Processing modality and negation for machine reading. Task description and definition of categories

Roser Morante and Walter Daelemans
CLiPS-CL University of Antwerp
{Roser.Morante,Walter.Daelemans}@ua.ac.be

Abstract

In this paper we describe the QA4MRE pilot task on *Processing modality and negation for machine reading* and define the categories on which the questions of the test set will be based.

1 Task description

We present a pilot task of the Question Answering for Machine Reading Evaluation (QA4MRE)[1] at CLEF 2011. The goal of the QA4MRE evaluation is to develop a methodology for evaluating Machine Reading systems through Question Answering and Reading Comprehension Tests. Systems should be able to extract knowledge from large volumes of text and use this knowledge to perform a test on each topic. The organization provides participants with a background collection of about 30,000 unannotated documents related to three topics: music and society, aids, and climate change. Systems should use the the background collection to acquire the reading capabilities and the background knowledge needed to answer a test on the topic. The tests consist of multiple choice questions on a set of 4 documents per topic. Participant systems have to choose the correct option per question. Background collections and tests are provided for several languages: English, Spanish, German, Italian, and Romanian.

The task *Processing modality and negation for machine reading*[2] is organised as a pilot task of the QA4MRE. The pilot task aims at evaluating whether machine reading systems understand extra-propositional aspects of meaning beyond propositional content. Modality and negation interact to express extra-propositional aspects of meaning. Modality is a grammatical category that allows to express aspects related to the attitude of the speaker towards her statements. Modality understood in a broader sense is also related to the expression of certainty, factuality, and evidentiality. Negation is a grammatical category that allows to change the truth value of a proposition.

Modality and negation devices allow to present an event with a specific propositional meaning with a variety of extra-propositional meaning. For example, the event <ADD(earthquake,further threats to the global economy)> can be presented as a fact (1), as a counterfact (2), or with many other meanings as in (3).

(1) The earthquake adds further threats to the global economy

(2) The earthquake does not add further threats to the global economy
The earthquake never added further threats to the global economy

(3) Does the earthquake add further threats to the global economy?
The earthquake will never add further threats to the global economy
The earthquake will probably add further threats to the global economy
The earthquake will certainly add further threats to the global economy

[1] Web site of QA4MRE: http://celct.isti.cnr.it/ResPubliQA/.
[2] Web site of the pilot task: http://www.cnts.ua.ac.be/BiographTA/qa4mre.html.

The earthquake might add further threats to the global economy
The earthquake might have added further threats to the global economy
According to some media sources, the earthquake adds further threats to the global economy, but this has not been confirmed with facts
The earthquake will add further threats to the global economy if the right measures are not applied
It is unclear whether the earthquake will add further threats to the global economy
It is expected that the earthquake will add further threats to the global economy
It has been denied that the earthquake adds further threats to the global economy
It is believed that the earthquake adds further threats to the global economy
Why would the earthquake not add further threats to the global economy?
Some experts are convinced that the earthquake adds further threats to the global economy, whereas other experts are more optimistic

Systems participating in the pilot task are supposed to learn from the background collections provided for the main task, although they will be evaluated on test sets designed specifically for the pilot task. The test texts come from the journal The Economist[3]. The format of the test sets is the same as in the main task, four texts will be provided per topic with ten multiple choice questions. Each question has five options, from which only one is correct. The options are exclusive. However, the task can also be seen as a classification task in which systems have to generate the event description. Questions are about how a certain event is presented in the text. This pilot task will evaluate how systems process the aspects of meaning presented in Section 2.

For example, given a sentence like (4) in the text, possible multiple choice options are listed in (5). The correct option would be (5.d).

(4) Experts consider that it is unclear whether the earthquake will add further threats to the global economy

(5) Event −−the earthquake <predicate>add</predicate> further threats to the global economy−− is presented in the text as:

a A negated event
b A condition for another event
c An event
d An uncertain event from the perspective of someone other than the author - CORRECT
e A purpose event

In order to make the options machine readable, a code will be assigned to them. The aspects of meaning to be coded are presented in Section 2 and the full list of possible code combinations are listed in Section 4. (6) shows the options of (5) translated into codes.

(6)
a NEG MOD-NON
b COND MOD-NON
c MOD-NON
d PERS UNCERT MOD-NON
e MOD-PURP

The question focuses on an event mentioned in the text. The event and its participants are quoted almost literally. The difference with the literal quotation is that only the lemma of the event predicate appears in the question instead of the full form, and that negation and modality marks are also removed.

[3]The Economist kindly made available the texts for non-commercial research purposes.

In (5), the lemma of the event predicate is *add*, which substitutes the full form *will add* that occurs in sentence (4). The question does not reproduce the full sentence where the event occurs, but only the event and its participants. In (4) the sentence is *Experts consider that it is unclear whether the earthquake will add further threats to the global economy*, but in the question only the event ADD and its participants are quoted, with the event tagged with an xml like tag: *the earthquake <predicate>add</predicate> further threats to the global economy*.

We understand *event* in a broad sense, including actions, processes and states. Events can be expressed by verbs and nouns.

Following the main task setting, we do not provide annotated data to train systems. Systems can use any existing resources and data to solve the task.

2 Aspects of meaning to be processed by systems

For this pilot task we have selected six aspects of the meaning of an event:

- Negation
- Perspective
- Certainty
- Modality
- Condition for another event or conditioned by another event

Tense, opinion and emotion are also interesting aspects of the events meaning, but are disregarded in this pilot task.

Systems have to choose the answer that best characterises an event along this six aspects.

2.1 Negation

An event can be presented as negated. In (7), the REPLACE event is negated with negation cue *not*. In (8), we consider <PUT the sort of price on carbon use that would drive its emission down> negated by the cue *inability*.

(7) But these new types of climate action do not replace the need to reduce carbon emissions.

(8) In the face of an international inability to put the sort of price on carbon use that would drive its emission down, an increasing number of policy wonks, and the politicians they advise, are taking a more serious look at these other factors as possible ways of controlling climate change.

2.2 Perspective

A statement is presented from the point of view of someone. By default the statement is presented from the perspective of the author of the text, but the author might be mentioning the view from someone else. The task will only evaluate whether systems are able to detect when an event is presented from a different perspective than the auhtor's. This is explicitly indicated in the multiple choice questions as *perspective from someone other than the author*.

For example, in (9) the fact <radioactive particles from the Fukushima Dai-ichi nuclear-power plant LEAD this once-prosperous city of 70,000 into a fight for its life> is presented from the perspective of the mayor of Minamisoma.

(9) Yet he (mayor of Minamisoma) believes the radioactive particles from the Fukushima Dai-ichi nuclear-power plant, 25km from his office, have led this once-prosperous city of 70,000 into a fight for its life.

In (10) event <LACK of testing equipment> is presented from the perspective of *traders in this places*, event <tuna that arrived in America SET aside by customs> from the perspective of *an executive at a Japanese trading house*, and event <Japanse food BE off the menu at hotels> from the perspective of *a sake brewer on a sales trip to Las Vegas*.

(10) The European Union has named a dozen prefectures that need radiation tests, yet traders in these places report a lack of testing equipment. In one case, says an executive at a Japanese trading house, tuna that arrived in America was set aside by customs, rotting before it was inspected. A sake brewer on a sales trip to Las Vegas noticed that Japanese food was off the menu at hotels.

2.3 Certainty

Events can be presented with a range of certainty values, including underspecified certainty. Here we include all not certain events under the category of *uncertain* events, without distinguishing degrees. The task focuses only on uncertain events.

In (11) the PROVIDING event is presented as uncertain.

(11) Providing most of that energy from wind, sunshine, plants and rivers, along with a bit of nuclear, is possible.

In (12) event <many of Minamisoma's evacuees COME back> is presented as uncertain and negated.

(12) ... Even though external radiation has since returned to near-harmless levels, Mr Sakurai fears many of Minamisoma's evacuees may never come back.

Event <the investment required to decarbonise power AVERAGE about £30 billion ($42 billion) a year over 40 years> in (13) is uncertain because of the conditional *would*.

(13) The commission says the investment required to decarbonise power would average about £30 billion ($42 billion) a year over 40 years.

In (14) event <you HUNT for every possible deduction for which you're eligible> is uncertain, as well as <these alternatives also IMPROVE the content and prospects of other climate action> in (15).

(14) If you are highly motivated to minimise your taxes, you can hunt for every possible deduction for which you're eligible.

(15) As well as having charms that efforts to reduce carbon-dioxide emissions lack, these alternatives could also improve the content and prospects of other climate action.

2.4 Modality

An event can be presented with several modal meanings. For this pilot task we select only the modal meanings listed below, although we are aware that the variety of modal meanings is broader.

Non-modal event This is the default category for events that do not fall under the modal categories below and do not have other modal meanings. In the questions we refer to it as *event*.

In (16) the events <A pen-like dosimeter HANG around the neck of Katsunobu Sakurai> and <he EXPOSED during the past two weeks of a four-week nuclear nightmare> are non-modal events.

(16) A pen-like dosimeter hangs around the neck of Katsunobu Sakurai, the tireless mayor of Minamisoma, measuring the accumulated radiation to which he has been exposed during the past two weeks of a four-week nuclear nightmare.

An event can be in the present, past or future tense.

Purpose event An event can be presented as a purpose, aim or goal. In (17) event <MAKE room to store more toxic stuff on land> is presented as the purpose related to the *decision to dump low-level radioactive waste into the sea*. In (18) <DECARBONISE power> is presented as a purpose as well as <PROTECT the ozone layer from similar industrial gases> in (19).

(17) Neighbouring South Korea expressed concern that it was not warned about TEPCOs decision to dump low-level radioactive waste into the sea to make room to store more toxic stuff on land.

(18) The commission says the investment required to decarbonise power would average about £30 billion ($42 billion) a year over 40 years.

(19) For instance, HFC-134a and a whole family of related chemicals could be dealt with by extending the Montreal protocol created to protect the ozone layer from similar industrial gases.

Need event An event might express need or requirement. In (20) event <all that gassy baggage GO> is presented as a need, as well as event <a lot of INVESTMENT in power generation and smarter grids in (21), and <DECARBONISATION> in (22).

(20) By 2050, proposes a "road map" released by the European Commission this week, all that gassy baggage must go.

(21) The plan requires a lot of investment in power generation and smarter grids, best done in the context of –at long last– reformed and competitive energy market.

(22) Broadening climate action can supplement existing efforts on carbon and provide new suppleness to climate politics–both good things. But this does not change the imperative of decarbonisation.

Obligation event In (23) events <global greenhouse-gas emissions FALL by half to limit climate change> and <rich countries CUT the most> are considered to be presented as obligations from the perspective of *Europe*.

(23) Believing that global greenhouse-gas emissions must fall by half to limit climate change, and that rich countries should cut the most, Europe has set a goal of reducing emissions by 80-95% by 2050.

Desire event We consider desires, intentions and plans to be included under this category. In (24) event <DUMP low-level radioactive waste into the sea to make room to store more toxic stuff on land> is presented as a plan (because of *decision*). In (25) events £80 billion GO on buildings and appliances and £150 billion on transport> and <SAVE on fuel costs> are presented as plans.

(24) Neighbouring South Korea expressed concern that it was not warned about TEPCOs decision to dump low-level radioactive waste into the sea to make room to store more toxic stuff on land.

(25) This is one of the cheaper parts of the plan; the total cost is about £270 billion a year, with £80 billion going on buildings and appliances and £150 billion on transport. But the commission's modelling also points to savings on fuel costs, which are low for nuclear and zero for most renewables, of between £175 billion and £320 billion.

2.5 Condition, conditioned by

An event can be presented as a condition for another event or as conditioned by another event. In (26) event <you BE highly motivated to minimise your taxes> is a condition of event <you HUNT for every possible deduction for which you're eligible>, which is conditioned. In (27) event <active measures to remove it from the atmosphere UNDERTAKE at some later date> is considered to be a condition of event <Carbon emitted today CONTINUE to warm the planet for millennia>, which is conditioned.

(26) If you are highly motivated to minimise your taxes, you can hunt for every possible deduction for which you're eligible.

(27) Carbon emitted today will continue to warm the planet for millennia, unless active measures to remove it from the atmosphere are undertaken at some later date.

3 Summary of cases to be learned by systems

Systems have to be able to identify for an event the six aspects of meaning described in the previous section. All events are assigned one of the following modality types:

- Event, purpose event, need event, obligation event, desire event

If applicable, events can additionally be described with the following aspects of meaning that systems have to identify:

- Negated
- Perspective of someone other than the author
- Uncertain
- Condition for another event, conditioned by another event

So, an event description consists at least of one modality value and at most of one value per aspect of meaning.

The options provided in the multiple choice characterise and event along this six dimensions. Systems have to choose the answer that best characterises the event mentioned in the question. If no aspect apart from the modality type is mentioned in the possible answer options, we assume that the event is not negated, it is presented from the perspective from the author, it is certain or undefined qua certainty, it is not subject to a condition and it is not the condition for another event.

The total cases to be learned by systems is listed at the end of this document. In total there are 120 combinations, which are listed in Section 4. Not all of them will be represented in the test set of 12 documents because not all of them are frequent.

The codes to be assigned to each of the values are:

- Event: MOD-NON
- Purpose event: MOD-PURP
- Need event: MOD-NEED
- Obligation event: MOD-MUST
- Desire event: MOD-WANT
- Negated: NEG

- Perspective of someone other than the author: PERS
- Uncertain: UNCERT
- Condition for another event: COND
- Conditioned by another event: COND-BY

The combinations can be summarized in the following regular expression:

$$[COND|COND-BY]?\ NEG?\ PERS?\ UNCERT?\ MOD\ [-NEED|-NON|-PURP|-MUST|-WANT]$$

4 Example test set

We provide two example tests with their questions and answers that can be downloaded from the web site of the pilot task[4].

We include here one of the example tests. The text comes from The Economist journal[5].

<?xml version="1.0" encoding="UTF-8"?>
<GOLD_STANDARD>
<topic t_id="1" t_name="Climate change" >
<reading-test r_id="1">
<doc d_id="1">
Climate change
Piecemeal possibilities
Paying attention to alternative ways of cooling the planet is a good idea; ignoring carbon emissions isn't

Feb 17th 2011 from The Economist print edition

THE planet-wide industrial exhalation of previously fossilised carbon is not the only way that humans are changing the Earth's climate. There are other greenhouse gases, other atmospheric pollutants, the effects of cutting down forests, and more: together these things may contribute almost as much as carbon emissions to global warming. In the face of an international inability to put the sort of price on carbon use that would drive its emission down, an increasing number of policy wonks, and the politicians they advise, are taking a more serious look at these other factors as possible ways of controlling climate change.

Three things make these alternative approaches attractive by comparison. The first is that the emission of carbon dioxide is a fundamental part of today's industrial infrastructure. The same is not true for, say, HFC-134a, a gas with various industrial uses that delivers more than 1,000 times more warming than carbon dioxide, mass for mass. Something peripheral for which alternatives can be readily found is easier and cheaper to do without than something at the heart of industrial life.

Second, the benefits of reducing carbon-dioxide emissions can seem abstract and far-off. In contrast, reducing emissions of the sooty particles known as black carbon, which are given off by inefficient combustion in cooking fires and brick kilns, and by dodgy diesel engines, offers rapid, huge and tangible public-health benefits (see article). Controlling black carbon by giving poor people cleaner ways to burn various fuels could not only forestall a decade or two of global warming, it would also save hundreds of thousands of lives currently blighted by smoke and disease.

[4] http://www.cnts.ua.ac.be/BiographTA/qa4mre.html.

[5] The original text can be found in http://www.economist.com/node/18178073. Last consulted 20 April 2011.

Third, equitable and efficient ways of reducing carbon emissions require new international agreements and new instruments of national policy. Putting these together has often proved difficult to the point of impossible: witness the UN climate talks. Sometimes the efforts have simply failed, as in America's cap-and-trade legislation. Acting on other warming agents will frequently be a more straightforward matter of adapting existing tools. For instance, HFC-134a and a whole family of related chemicals could be dealt with by extending the Montreal protocol created to protect the ozone layer from similar industrial gases. Similarly, black carbon can in many places be managed under existing clean-air regulations, as can some other climate-changing pollutants. True, the Obama administration is trying to tackle carbon dioxide in a similar way, by having the Environmental Protection Agency regulate emissions. But this, too, may fail, and even its proponents do not see it as a very attractive way forward.

Let the good be the friend of the better

As well as having charms that efforts to reduce carbon-dioxide emissions lack, these alternatives could also improve the content and prospects of other climate action. They allow people to meet in smaller venues than the vast UN shindigs. Imagine that success on some of these currently marginal climate issues came fairly quickly and easily. That could help build the trust, ambition and momentum needed to get further on deals to reduce carbon-dioxide emissions, and to find ways to finance the new energy infrastructures those reductions require, both through the UN process and by other means.

But these new types of climate action do not replace the need to reduce carbon emissions. Carbon-dioxide levels are still rising; the shadow of uncertainty and risk they cast into the future is getting deeper and longer. Carbon emitted today will continue to warm the planet for millennia, unless active measures to remove it from the atmosphere are undertaken at some later date. Reducing other short-lived sources of climate change while continuing to emit carbon will delay rises in temperature, but it will not stop them. Broadening climate action can supplement existing efforts on carbon and provide new suppleness to climate politics- -both good things. But this does not change the imperative of decarbonisation.
</doc>
<question q_id="1">
<q_str>Event - -humans <predicate>change</predicate> the Earth's climate- - is presented in the text as:</q_str>
<answer a_id="1">NEG MOD-NON</answer>
<answer a_id="2">NEED</answer>
<answer a_id="3" correct="Yes">MOD-NON</answer>
<answer a_id="4">NEG MOD-PURP</answer>
<answer a_id="5">UNCERT MOD-NON</answer>
</question>
<question q_id="2">
<q_str>Event - -the emission of HFC-134a <predicate>be</predicate> a fundamental part of todays industrial infrastructure- - is presented in the text as:</q_str>
<answer a_id="1" correct="Yes">NEG NON-MOD</answer>
<answer a_id="2">MOD-NON</answer>
<answer a_id="3">COND MOD-NON</answer>
<answer a_id="4">NEG UNCERT MOD-NON</answer>
<answer a_id="5">PERS MOD-NON</answer>
</question>
<question q_id="3">
<q_str>Event - -controlling black carbon by giving poor people cleaner ways to burn various fuels <predicate>forestall</predicate> a decade or two of global warming- - is presented in the text as:</q_str>
<answer a_id="1">MOD-NEED</answer>
<answer a_id="2">MOD-WANT</answer>

<answer a_id="3">COND-BY MOD-NON</answer>
<answer a_id="4" correct="Yes">UNCERT MOD-NON</answer>
<answer a_id="5">NEG UNCERT MOD-NON</answer>
</question>
<question q_id="4">
<q_str>Event - -New international <predicate>agreements</predicate>- - is presented in the text as:</q_str>
<answer a_id="1">UNCERT MOD-NON</answer>
<answer a_id="2" correct="Yes">MOD-NEED</answer>
<answer a_id="3">MOD-PURP</answer>
<answer a_id="4">MOD-WANT</answer>
<answer a_id="5">NEG MOD-NON</answer>
</question>
<question q_id="5">
<q_str>Event - -<predicate>protect</predicate> the ozone layer from similar industrial gases- - is presented in the text as:</q_str>
<answer a_id="1">UNCERT MOD-NON</answer>
<answer a_id="2">MOD-NEED</answer>
<answer a_id="3" correct="Yes">MOD-PURP</answer>
<answer a_id="4">MOD-WANT</answer>
<answer a_id="5">NEG MOD-NON</answer>
</question>
<question q_id="6">
<q_str>Event - -even its proponents <predicate>see</predicate> it as a very attractive way forward- - is presented in the text as:</q_str>
<answer a_id="1">UNCERT MOD-NON</answer>
<answer a_id="2">MOD-NEED</answer>
<answer a_id="3">MOD-PURP</answer>
<answer a_id="4">MOD-WANT</answer>
<answer a_id="5" correct="Yes">NEG MOD-NON</answer>
</question>
<question q_id="7">
<q_str>Event - -these alternatives <predicate>improve</predicate> the content and prospects of other climate action- - is presented in the text as:</q_str>
<answer a_id="1">MOD-NON</answer>
<answer a_id="2">MOD-MUST</answer>
<answer a_id="3">COND MOD-NON</answer>
<answer a_id="4">MOD-PURP</answer>
<answer a_id="5" correct="Yes">UNCERT MOD-NON</answer>
</question>
<question q_id="8">
<q_str>Event - -Carbon-dioxide levels <predicate>rise</predicate>- - is presented in the text as:</q_str>
<answer a_id="1">UNCERT MOD-NON</answer>
<answer a_id="2" correct="Yes">MOD-NON</answer>
<answer a_id="3">MOD-PURP</answer>
<answer a_id="4">NEG MOD-NON</answer>
<answer a_id="5">MOD-NEED</answer>
</question>
<question q_id="9">
<q_str>Event - -Broadening climate action <predicate>supplement</predicate> existing efforts on carbon and provide new suppleness to climate politicsboth good things- - is presented in the text as:</q_str>

<answer a_id="1">MOD-NON</answer>
<answer a_id="2">MOD-MUST</answer>
<answer a_id="3">COND-BY MOD-NON</answer>
<answer a_id="4">MOD-PURP</answer>
<answer a_id="5" correct="Yes">UNCERT MOD-NON</answer>
</question>
<question q_id="10">
<q_str>Event - -<predicate>decarbonisation</predicate>- - </q_str>
<answer a_id="1">UNCERT MOD-NON</answer>
<answer a_id="2" correct="Yes">MOD-NEED</answer>
<answer a_id="3">MOD-PURP</answer>
<answer a_id="4">NEG MOD-NON</answer>
<answer a_id="5">MOD-NON</answer>
</question>
</reading-test>

</topic>
</GOLD_STANDARD>

5 List of possible categories

1. MOD-NON
2. MOD-PURP
3. MOD-NEED
4. MOD-MUST
5. MOD-WANT
6. NEG MOD-NON
7. NEG MOD-PURP
8. NEG MOD-NEED
9. NEG MOD-MUST
10. NEG MOD-WANT
11. PERS MOD-NON
12. PERS MOD-PURP
13. PERS MOD-NEED
14. PERS MOD-MUST
15. PERS MOD-WANT
16. UNCERT MOD-NON
17. UNCERT MOD-PURP
18. UNCERT MOD-NEED
19. UNCERT MOD-MUST
20. UNCERT MOD-WANT
21. COND MOD-NON
22. COND MOD-PURP
23. COND MOD-NEED
24. COND MOD-MUST
25. COND MOD-WANT
26. COND-BY MOD-NON
27. COND-BY MOD-PURP
28. COND-BY MOD-NEED
29. COND-BY MOD-MUST
30. COND-BY MOD-WANT
31. NEG PERS MOD-NON
32. NEG PERS MOD-PURP
33. NEG PERS MOD-NEED
34. NEG PERS MOD-MUST
35. NEG PERS MOD-WANT
36. NEG UNCERT MOD-NON
37. NEG UNCERT MOD-PURP
38. NEG UNCERT MOD-NEED
39. NEG UNCERT MOD-MUST
40. NEG UNCERT MOD-WANT
41. COND NEG MOD-NON
42. COND NEG MOD-PURP
43. COND NEG MOD-NEED
44. COND NEG MOD-MUST
45. COND NEG MOD-WANT
46. COND-BY NEG MOD-NON
47. COND-BY NEG MOD-PURP
48. COND-BY NEG MOD-NEED
49. COND-BY NEG MOD-MUST
50. COND-BY NEG MOD-WANT
51. PERS UNCERT MOD-NON
52. PERS UNCERT MOD-PURP
53. PERS UNCERT MOD-NEED
54. PERS UNCERT MOD-MUST
55. PERS UNCERT MOD-WANT
56. COND PERS MOD-NON
57. COND PERS MOD-PURP
58. COND PERS MOD-NEED
59. COND PERS MOD-MUST
60. COND PERS MOD-WANT
61. COND-BY PERS MOD-NON
62. COND-BY PERS MOD-PURP
63. COND-BY PERS MOD-NEED
64. COND-BY PERS MOD-MUST
65. COND-BY PERS MOD-WANT
66. COND UNCERT MOD-NON
67. COND UNCERT MOD-PURP
68. COND UNCERT MOD-NEED
69. COND UNCERT MOD-MUST
70. COND UNCERT MOD-WANT
71. COND-BY UNCERT MOD-NON
72. COND-BY UNCERT MOD-PURP
73. COND-BY UNCERT MOD-NEED
74. COND-BY UNCERT MOD-MUST
75. COND-BY UNCERT MOD-WANT
76. NEG PERS UNCERT MOD-NON
77. NEG PERS UNCERT MOD-PURP
78. NEG PERS UNCERT MOD-NEED
79. NEG PERS UNCERT MOD-MUST
80. NEG PERS UNCERT MOD-WANT
81. COND NEG PERS MOD-NON
82. COND NEG PERS MOD-PURP
83. COND NEG PERS MOD-NEED
84. COND NEG PERS MOD-MUST
85. COND NEG PERS MOD-WANT
86. COND-BY NEG PERS MOD-NON
87. COND-BY NEG PERS MOD-PURP
88. COND-BY NEG PERS MOD-NEED
89. COND-BY NEG PERS MOD-MUST
90. COND-BY NEG PERS MOD-WANT
91. COND PERS UNCERT MOD-NON
92. COND PERS UNCERT MOD-PURP
93. COND PERS UNCERT MOD-NEED
94. COND PERS UNCERT MOD-MUST
95. PERS UNCERT MOD-WANT
96. COND-BY PERS UNCERT MOD-NON
97. COND-BY PERS UNCERT MOD-PURP
98. COND-BY PERS UNCERT MOD-NEED
99. COND-BY PERS UNCERT MOD-MUST
100. COND-BY PERS UNCERT MOD-WANT
101. COND NEG UNCERT MOD-NON
102. COND NEG UNCERT MOD-PURP
103. COND NEG UNCERT MOD-NEED
104. COND NEG UNCERT MOD-MUST
105. COND NEG UNCERT MOD-WANT
106. COND-BY NEG UNCERT MOD-NON
107. COND-BY NEG UNCERT MOD-PURP
108. COND-BY NEG UNCERT MOD-NEED
109. COND-BY NEG UNCERT MOD-MUST
110. COND-BY NEG UNCERT MOD-WANT
111. COND NEG PERS UNCERT MOD-NON
112. COND NEG PERS UNCERT MOD-PURP
113. COND NEG PERS UNCERT MOD-NEED
114. COND PERS UNCERT MOD-MUST
115. COND PERS UNCERT MOD-WANT
116. COND-BY NEG PERS UNCERT MOD-NON
117. COND-BY NEG PERS UNCERT MOD-PURP
118. COND-BY NEG PERS UNCERT MOD-NEED
119. COND-BY PERS UNCERT MOD-MUST
120. COND-BY PERS UNCERT MOD-WANT