animal.
 P2 Dumbo is a large animal.
 Q Is Mickey smaller than Dumbo?
 H Mickey is smaller than Dumbo.
 Why *"Small" and "large" are related via the comparative "smaller"*

fracas-209 answer: **no**
 P1 Mickey is a small animal.
 P2 Dumbo is a large animal.
 Q Is Mickey larger than Dumbo?
 H Mickey is larger than Dumbo.
 Why *"Small" and "large" are related via the comparative "larger"*

5.4 Extensional Comparison Classes

Adjectives like large and small depend only on the extension of the comparison class they depend on.

fracas-210 answer: **no**
 P1 All mice are small animals.
 P2 Mickey is a large mouse.
 Q Is Mickey a large animal?
 H Mickey is a large animal.

fracas-211 answer: **no**
 P1 All elephants are large animals.

P2 Dumbo is a small elephant.
 Q Is Dumbo a small animal?
 H Dumbo is a small animal.

fracas-212 answer: **yes**

P1 All mice are small animals.
 P2 All elephants are large animals.
 P3 Mickey is a large mouse.
 P4 Dumbo is a small elephant.
 Q Is Dumbo larger than Mickey?
 H Dumbo is larger than Mickey.
 Why *Assume comparative relations exemplified in (208) and (209)*

fracas-213 answer: **undef ****

P1 All mice are small animals.
 P2 Mickey is a large mouse.
 Q Is Mickey small?
 H Mickey is small.
 A ??: Yes for a mouse; ?? No for an animal
 Why *Adjectives requiring a comparison class cannot usually be predicated in the absence of a common noun, unless some comparison class is clear from the wider context.*

5.5 Extensional and Intensional Comparison Classes

Some adjectives require an "intensional" comparison class: different inferences may follow when two distinct but co-extensive predicates provide the comparison class.

fracas-214 answer: **yes**

P1 All legal authorities are law lecturers.
 P2 All law lecturers are legal authorities.
 Q Are all fat legal authorities fat law lecturers?
 H All fat legal authorities are fat law lecturers.
 Why *Extensional comparison class*

fracas-215 answer: unknown

P1 All legal authorities are law lecturers.
 P2 All law lecturers are legal authorities.
 Q Are all competent legal authorities competent law lecturers?
 H All competent legal authorities are competent law lecturers.
 Why *Intensional comparison class*

fracas-216 answer: **yes**

P1 John is a fatter politician than Bill.
 Q Is John fatter than Bill?
 H John is fatter than Bill.
 Why *Extensional*

fracas-217 answer: unknown

P1 John is a cleverer politician than Bill.

Q Is John cleverer than Bill?

H John is cleverer than Bill.

Why *Intensional*

Note that both intensional and extensional comparison class adjectives support comparatives.

5.6 Default Comparison Classes

Comparison class adjectives can sometimes pick up a default comparison class from the subject NP. For example, knowing that Kim is a person provides a default scale for assessing cleverness in people. If Kim were known to be a dog, the assessment scale would be different.

fracas-218 answer: **yes**

P1 Kim is a clever person.

Q Is Kim clever?

H Kim is clever.

fracas-219 answer: unknown

P1 Kim is a clever politician.

Q Is Kim clever?

H Kim is clever.

6 COMPARATIVES

6.1 Phrasal Comparatives

fracas-220 answer: **yes**

P1 The PC-6082 is faster than the ITEL-XZ.

P2 The ITEL-XZ is fast.

Q Is the PC-6082 fast?

H The PC-6082 is fast.

fracas-221 answer: unknown

P1 The PC-6082 is faster than the ITEL-XZ.

Q Is the PC-6082 fast?

H The PC-6082 is fast.

fracas-222 answer: unknown

P1 The PC-6082 is faster than the ITEL-XZ.

P2 The PC-6082 is fast.
Q Is the ITEL-XZ fast?
H The ITEL-XZ is fast.

fracas-223 answer: **no**

P1 The PC-6082 is faster than the ITEL-XZ.
P2 The PC-6082 is slow.
Q Is the ITEL-XZ fast?
H The ITEL-XZ is fast.

fracas-224 answer: **yes**

P1 The PC-6082 is as fast as the ITEL-XZ.
P2 The ITEL-XZ is fast.
Q Is the PC-6082 fast?
H The PC-6082 is fast.

fracas-225 answer: unknown

P1 The PC-6082 is as fast as the ITEL-XZ.
Q Is the PC-6082 fast?
H The PC-6082 is fast.

fracas-226 answer: unknown

P1 The PC-6082 is as fast as the ITEL-XZ.
P2 The PC-6082 is fast.
Q Is the ITEL-XZ fast?
H The ITEL-XZ is fast.

fracas-227 answer: **no**

P1 The PC-6082 is as fast as the ITEL-XZ.
P2 The PC-6082 is slow.
Q Is the ITEL-XZ fast?
H The ITEL-XZ is fast.

fracas-228 answer: unknown

P1 The PC-6082 is as fast as the ITEL-XZ.
Q Is the PC-6082 faster than the ITEL-XZ?
H The PC-6082 is faster than the ITEL-XZ.

fracas-229 answer: **no**

P1 The PC-6082 is as fast as the ITEL-XZ.
Q Is the PC-6082 slower than the ITEL-XZ?
H The PC-6082 is slower than the ITEL-XZ.

fracas-230 answer: **yes**

P1 ITEL won more orders than APCOM did.
Q Did ITEL win some orders?
H ITEL won some orders.

fracas-231 answer: unknown

P1 ITEL won more orders than APCOM did.

Q Did APCOM win some orders?

H APCOM won some orders.

fracas-232 answer: **yes**

P1 ITEL won more orders than APCOM did.

P2 APCOM won ten orders.

Q Did ITEL win at least eleven orders?

H ITEL won at least eleven orders.

Inferences (233)-(235) are similar to (230)-(232). Note however, that if "APCOM" can be interpreted as referring to a particular order (e.g. "the APCOM contract"), as it can in (233), the sentence ITEL won more orders than APCOM is ambiguous between a reading like that in (230)-(232), and one where ITEL won more than just the APCOM order ... see (236)

fracas-233 answer: **yes**

P1 ITEL won more orders than APCOM.

Q Did ITEL win some orders?

H ITEL won some orders.

fracas-234 answer: unknown

P1 ITEL won more orders than APCOM.

Q Did APCOM win some orders?

H APCOM won some orders.

fracas-235 answer: **yes**

P1 ITEL won more orders than APCOM.

P2 APCOM won ten orders.

Q Did ITEL win at least eleven orders?

H ITEL won at least eleven orders.

fracas-236 answer: **yes**

P1 ITEL won more orders than the APCOM contract.

Q Did ITEL win the APCOM contract?

H ITEL won the APCOM contract.

fracas-237 answer: **yes**

P1 ITEL won more orders than the APCOM contract.

Q Did ITEL win more than one order?

H ITEL won more than one order.

fracas-238 answer: **yes**

P1 ITEL won twice as many orders than APCOM.

P2 APCOM won ten orders.

Q Did ITEL win twenty orders?
H ITEL won twenty orders.

6.2 Clausal Complement

fracas-239 answer: **yes**

P1 ITEL won more orders than APCOM lost.
Q Did ITEL win some orders?
H ITEL won some orders.

fracas-240 answer: unknown

P1 ITEL won more orders than APCOM lost.
Q Did APCOM lose some orders?
H APCOM lost some orders.

fracas-241 answer: **yes**

P1 ITEL won more orders than APCOM lost.
P2 APCOM lost ten orders.
Q Did ITEL win at least eleven orders?
H ITEL won at least eleven orders.

6.3 Measure Phrases

fracas-242 answer: **yes**

P1 The PC-6082 is faster than 500 MIPS.
P2 The ITEL-ZX is slower than 500 MIPS.
Q Is the PC-6082 faster than the ITEL-ZX?
H The PC-6082 is faster than the ITEL-ZX.

6.4 Differential Comparatives

fracas-243 answer: **yes**

P1 ITEL sold 3000 more computers than APCOM.
P2 APCOM sold exactly 2500 computers.
Q Did ITEL sell 5500 computers?
H ITEL sold 5500 computers.

6.5 Attributive Comparatives

fracas-244 answer: **yes** **

P1 APCOM has a more important customer than ITEL.
Q Does APCOM have a more important customer than ITEL is?
H APCOM has a more important customer than ITEL is.
A Yes, on one reading of the premise

fracas-245 answer: **yes** **

P1 APCOM has a more important customer than ITEL.

Q Does APCOM has a more important customer than ITEL has?

H APCOM has a more important customer than ITEL has.

A Yes, on one reading of the premise

Note *Note ungrammaticality of question in original source: subject/verb agreement.*

6.6 Comparatives and Quantifiers

fracas-246 answer: **yes**

P1 The PC-6082 is faster than every ITEL computer.

P2 The ITEL-ZX is an ITEL computer.

Q Is the PC-6082 faster than the ITEL-ZX?

H The PC-6082 is faster than the ITEL-ZX.

fracas-247 answer: unknown

P1 The PC-6082 is faster than some ITEL computer.

P2 The ITEL-ZX is an ITEL computer.

Q Is the PC-6082 faster than the ITEL-ZX?

H The PC-6082 is faster than the ITEL-ZX.

fracas-248 answer: **yes**

P1 The PC-6082 is faster than any ITEL computer.

P2 The ITEL-ZX is an ITEL computer.

Q Is the PC-6082 faster than the ITEL-ZX?

H The PC-6082 is faster than the ITEL-ZX.

fracas-249 answer: **yes**

P1 The PC-6082 is faster than the ITEL-ZX and the ITEL-ZY.

Q Is the PC-6082 faster than the ITEL-ZX?

H The PC-6082 is faster than the ITEL-ZX.

fracas-250 answer: **yes** **

P1 The PC-6082 is faster than the ITEL-ZX or the ITEL-ZY.

Q Is the PC-6082 faster than the ITEL-ZX?

H The PC-6082 is faster than the ITEL-ZX.

A Yes, on one reading of the premise

7 TEMPORAL REFERENCE

Inference patterns involving temporal reference are complicated by the interplay between tense, aspectual information, lexical semantics, defeasible interpretation principles such as narrative progression, rhetorical relations, a theory of action and causation, world knowledge, interaction between plurality, genericity and temporal/aspectual phenomena etc. Some of the inferences are very basic, some are more involved. The more complex examples

give ample illustration of the fact that temporal phenomena are usually discourse phenomena.

7.1 Standard Use of Tenses

fracas-251 answer: **yes**

P1 ITEL has a factory in Birmingham.

Q Does ITEL currently have a factory in Birmingham?

H ITEL currently has a factory in Birmingham.

fracas-252 answer: **yes**

P1 Since 1992 ITEL has been in Birmingham.

P2 It is now 1996.

Q Was ITEL in Birmingham in 1993?

H ITEL was in Birmingham in 1993.

(251) and (252) are instances of the subinterval property. This works only with stative verbs. C.f. the following example involving an accomplishment verb in the simple past:

fracas-253 answer: unknown

P1 ITEL has developed a new editor since 1992.

P2 It is now 1996.

Q Did ITEL develop a new editor in 1993?

H ITEL developed a new editor in 1993.

Similarly with activity verbs and adverbial modification:

fracas-254 answer: unknown

P1 ITEL has expanded since 1992.

P2 It is now 1996.

Q Did ITEL expand in 1993?

H ITEL expanded in 1993.

Also, the position of the "since" adverbial affects the range of readings available:

fracas-255 answer: **yes**

P1 Since 1992 ITEL has made a loss.

P2 It is now 1996.

Q Did ITEL make a loss in 1993?

H ITEL made a loss in 1993.

fracas-256 answer: unknown **

P1 ITEL has made a loss since 1992.

P2 It is now 1996.

Q Did ITEL make a loss in 1993?

H ITEL made a loss in 1993.

A Don't know, on one reading of the premise

fracas-257 answer: **yes** **

P1 ITEL has made a loss since 1992.

P2 It is now 1996.

Q Did ITEL make a loss in 1993?

H ITEL made a loss in 1993.

A Yes, on one reading of the premise

Note *Note that this is formally identical with preceding.*

fracas-258 answer: **no**

P1 In March 1993 APCOM founded ITEL.

Q Did ITEL exist in 1992?

H ITEL existed in 1992.

(258) involves the lexical semantics of found.

7.2 Temporal Adverbials

7.2.1 Indexicals

Non-context dependent indexicals are reasonably straightforward:

fracas-259 answer: **yes**

P1 The conference started on July 4th, 1994.

P2 It lasted 2 days.

Q Was the conference over on July 8th, 1994?

H The conference was over on July 8th, 1994.

Context dependent indexicals (e.g. today, yesterday) are evaluated with respect to some temporal reference point (e.g. now):

fracas-260 answer: **yes**

P1 Yesterday APCOM signed the contract.

P2 Today is Saturday, July 14th.

Q Did APCOM sign the contract Friday, 13th.?

H APCOM signed the contract Friday, 13th.

Note *The odd punctuation in the question was in the original.*

7.2.2 "Before", "After" (Temporal Subordinate Clauses)

Ignoring counterfactual readings, 'before' and 'after' have the following transitivity properties: if X, Y and Z are either all state or accomplishment or achievement or activity denoting sentences we have

$X < Y$.

$Y < Z$.

$X < Z$.

where $< \in \{\text{before; after}\}$

fracas-261 answer: **yes**

P1 Smith left before Jones left.

P2 Jones left before Anderson left.

Q Did Smith leave before Anderson left?

H Smith left before Anderson left.

Note *Original is degenerate problem; this is my fabrication.*

fracas-262 answer: **yes**

P1 Smith left after Jones left.

P2 Jones left after Anderson left.

Q Did Smith leave after Anderson left?

H Smith left after Anderson left.

In general transitivity does not hold when we mix aspectual classes in the premises:

fracas-263 answer: unknown

P1 Smith was present after Jones left.

P2 Jones left after Anderson was present.

Q Was Smith present after Anderson was present?

H Smith was present after Anderson was present.

If X and Y are either all accomplishment or achievement denoting sentences with simple tenses 'before' and 'after' are inverses of each other:

$X \text{ before } Y \text{ iff } Y \text{ after } X$.

fracas-264 answer: **yes**

P1 Smith left.

P2 Jones left.

P3 Smith left before Jones left.

Q Did Jones leave after Smith left?

H Jones left after Smith left.

Note *Original is degenerate problem; this is my fabrication.*

fracas-265 answer: **yes**

P1 Smith left.
P2 Jones left.
P3 Smith left after Jones left.
Q Did Jones leave before Smith left?
H Jones left before Smith left.

fracas-266 answer: **yes**

P1 Smith left.
P2 Jones left.
P3 Jones left before Smith left.
Q Did Smith leave after Jones left?
H Smith left after Jones left.

fracas-267 answer: **yes**

P1 Jones revised the contract.
P2 Smith revised the contract.
P3 Jones revised the contract before Smith did.
Q Did Smith revise the contract after Jones did?
H Smith revised the contract after Jones did.

fracas-268 answer: **yes**

P1 Jones revised the contract.
P2 Smith revised the contract.
P3 Jones revised the contract after Smith did.
Q Did Smith revise the contract before Jones did?
H Smith revised the contract before Jones did.

In general this is not so with activity verbs:

fracas-269 answer: unknown

P1 Smith swam.
P2 Jones swam.
P3 Smith swam before Jones swam.
Q Did Jones swim after Smith swam?
H Jones swam after Smith swam.

However we do get

fracas-270 answer: **yes**

P1 Smith swam to the shore.
P2 Jones swam to the shore.
P3 Smith swam to the shore before Jones swam to the shore.
Q Did Jones swim to the shore after Smith swam to the shore?
H Jones swam to the shore after Smith swam to the shore.

Here the PP "to the shore" provides an end point or conclusion for the activity.

"Before" and "after" are not inverses for state-denoting sentences:

fracas-271 answer: unknown

- P1 Smith was present.
P2 Jones was present.
P3 Smith was present after Jones was present.
Q Was Jones present before Smith was present?
H Jones was present before Smith was present.

fracas-272 answer: unknown

- P1 Smith was present.
P2 Jones was present.
P3 Smith was present before Jones was present.
Q Was Jones present after Smith was present?
H Jones was present after Smith was present.

fracas-273 answer: unknown

- P1 Smith was writing a report.
P2 Jones was writing a report.
P3 Smith was writing a report before Jones was writing a report.
Q Was Jones writing a report after Smith was writing a report?
H Jones was writing a report after Smith was writing a report.

fracas-274 answer: unknown

- P1 Smith was writing a report.
P2 Jones was writing a report.
P3 Smith was writing a report after Jones was writing a report.
Q Was Jones writing a report before Smith was writing a report?
H Jones was writing a report before Smith was writing a report.

Also "before", but not "after", can have a counterfactual meaning. Whether this is a distinct sense of "before" is open to debate:

fracas-275 answer: unknown

- P1 Smith left the meeting before he lost his temper.
Q Did Smith lose his temper?
H Smith lost his temper.

With "when" things are even more complicated. The problem is that it is often very difficult to tease apart the temporal from the causal dimension of "when", c.f.

fracas-276 answer: **undef** **

P1 When they opened the M25, traffic increased.

Q

H

A

Note *Original is degenerate problem; no question or answer given.*

7.2.3 "In", "For" and "On" Temporal Adverbials

"In" and "for" adverbials can be used as tests for the aspectual class of verb phrases (or sentences).

fracas-277 answer: unknown

P1 Smith lived in Birmingham in 1991.

Q Did Smith live in Birmingham in 1992?

H Smith lived in Birmingham in 1992.

Why *Stative*

fracas-278 answer: **no**

P1 Smith wrote his first novel in 1991.

Q Did Smith write his first novel in 1992?

H Smith wrote his first novel in 1992.

Why *(Unrepeatable) accomplishment*

fracas-279 answer: **no**

P1 Smith wrote a novel in 1991.

Q Did Smith write it in 1992?

H Smith wrote it in 1992.

Why *(Unrepeatable) accomplishment*

fracas-280 answer: unknown

P1 Smith wrote a novel in 1991.

Q Did Smith write a novel in 1992?

H Smith wrote a novel in 1992.

Why *(Repeatable) accomplishment*

fracas-281 answer: unknown

P1 Smith was running a business in 1991.

Q Was Smith running it in 1992?

H Smith was running it in 1992.

Why *Activity*

fracas-282 answer: **no**

P1 Smith discovered a new species in 1991.

Q Did Smith discover it in 1992?

H Smith discovered it in 1992.

Why (Unrepeatable) achievement

fracas-283 answer: unknown

P1 Smith discovered a new species in 1991.

Q Did Smith discover a new species in 1992?

H Smith discovered a new species in 1992.

Why (Repeatable) achievement

fracas-284 answer: yes

P1 Smith wrote a report in two hours.

P2 Smith started writing the report at 8 am.

Q Had Smith finished writing the report by 11 am?

H Smith had finished writing the report by 11 am.

Why Accomplishment

fracas-285 answer: unknown

P1 Smith wrote a report in two hours.

Q Did Smith spend two hours writing the report?

H Smith spent two hours writing the report.

Why *Smith may have written the report in less than two hours. It is unclear whether there are two different readings for the premise: one where Smith takes exactly two hours, and one where he does it within two hours.*

fracas-286 answer: no

P1 Smith wrote a report in two hours.

Q Did Smith spend more than two hours writing the report?

H Smith spent more than two hours writing the report.

fracas-287 answer: unknown

P1 Smith wrote a report in two hours.

Q Did Smith write a report in one hour?

H Smith wrote a report in one hour.

fracas-288 answer: yes

P1 Smith wrote a report in two hours.

Q Did Smith write a report?

H Smith wrote a report.

fracas-289 answer: no

P1 Smith discovered a new species in two hours.

Q Did Smith spend two hours discovering the new species?

H Smith spent two hours discovering the new species.

Why *Achievements are typically (more or less) instantaneous*

fracas-290 answer: yes

P1 Smith discovered a new species in two hours.

Q Did Smith discover a new species?

H Smith discovered a new species.

fracas-291 answer: **yes** **

P1 Smith discovered many new species in two hours.

Q Did Smith spend two hours discovering new species?

H Smith spent two hours discovering new species.

A ?Yes

Why *Repeated achievement can last two hours.*

fracas-292 answer: unknown

P1 Smith was running his own business in two years.

Q Did Smith spend two years running his own business?

H Smith spent two years running his own business.

Why *Premise refers to time taken to inception of activity, not duration of activity.*

fracas-293 answer: unknown

P1 Smith was running his own business in two years.

Q Did Smith spend more than two years running his own business?

H Smith spent more than two years running his own business.

Why *Cf. similar inference for accomplishment, (286)*

fracas-294 answer: **yes**

P1 Smith was running his own business in two years.

Q Did Smith run his own business?

H Smith ran his own business.

fracas-295 answer: unknown

P1 In two years Smith owned a chain of businesses.

Q Did Smith own a chain of business for two years?

H Smith owned a chain of business for two years.

Why *States behave like activities.*

Note *Sic: the original did have "chain of business" in the question.*

fracas-296 answer: unknown

P1 In two years Smith owned a chain of businesses.

Q Did Smith own a chain of business for more than two years?

H Smith owned a chain of business for more than two years.

Note *Sic: the original did have "chain of business" in the question.*

fracas-297 answer: **yes**

P1 In two years Smith owned a chain of businesses.

Q Did Smith own a chain of business?

H Smith owned a chain of business.

Note *Sic: the original did have "chain of business" in the question.*

fracas-298 answer: **yes**

P1 Smith lived in Birmingham for two years.

Q Did Smith live in Birmingham for a year?

H Smith lived in Birmingham for a year.

Why *State*

fracas-299 answer: **no**

P1 Smith lived in Birmingham for two years.

Q Did Smith live in Birmingham for exactly a year?

H Smith lived in Birmingham for exactly a year.

fracas-300 answer: **yes**

P1 Smith lived in Birmingham for two years.

Q Did Smith live in Birmingham?

H Smith lived in Birmingham.

fracas-301 answer: **yes**

P1 Smith ran his own business for two years.

Q Did Smith run his own business for a year?

H Smith ran his own business for a year.

Why *Activity*

fracas-302 answer: **yes**

P1 Smith ran his own business for two years.

Q Did Smith run his own business?

H Smith ran his own business.

fracas-303 answer: **yes**

P1 Smith wrote a report for two hours.

Q Did Smith write a report for an hour?

H Smith wrote a report for an hour.

Why *Accomplishment*

fracas-304 answer: unknown

P1 Smith wrote a report for two hours.

Q Did Smith write a report?

H Smith wrote a report.

Why *He may not have finished it*

fracas-305 answer: **undef** **

P1 Smith discovered a new species for an hour.

Q

H

A

Note *Original is degenerate problem; no question or answer given.*

fracas-306 answer: **yes**

P1 Smith discovered new species for two years.

Q Did Smith discover new species?

H Smith discovered new species.

Why *Repeated achievement*

7.2.4 Quantificational Adverbials

fracas-307 answer: **yes**

P1 In 1994 ITEL sent a progress report every month.

Q Did ITEL send a progress report in July 1994?

H ITEL sent a progress report in July 1994.

Quantificational adverbials also introduce scope ambiguities with respect to other quantified NPs

fracas-308 answer: **undef ****

P1 Smith wrote to a representative every week.

Q Is there a representative that Smith wrote to every week?

H There is a representative that Smith wrote to every week.

A Yes on one scoping; unknown on another scoping

7.3 Anaphoric Dimension

Rhetorical relations like narrative progression are defeasible interpretation principles. They depend on a theory of action and causation and general world knowledge (c.f. (309) and (310)).

fracas-309 answer: **undef ****

P1 Smith left the house at a quarter past five.

P2 She took a taxi to the station and caught the first train to Luxembourg.

Q

H

A

Note *Original is degenerate problem; no question or answer given.*

fracas-310 answer: **undef ****

P1 Smith lost some files.

P2 They were destroyed when her hard disk crashed.

Q

H

A

Note *Original is degenerate problem; no question or answer given.*

fracas-311 answer: **yes**

P1 Smith had left the house at a quarter past five.

P2 Then she took a taxi to the station.

Q Did Smith leave the house before she took a taxi to the station?

H Smith left the house before she took a taxi to the station.

7.4 Adverbs of Quantification

fracas-312 answer: **yes**

P1 ITEL always delivers reports late.

P2 In 1993 ITEL delivered reports.

Q Did ITEL delivered reports late in 1993?

H ITEL delivered reports late in 1993.

Note *Sic: the original did have "delivered" in the question.*

fracas-313 answer: **no**

P1 ITEL never delivers reports late.

P2 In 1993 ITEL delivered reports.

Q Did ITEL delivered reports late in 1993?

H ITEL delivered reports late in 1993.

Note *Sic: the original did have "delivered" in the question.*

7.5 Some more Complex Examples

fracas-314 answer: **yes**

P1 Smith arrived in Paris on the 5th of May, 1995.

P2 Today is the 15th of May, 1995.

P3 She is still in Paris.

Q Was Smith in Paris on the 7th of May, 1995?

H Smith was in Paris on the 7th of May, 1995.

fracas-315 answer: **yes**

P1 When Smith arrived in Katmandu she had been travelling for three days.

Q Had Smith been travelling the day before she arrived in Katmandu?

H Smith had been travelling the day before she arrived in Katmandu.

fracas-316 answer: **yes**

P1 Jones graduated in March and has been employed ever since.

P2 Jones has been unemployed in the past.

Q Was Jones unemployed at some time before he graduated?

H Jones was unemployed at some time before he graduated.

fracas-317 answer: **yes**

P1 Every representative has read this report.

P2 No two representatives have read it at the same time.

P3 No representative took less than half a day to read the report.

P4 There are sixteen representatives.

Q Did it take the representatives more than a week to read the report?

H It took the representatives more than a week to read the report.

fracas-318 answer: **no**

P1 While Jones was updating the program, Mary came in and told him about the board meeting.

- P2 She finished before he did.
Q Did Mary's story last as long as Jones's updating the program?
H Mary's story lasted as long as Jones's updating the program.

fracas-319 answer: **yes**

- P1 Before APCOM bought its present office building, it had been paying mortgage interest on the previous one for 8 years.
P2 Since APCOM bought its present office building it has been paying mortgage interest on it for more than 10 years.
Q Has APCOM been paying mortgage interest for a total of 15 years or more?
H APCOM has been paying mortgage interest for a total of 15 years or more.

fracas-320 answer: **yes**

- P1 When Jones got his job at the CIA, he knew that he would never be allowed to write his memoirs.
Q Is it the case that Jones is not and will never be allowed to write his memoirs?
H It is the case that Jones is not and will never be allowed to write his memoirs.

fracas-321 answer: **yes**

- P1 Smith has been to Florence twice in the past.
P2 Smith will go to Florence twice in the coming year.
Q Two years from now will Smith have been to Florence at least four times?
H Two years from now Smith will have been to Florence at least four times.

fracas-322 answer: **yes**

- P1 Last week I already knew that when, in a month's time, Smith would discover that she had been duped she would be furious.
Q Will it be the case that in a few weeks Smith will discover that she has been duped; and will she be furious?
H It will be the case that in a few weeks Smith will discover that she has been duped; and she will be furious.

fracas-323 answer: **yes**

- P1 No one gambling seriously stops until he is broke.
P2 No one can gamble when he is broke.
Q Does everyone who starts gambling seriously stop the moment he is broke?
H Everyone who starts gambling seriously stops the moment he is broke.

fracas-324 answer: **yes**

- P1 No one who starts gambling seriously stops until he is broke.
Q Does everyone who starts gambling seriously continue until he is broke?
H Everyone who starts gambling seriously continues until he is broke.

fracas-325 answer: **yes**

- P1 Nobody who is asleep ever knows that he is asleep.
P2 But some people know that they have been asleep after they have been asleep.
Q Do some people discover that they have been asleep?
H Some people discover that they have been asleep.

8 VERBS

8.1 Aspectual Classes

See also the inference pertaining to in and for adverbials.

fracas-326 answer: **yes**

P1 ITEL built MTALK in 1993.

Q Did ITEL finish MTALK in 1993?

H ITEL finished MTALK in 1993.

fracas-327 answer: unknown

P1 ITEL was building MTALK in 1993.

Q Did ITEL finish MTALK in 1993?

H ITEL finished MTALK in 1993.

fracas-328 answer: **yes**

P1 ITEL won the contract from APCOM in 1993.

Q Did ITEL win a contract in 1993?

H ITEL won a contract in 1993.

fracas-329 answer: unknown

P1 ITEL was winning the contract from APCOM in 1993.

Q Did ITEL win a contract in 1993?

H ITEL won a contract in 1993.

fracas-330 answer: **yes**

P1 ITEL owned APCOM from 1988 to 1992.

Q Did ITEL own APCOM in 1990?

H ITEL owned APCOM in 1990.

8.2 Distributive and Collective Predication

fracas-331 answer: **yes**

P1 Smith and Jones left the meeting.

Q Did Smith leave the meeting?

H Smith left the meeting.

fracas-332 answer: **yes**

P1 Smith and Jones left the meeting.

Q Did Jones leave the meeting?

H Jones left the meeting.

fracas-333 answer: **yes**

P1 Smith, Anderson and Jones met.

Q Was there a group of people that met?

H There was a group of people that met.

9 ATTITUDES

9.1 Epistemic, Intentional and Reportive Attitudes

fracas-334 answer: **yes**

P1 Smith knew that ITEL had won the contract in 1992.

Q Did ITEL win the contract in 1992?

H ITEL won the contract in 1992.

fracas-335 answer: unknown

P1 Smith believed that ITEL had won the contract in 1992.

Q Did ITEL win the contract in 1992?

H ITEL won the contract in 1992.

Note *Sic: the original had "believed / said / denied / feared / hoped" in the premise. I changed this to just "tried".*

fracas-336 answer: **yes**

P1 ITEL managed to win the contract in 1992.

Q Did ITEL win the contract in 1992?

H ITEL won the contract in 1992.

fracas-337 answer: unknown

P1 ITEL tried to win the contract in 1992.

Q Did ITEL win the contract in 1992?

H ITEL won the contract in 1992.

Note *Sic: the original had "tried / wanted" in the premise. I changed this to just "tried".*

fracas-338 answer: **yes**

P1 It is true that ITEL won the contract in 1992.

Q Did ITEL win the contract in 1992?

H ITEL won the contract in 1992.

fracas-339 answer: **no**

P1 It is false that ITEL won the contract in 1992.

Q Did ITEL win the contract in 1992?

H ITEL won the contract in 1992.

9.2 Preceptive Attitudes: "See" with Bare Infinitive Complements

9.2.1 Inferences we do not get

fracas-340 answer: unknown

P1 Smith saw Jones sign the contract.

P2 If Jones signed the contract, his heart was beating.
 Q Did Smith see Jones' heart beat?
 H Smith saw Jones' heart beat.

fracas-341 answer: unknown

P1 Smith saw Jones sign the contract.
 P2 When Jones signed the contract, his heart was beating.
 Q Did Smith see Jones' heart beat?
 H Smith saw Jones' heart beat.

9.2.2 Veridicality

$a \text{ saw } \phi < \phi$

fracas-342 answer: **yes**

P1 Smith saw Jones sign the contract.
 Q Did Jones sign the contract?
 H Jones signed the contract.

9.2.3 Substitution

$a \text{ saw } \phi(b), b = c < a \text{ saw } \phi(c)$

fracas-343 answer: **yes**

P1 Smith saw Jones sign the contract.
 P2 Jones is the chairman of ITEL.
 Q Did Smith see the chairman of ITEL sign the contract?
 H Smith saw the chairman of ITEL sign the contract.

9.2.4 Existential instantiation

$a \text{ saw } \phi(b) < \exists x a \text{ saw } \phi(x)$

fracas-344 answer: **yes**

P1 Helen saw the chairman of the department answer the phone.
 P2 The chairman of the department is a person.
 Q Is there anyone whom Helen saw answer the phone?
 H There is someone whom Helen saw answer the phone.

9.2.5 Conjunction distribution

$a \text{ saw } \phi \text{ and } \psi < a \text{ saw } \phi \text{ and } a \text{ saw } \psi$

fracas-345 answer: **yes**

P1 Smith saw Jones sign the contract and his secretary make a copy.

Q Did Smith see Jones sign the contract?

H Smith saw Jones sign the contract.

9.2.6 Disjunction distribution

$A \text{ saw } \phi \text{ or } \psi \rightarrow A \text{ saw } \phi \text{ or } A \text{ saw } \psi$

fracas-346 answer: **yes**

P1 Smith saw Jones sign the contract or cross out the crucial clause.

Q Did Smith either see Jones sign the contract or see Jones cross out the crucial clause?

H Smith either saw Jones sign the contract or saw Jones cross out the crucial clause.