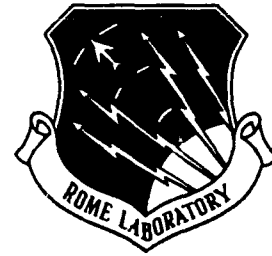


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December 1992



AN EVALUATION METHODOLOGY FOR NATURAL LANGUAGE PROCESSING SYSTEMS

Calspan Corporation

Jeannette G. Neal, Elissa L. Feit, Douglas J. Funke,
Christine A. Montgomery

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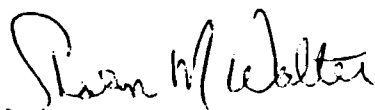
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Preface

The Neal-Montgomery NLP Evaluation Methodology was developed under the **Benchmark Investigation/Identification Program** as a means of determining the linguistic competence of Natural Language Processing (NLP) systems. Embodied in an evaluation tool based on a detailed classification of linguistic phenomena with, currently, over 350 test items, the methodology produces descriptive profiles of NLP system linguistic capabilities, and can be applied without regard to the current system application, domain, or specific language processing task. Evaluation data and scores are explicit and thus open to NLP community review and critique.

The Neal-Montgomery NLP Evaluation Methodology is intended for the evaluation of whole systems as opposed to the examination of individual system components. To date, it has been applied to three NL database query systems and three text processing systems.

The evaluation methodology is not presented here as a product to be accepted, in toto, by the NLP community as the standard for system evaluation, but rather as a basis for discussion, critique, and possible refinement towards standards development. Part of that evolutionary process may become concerned, beyond the specific content of the evaluation methodology, with the interpretation of evaluation results. For example, total consistency even among multiple evaluations of a single system is not practical and cannot be expected. Evaluation results obtained when an NLP system *developer* applies the Neal-Montgomery NLP Evaluation Methodology *within its original domain* may be optimal scores. Other evaluators, or evaluations of the same system applied to new domains, could expect to come within a certain range of those optimal scores, most likely without surpassing them.

Researchers are invited to apply the evaluation methodology (included within this report) to their systems and report their critique and recommendations towards the evolution of standard evaluation procedures for NLP systems. Comments can also be made directly to the authors or to me.

Sharon M. Walter
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1. Introduction

The evaluation of natural language processing (NLP) systems has become an issue of increasing concern among the producers and consumers of NLP products as the number of systems and applications increases [Neal91], [Palmer89]. While NLP system developers look to evaluation as a means of measuring capabilities and tracking improvements in their evolving systems, consumers are concerned with comparative evaluation of different NLP systems as a basis for selecting NLP systems that best fit the communication requirements of particular applications. NLP producers and consumers, as well as sponsors of NLP research and development, also see evaluation as a means of assessing technical progress and growth in the field.

Currently, some of the most common applications of NLP systems are:

- Interactive Human-Computer Interfaces to:
 - Data Base Management Systems
 - Command and Control Systems
 - Decision-Aiding Systems
 - Engineering Design Systems
 - Diagnostic Systems
- Text Understanding for Information Extraction:
 - Intelligence Agencies
 - DoD Foreign Technology Divisions

Figure 1 depicts the dilemma of application system developers who need to select an appropriate NLP system that will meet their needs. In the process of developing new application systems, analysis of requirements produces specifications that developers need to be able to match against the capabilities of existing NLP systems in order to identify those NLP systems that adequately meet the system requirements for NL processing. The NLP Evaluation Tool, developed as part of the Benchmark Investigation/Identification (I/I) Program, supports this process by producing detailed, quantitative, descriptive evaluation profiles of NLP systems for comparison against application system requirements. The classification scheme, also developed as part of the Benchmark I/I Program, provides a checklist of language processing capabilities for use in determining application system requirements.

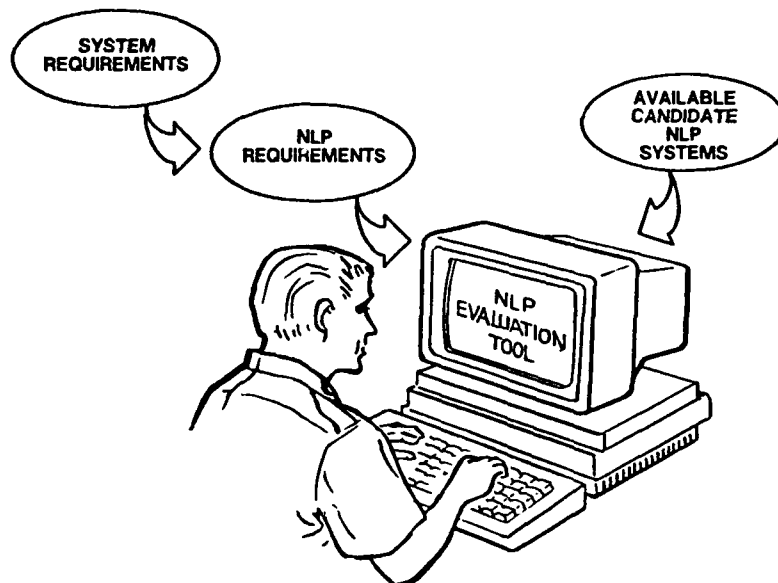


Figure 1: Matching Capabilities of NLP Systems Against Requirements

Figure 2 depicts the total environment of the problem. The wheel in the figure illustrates the fact that NLP systems provide users with the means or support for performing application domain tasks. The user is represented at the hub of the wheel and the circle around the hub represents the different types of NLP systems, including those for text and query understanding, text generation, dialogue understanding, and speech generation and understanding. The main spokes of the wheel are the types of linguistic functionality required in NLP systems (phonological being limited to speech systems). Some of the types of phenomena that fall within the given functionality area are listed beneath the major functionality heading. The next concentric circle of the wheel is interpreted as the robustness factor, which represents the critical functionality for dealing with unexpected inputs, both errors and material new to the system, as well as systematic acquisition of linguistic knowledge for extending the system. Robustness applies to all the areas of functionality. The outermost circle of the wheel represents some of the types of applications that an NLP system can potentially be integrated with, including command and control systems, decision-aiding systems, planning systems, simulation systems, DBMSs, etc.

There are many dimensions along which NLP systems can be evaluated. These dimensions include:

- linguistic competence,
- end user issues (e.g., habitability, reliability, likability),

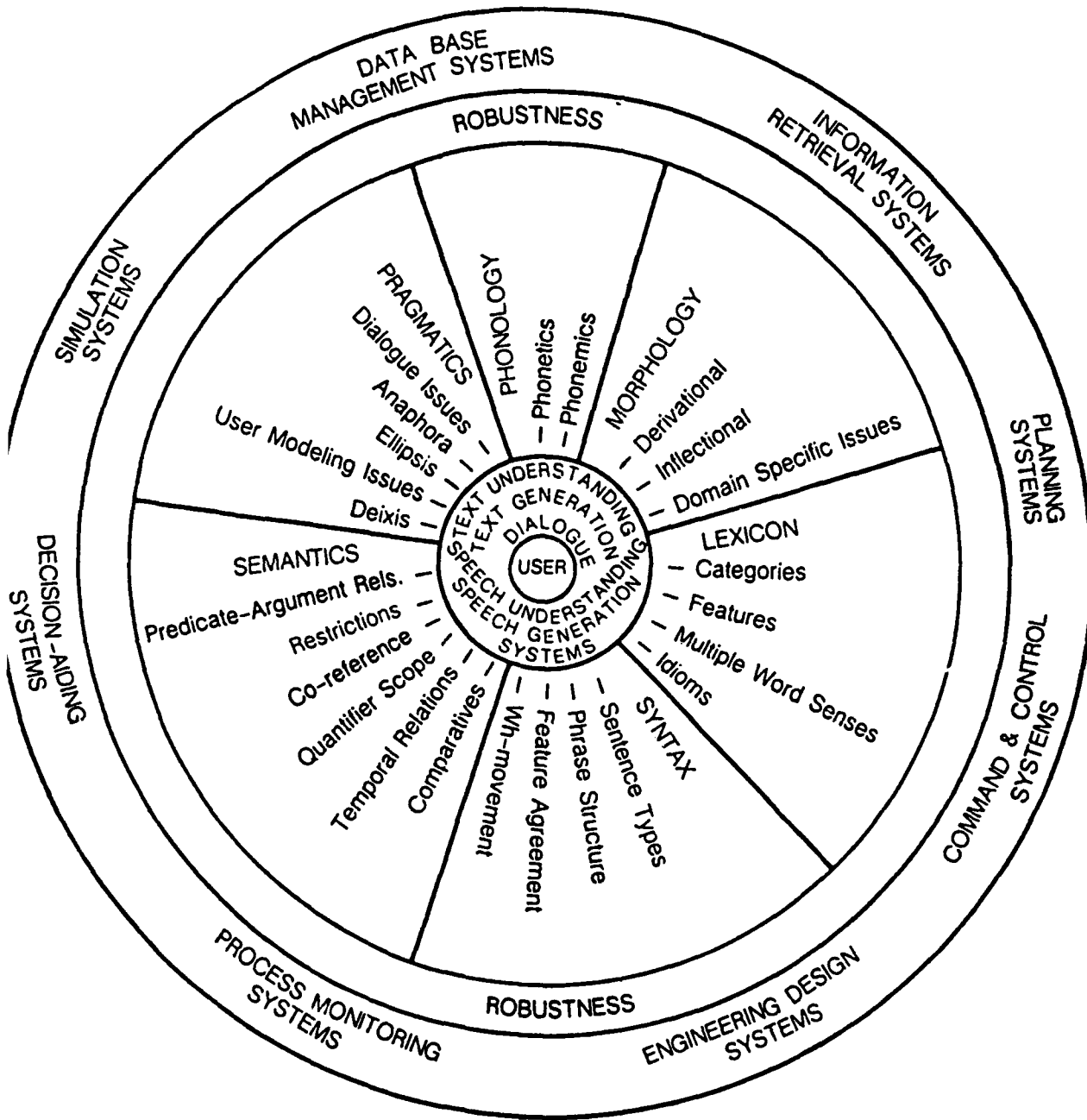


Figure 2: The Context of the NLP Evaluation Problem

- system development issues (e.g., cost, ease of development, maintainability, portability), and
- intelligent behavior issues (e.g., inference, learning, cooperative dialogue).

These issues are discussed in more detail in Section 2. Of the many dimensions along which NLP systems can be evaluated, this project focused on the linguistic competence of NLP systems, including lexical, syntactic, semantic, and discourse capabilities.

There are several problems in evaluating NLP systems with regard to linguistic competence. First is the need for clear definitions of the linguistic phenomena being tested and the classification scheme being used. For example, what is meant by the claim that a system handles "comparatives," "ellipsis" or "anaphoric references"? Since there are various types of each of these phenomena, do the users of these terms mean that their systems handle all types of the particular phenomenon, or just a subset?

Second, a problem that has occurred with most evaluation approaches to date is that they are restricted to a particular application (e.g., information extraction, database retrieval), domain (e.g., terrorism, Navy situation reports, company employee database information), and/or NLP system type (e.g., text understanding systems, interactive NL front ends to application systems). For example, a corpus-based evaluation approach is restricted to the specific domain(s) used in the corpus and the type of systems for which the corpus was designed. Examples of corpora that have been developed for evaluation of database query systems include the BBN corpus [BBN88], the LADDER corpus [Hendrix76], the Malhotra corpus [Malhotra75], and the HP corpus [Flickinger87]. The MUC-3 (Message Understanding Conference #3) [Sundheim91], [Lehnert91] evaluation effort and the more recent MUC-4 (Message Understanding Conference #4) were also restricted to a particular domain and NLP application. They used a domain restricted to terrorism activities and focused on the performance of text analysis systems for information extraction.

These application domain and system-type dependencies can cause several difficulties. First, for a domain-dependent evaluation method such as the MUCs, the task of porting NLP systems to the particular domain can be prohibitive. This may limit the number of participating systems. Furthermore, deficiencies of the participating NLP systems being evaluated could be the result of porting difficulties rather than problems with the NLP system itself. Second, some linguistic phenomena may be ignored because they do not arise in the particular application domain or task of the evaluation exercise(s). As a result, linguistic capabilities that may be useful for other applications and for systems of the future, may be ignored. This would become a significant problem if the computational linguistics research community focused too strongly on certain application domains and tasks to the exclusion of others.

Because of shortcomings such as those discussed above, the goal of the Benchmark Investigation/Identification Program was to develop a methodology and procedure/tool for evaluating NLP systems that is, insofar as possible, independent of application, domain, and

NLP system type. The procedure/tool is based on a glossary of defined terminology and a linguistic phenomena classification scheme. Read et al. [Read88], [Read90] also advocated this type of evaluation methodology in discussions of their work on the Sourcebook. Their sourcebook provides a collection of exemplars of numerous types of linguistic phenomena, but does not provide a procedure or method for evaluating systems' performance on processing these phenomena.

In summary, the primary objective of the Benchmark Investigation/Identification Program has been the development of a method and procedure/tool for evaluating NLP systems that:

1. produces profiles of NLP systems that are:

- descriptive: the profiles provide descriptive information with regard to the types of linguistic phenomena on which the NLP succeeded or failed, not just one or two numerical scores (e.g., recall and precision) that provide no detailed analysis.
- hierarchically organized: the capabilities of NLP systems are described by individual capability as well as by class of capability, at the various levels of granularity provided by the hierarchical structure of the profile.
- quantitative: the scores that are assigned by the evaluators to individual test items are aggregated by class and weighted averages are used to calculate a numerical performance score for each class in the hierarchy.
- objective: test items are structured in a detailed manner with defined criteria so as to mitigate the subjectivity of the evaluator.

2. is usable across domains (e.g., terrorism, military situation reports, company employee database information).
3. is usable across applications (e.g., text processing for information extraction, message routing/dissemination, human-computer interface for interactive dialogue)
4. is applicable across the different types of NLP systems such as database query NL front-end systems, text/message processing systems, interactive NL dialogue interfaces, etc.
5. is repeatable; the procedure/tool produces consistent results, independent of evaluator.
6. does not require that the evaluator be a trained linguist.
7. is unbiased with respect to linguistic theories, system-internal processing methods, and knowledge representation techniques.

The NLP Evaluation Procedure and Tool satisfy the objectives listed above and, in fact, this makes the NLP Evaluation Tool unique. In particular, the features that are unique to the Tool are:

- the profiling facility and
- its usability/acceptability across domains, applications, and system types, which means that the Tool does not require NLP systems to be modified or ported to a particular text corpus or domain.

Since the NLP Evaluation Procedure/Tool has been designed to produce comprehensive descriptive evaluation profiles for NLP systems, such a profile should be interpreted in terms of the nature of the NLP system type and the application task for which the system is configured or installed as well as in terms of the requirements of the application for which the NLP system is to be used. One would not necessarily expect a particular (type of) NLP system to excel in all areas. For example, a text processing system that performs well at information extraction for the purpose of database update may not process NL queries or commands. On the other hand, a database query NL front-end system may perform extremely well at processing NL queries and commands, but may not process declarative sentences.

The following is a list of the products developed as part of the Benchmark Investigation/Identification Program:

- a glossary of non-subjective descriptive terminology for describing NLP capabilities outside the context of their application to target software.
- a bibliography of relevant literature used in this effort.
- a classification scheme for NLP capabilities and issues that provides the hierarchical organization for NLP system profiles.
- the Tool/Procedure which guides the evaluator through the evaluation process. This Tool provides assistance to the evaluator with the development of test sentences and provides for the recording of results/scores.
- the profiling mechanism for producing descriptive profiles of NLP systems. The profiling facility can describe a system's ability to process linguistic phenomena in terms of fairly coarse-grained, broadly defined classes of phenomena as well as in terms of detailed, fine-grained, narrowly defined classes of phenomena.
- periodic assessment of the NLP Evaluation Tool at the end of each of the three six-month development phases of the program. This assessment consisted of having interface technologists, who were not linguists, apply the NLP Evaluation Procedure/Tool to several well-developed NLP systems. The interface technologists had no involvement in the development of the Tool, but received training in its application. The results of the assessment by the interface technologists provided feedback to the developers during its incremental development. Among the systems used for the assessment activity are three commercially available NL database query systems and three of the MUC-3

participant systems. The final assessment of the Tool provided information regarding the reliability of the Tool.

This report discusses the products of the Benchmark Investigation/Identification effort, particularly the NLP Evaluation Tool, and the final assessment experiment involving the Evaluation Tool. Section 2 discusses background and scope. Section 3 briefly discusses the bibliography developed as part of the effort and Section 4 briefly covers the glossary of descriptive terminology. Section 5 discusses the classification scheme. Section 6 discusses the design, content, organization, and use of the Evaluation Tool. Section 7 discusses the profiling facility and the profiles produced by the facility. Section 8 reports on the final assessment of the Evaluation Tool. Section 9 provides conclusions and recommendations. Section 10 includes the references used in this report. Appendix A contains the complete NLP Evaluation Tool. Appendix B includes a profile of an NLP system produced by the NLP Evaluation Tool. Appendix C includes a summary of the Assessment Questionnaire responses from the interface technologists.

2. Background

There are many different areas and issues for which NLP systems need to be evaluated. Table 1 categorizes and lists many of these issues. The problem of evaluation of NLP systems is difficult and many approaches to these different issues have been discussed [Bates90], [BBN88], [Biermann83], [Flickinger87], [Guida86], [Hayes-Roth89], [Hendrix76], [Hershman79], [Hix91], [Kohoutek84], [Lazzara90], [Malhotra75], [Mitta91], [Ogden88], [Palmer89], [Read88], [Read90], [Sundheim91], [Tennant79], [Weischedel86]. The NLP Evaluation Tool, developed as part of the Benchmark I/I Program, focuses on the *linguistic issues* listed in the first column of the table. The following paragraphs briefly review some of the related evaluation efforts and approaches.

Table 1: Categories of Evaluation Issues

Linguistic Issues	Intelligent Behavior & Reasoning Issues	End User Issues	System Development Issues
lexicon	inference	habitability	quality of tools
syntax	learning	reliability	cost
semantics	cooperative dialogue	likability	ease of development
discourse	speaker/hearer modeling	efficiency	maintainability
pragmatics	real world knowledge	extensibility	portability
			integrability

Several studies have focused on the issue of habitability. Hershman, Kelly, and Miller [Hershman79] conducted laboratory evaluations in which these researchers studied ten Navy officers using LADDER, a natural language query system designed to provide easy access to a naval database. The study simulated the actual operational environment in which LADDER would be used and the subjects were trained to the database and LADDER interface. The results of the study indicated that the extensive training given to the subjects was adequate for training the functional and conceptual coverage of the system but not for training the syntactic and lexical coverage.

Focusing on habitability and efficiency, Biermann, Ballard, and Sigmon [Biermann83] designed an experiment that was concerned with the usefulness of English as a programming language. Their experiment used a natural language programming system, called NLC, that allows a user to display and manipulate tables and matrices while at a display terminal. All user inputs were expressed in English. The results of the study indicated that, with a relatively short training period on the NLC system, subjects were able to type system-acceptable syntax with a high enough success rate to obtain correct answers in a reasonable amount of time.

The Performance Evaluation Plan (PEP) [Lazzara90] addresses the evaluation of NLP tools or shells for the development of specific NLP applications from a user-oriented perspective, where three classes of users are identified: systems developers, end users, and systems

maintainers. As a result, the PEP provides a methodology for evaluating issues such as integrity, maintainability, extendability, portability, user productivity and likability.

Hayes-Roth [Hayes-Roth89] and Mitta [Mitta91] are concerned with evaluation of knowledge systems and expert systems. Hayes-Roth [Hayes-Roth89] is primarily concerned with extrinsic issues such as advice quality, reasoning correctness, robustness, solution efficiency and intrinsic issues such as elegance of knowledge base design, modularity, and architecture. Mitta [Mitta91] discusses a methodology for evaluating an expert system's usability, based on the following six variables or measures: user confidence that the solution is correct, user perception of difficulty, correctness of solution, number of responses required of users, inability of expert system to provide a solution, and the rate of help requests. Although focusing on knowledge systems or expert systems, these discussions and methodologies have applicability to NLP systems also, since NLP systems are special types of knowledge systems.

Several approaches and studies focus on linguistic and NL understanding capabilities. Guida and Mauri [Guida86] have developed a formal and detailed method for evaluating NLP systems. They treat an NLP system as a function from a set of input expressions to one or more sets of outputs. Their method requires a measure of error, defined to compare the closeness of the output to the correct output, and a measure of the importance of each input. Their method computes the sum of the errors weighted by the importance of the input, as the evaluation of an NLP system.

Several approaches that focus on linguistic capabilities have entailed the development of test corpora for evaluating NL database query interfaces [BBN88], [Hendrix76], [Malhotra75], and [Flickinger87]. Flickinger, Nerbonne, Sag, and Wasow [Flickinger87] developed a test suite of English sentences, annotated by construction type, that covers a wide variety of syntactic and semantic phenomenon. In order to avoid theory dependence, the level of granularity in the test suite was built on intuition rather than theoretical significance. Anomalous strings are included as well as well-formed sentences.

As part of the Artificial Intelligence Measurement System (AIMS) project [Read88], evaluation criteria and methods for describing linguistic coverage were developed for NLP systems. As a result, a *Sourcebook* [Read90] was developed consisting of a database of 'exemplars' of representative problems in NL processing. Each exemplar includes a piece of illustrative text, a description of the linguistic/conceptual issue at stake, discussion of the problems in understanding the text, and references to more extensive discussion in the literature.

The Naval Ocean Systems Center (NOSC) completed the third evaluation of English text processing systems in May, 1991, with the Third Message Understanding Conference (MUC-3) [Sundheim91]. The Fourth Message Understanding Conference (MUC-4) took place 16-18 June 1992 (no report available yet). These evaluations have focused on the performance of text analysis systems on an information extraction task. The training data set consisted of 1300 texts with an overall size of over 2.5 megabytes. The task was to extract information on terrorist incidents from relevant text among 100 previously unseen texts.

Finally, an important issue is the reliability of evaluation methods. That is, different evaluators must produce consistent results when applying the same evaluation method to the same target system. Although not concerned with NL processing directly, the approach of Hix and Schulman [Hix91] for testing the reliability of their methodology for evaluating human-computer interface development tools is relevant. To empirically test their methodology, Hix and Schulman had six evaluators each apply the method to two (out of a total three) application tools, so that each tool was evaluated by four different participants. To produce statistical tests of reliability, the researchers computed the probability that responses from the four evaluators for each tool would match by chance. The observed proportion of matches for each category of items was compared with the chance probability using a binomial test.

The NLP Evaluation Procedure focuses on the linguistic capabilities of NLP systems. Important components of the NLP Evaluation Tool are the hierarchically structured classification scheme for linguistic phenomena, the emphasis on descriptions of the linguistic phenomena covered in the Tool, and the examples illustrating linguistic phenomena. In these aspects, it has some similarity to the Sourcebook approach of Read et al [Read88], but the NLP Evaluation Tool provides broader and more detailed coverage than the Sourcebook. Furthermore, the Benchmark I/I Program product includes a procedure or tool for testing whether NLP systems are capable of handling the described linguistic phenomena, which the Sourcebook does not. The NLP Evaluation Tool includes patterns, instructions, and illustrative examples for composing NL text for testing purposes and a profile generator that displays the evaluation results in the form of descriptive profiles of NLP systems organized according to the hierarchically structured classification scheme for linguistic phenomena. We also conducted a reliability experiment for the NLP Evaluation Tool that has some similarity to that of Hix and Schulman [Hix91]. In contrast to the approaches discussed in this section, with the exception of the Sourcebook [Read90], the NLP Evaluation Tool is designed to be applicable to different types of NLP systems and to be applicable across application domains.

The following sections discuss the Benchmark I/I Program products: the bibliography, the glossary of descriptive terminology, the classification scheme, the NLP Evaluation Procedure/Tool, and the profiling facility.

3. The Bibliography

As part of the Benchmark I/I Program, we developed a bibliography of literature that served as the basis for the terminology definitions and the development of test items for the NLP Evaluation Tool. The bibliography was developed from literature search and review and has approximately 600 entries. The bibliography is included in Volume II of this report.

We performed a search for relevant literature from several databases. The research team used services such as the DIALOG Information Retrieval Service, from Dialog Information Services, and the ORBIT Search Service, from the Pergamon Group of Companies as well as databases that are not part of these services. The literature databases that were used include the MLA (Modern Language Association) database, the BISON (Buffalo Information System OnliNe) database, LINGUISTICS & LANGUAGE BEHAVIOR ABSTRACTS, INSPEC, NOTIS, COMPENDIX PLUS, The COMPUTER DATABASE, and PsycINFO.

Other literature sources that were used include recent publications of the Association for Computational Linguistics (ACL), the American Association for Artificial Intelligence (AAAI), and the Linguistics Society of America (LSA).

4. The Glossary of Descriptive Terminology

Identification and definition of the evaluation issues and criteria is important in any evaluation effort. The Benchmark I/I Program focused on the ability of NLP systems to process the various constructs and phenomena of natural language. As part of this project, we developed a glossary of descriptive terminology with which to describe the linguistic phenomena and features for which NLP systems are tested in the NLP Evaluation Tool. This terminology was developed from the literature on linguistics and computational linguistics. Definitions are based on, or selected from, well-respected literature sources. This terminology is used throughout the Tool to identify what is being evaluated in each Tool item and it is used in the classification scheme that provides the framework for the NLP system profiles produced by the Tool. The Glossary is included in Volume II of this final report.

5. The Classification Scheme

As part of the Benchmark I/I Program, we developed a hierarchical classification scheme for linguistic phenomena that also serves as the organizing framework for displaying NLP system profiles. This classification scheme has been designed to accommodate a spectrum of concepts from broadly defined categories of phenomena to specific types of phenomena.

One of the problems with classification of linguistic phenomena is that the phenomena frequently cannot be categorized into unique categories, but should be classified in multiple categories. For example, comparatives commonly include the use of ellipsis, e.g., "*Is John as old as Dave?*" Should this type of linguistic phenomenon be classified as ellipsis, comparatives, both, or in an elliptical-comparatives class that may be a subclass of both ellipsis

and comparatives?

Another problem is in determining the appropriate categories of test phenomena for a black box evaluation method. For example, for the four types of processing (e.g., lexical, syntactic, semantic, and discourse) typically identified in NLP systems, should each of the four be separately identified for each linguistic phenomenon? For example, handling pronominal anaphoric references would typically entail lexical capabilities such as recognizing/determining the *lexical* features of the pronoun, recognition of the pronoun as a *syntactic* component of the clause or phrase being processed, use of *semantic* knowledge about other entities in the discourse, and the use of *discourse* knowledge in being able to select from among the candidate referents for the pronoun. Should each of these component types of capabilities be identified in the classification scheme (e.g., classes called *pronoun anaphora - lexical*, *pronoun anaphora - syntactic*, *pronoun anaphora - semantic*, and *pronoun anaphora - discourse*)?

This type of categorization scheme, however, is not appropriate if a black box approach is being used on NLP systems, treated as whole systems, and access to the components is not part of the evaluation. For example, if a system fails on a particular test item, such as pronoun anaphoric references, it is very difficult to determine which of the four component capabilities really caused the processing failure.

Since the goals of the Benchmark I/I Program were focused on evaluation of whole NLP systems rather than individual components, our approach was to develop test items that address the detailed individual component capabilities to the best of our ability, while treating the systems as whole systems and not expecting to examine the inputs and outputs of any system's components. We also opted for a tree structured classification scheme that includes verbal pointers to other sections of the classification scheme for classes that could be classified under multiple parents. Figure 3 shows the classification hierarchy for a portion of the section on Reference issues. The entire classification scheme developed under the Benchmark I/I Program is displayed in the NLP system profile in Appendix B.

X. REFERENCE

1. Specific Reference

1.1 Anaphoric Reference

1.1.1 Pronominal Anaphora

1.1.1.1 Anaphoric References With NP Antecedents

1.1.1.1.1 Anaphoric Reference Functions as Subject

1.1.1.1.2 Anaphoric Reference Functions as Object

1.1.1.1.3 Anaphoric Reference Functions as Possessive

1.1.1.1.4 Ambiguous Anaphoric References

1.1.1.2 Anaphoric References with Verb Phrase or Sentence Antecedents

1.1.2 Nominal Anaphora

1.1.2.1 Anaphoric References with NP Antecedents

1.1.2.1.1 Direct

1.1.2.1.2 Indirect

1.1.2.2 Anaphoric References With Clause or Sentence Antecedents

1.1.3 Anaphora with *SO* and *AS*

1.1.3.1 Anaphora with *SO*

1.1.3.2 Anaphora with *AS*

1.1.4 Intra- and Inter-Sentential Anaphora

1.1.4.1 Intra-sentential anaphora

1.1.4.2 Inter-sentential anaphora

1.2 Cataphoric Reference

1.2.1 Cataphoric References With NP Antecedents

1.2.2 Cataphoric References With Verb Phrase or Sentence Antecedents

1.3 General Knowledge or the Larger Situation

2. Generic Reference

Figure 3: The Classification Scheme for Section X Reference

6. The NLP Evaluation Procedure/Tool

The organization of the NLP Evaluation Tool is discussed in Section 6.1, the Tool design is discussed in Section 6.2, and the computer-based Tool application facility is discussed in Section 6.3. The Tool includes 352 items, each covering a different linguistic phenomenon. Tool items are classified according to the classification scheme discussed in Section 5.

6.1 Tool Organization

The top level of the classification scheme consists of the categories listed below. These categories are also the topics of the twelve major sections of the Tool, as shown in Table 2.

Table 2: The Twelve Main Tool Sections

SECTION NUMBER	SECTION TITLE
I.	Basic Sentences
II.	Interrogative Sentences
III.	Noun Phrases
IV.	Adverbials
V.	Verbs and Verb Phrases
VI.	Quantifiers
VII.	Comparatives
VIII.	Connectives
IX.	Embedded Sentences
X.	Reference
XI.	Ellipsis
XII.	Semantics of Events

The Tool starts with basic sentences since the input to most NLP systems must consist of whole sentences, except for cases of ellipsis which typically follow complete sentences. The first chapter covers the basic sentence types (i.e., declaratives, interrogatives, and imperatives), basic determiners (i.e., articles), basic noun phrases, and basic verb phrases. Starting in Tool Section I, the evaluator determines the capabilities of the system that can be used in subsequent test inputs, so as to focus each test on the particular targeted phenomenon, using the phenomenon in the context of other linguistic phenomena upon which the system has already succeeded.

6.2 Tool Design

Since a goal of our NLP Evaluation Tool design effort is to achieve *domain or application independence*, insofar as possible, the Tool is designed so that it does not rely on a particular corpus of natural language text or sentences. Instead, the test sentences or paragraphs to be

processed by an NLP system are composed by the evaluator either during, or prior to, the administration of the evaluation procedure/test to the NLP system. The NLP Evaluation Tool is designed to assist the evaluator with the creation, modification, or tailoring of test sentences.

In order to make the Tool sensitive to individual linguistic capabilities, it is designed so that, for untested individual NLP capabilities, each item tests just one NLP capability at a time, to the extent possible, and combinations are tested after the individual capabilities are tested. The Tool is designed to progress from very elementary sentence types containing simple constituents to more complex sentence (or paragraph) types. The idea is that each time a test sentence (or paragraph) is presented to the NLP system being evaluated, the sentence (or paragraph) should contain only one new (untested) linguistic capability or one new untested combination of tested capabilities. The other capabilities required for processing the input should already have been tested and the NLP system should already have succeeded on these other issues. In administering the NLP Evaluation Tool, the evaluator must avoid combining tests for several capabilities in the same test sentences, since the Tool would then be insensitive to the individual capabilities. For example, a test of ellipsis only in the context of question-answering dialogue would not be usable with a system that is not designed to handle questions (e.g., a text understanding system designed for an information extraction task, which typically processes declarative sentences, but not interrogatives or imperatives).

Each Tool item includes:

- An explanation and definition of the linguistic phenomenon or capability being tested, along with any special instructions for testing.
- Patterns/descriptions that define the structure and features of the test sentences to be composed and input to the NLP system under evaluation.
- Example sentences to aid the evaluator in composing test sentences.
- A statement of the evaluation criteria for the individual test item.
- A place for the evaluator's test sentences.
- A place for the evaluator's score.

Figure 4 shows a Tool item from Section 2.2 that addresses the issue of adjective nominals. The item begins with an explanation or definition of the linguistic phenomenon being tested along with instructions for composing appropriate test inputs. Four suggested patterns are then given to help guide the evaluator in creating test input sentences. Below each pattern is an example. The examples in the Tool are from two application domains: an employee database information retrieval domain and the terrorist domain of the MUC-3 exercise. The evaluator should pick a sentence pattern from among those listed in the

particular test item, or from among those in previous sections upon which the NLP system has succeeded. The evaluator is expected to make the substitutions described in the Tool item instructions, namely, to replace the “[NP]” with “([Det]) [Adj.Nom.]”. Then the evaluator is to replace the non-terminals in the pattern with words that are within the lexicon of the NLP system being tested and appropriate to the domain of the system. So, for example, if the domain of a system was mission planning for the Air Force, an appropriate test input might be “List the most senior in the Iraqi military,” which matches the first sentence pattern with “the most senior” as the adjective nominal. The test criteria is stated so as to focus the evaluator’s attention on the critical phenomenon being tested and to provide a standard (objective) scoring metric. Then below the criteria is a place for the evaluator’s test input and score.

For each test item in the NLP Evaluation Tool, the evaluator submits an NL input to the NLP system being evaluated and determines whether or not the response indicates that the system understood and processed the input correctly. The evaluator has five choices of scores to award for each test input:

- Success: The system successfully met the evaluation criteria stated for the particular test item.
- Correct: The system did not successfully meet the evaluation criteria, but produced acceptable/correct output.
- Partially Correct: The system did not successfully meet the evaluation criteria, and only produced partially acceptable/correct output.
- Failure: The system did not successfully meet the evaluation criteria and produced no correct output.
- No output: The system produced no output.

One of the difficulties in applying this NLP Evaluation Tool is that the decision as to what score should be awarded to the system for each test item can be somewhat subjective. That is, there is no predefined answer key that must be matched for each test input. Instead, the evaluator is expected to create good, discriminating test inputs and define the correct outputs based on the criteria, just as a teacher would for a class of students. Therefore, the evaluator must be trained in the application domain and task of the NLP system and must know:

- the vocabulary of the NLP system so as to stay within its bounds, unless the vocabulary itself is the focus of a test item;
- the tasks that the NLP system (with its back-end system, if appropriate) is capable of performing (e.g., retrieving data from a database);

2.2 Nominals

Nominals are non-noun parts of speech used as the head of a noun phrase.

2.2.1 Adjective Nominal

An adjective nominal consists of an optional determiner followed by an adjective used as the head of the noun phrase. Examples: “the elderly”, “the poor”, “the youngest”, “the smartest”. You may use any of the successful sentence patterns from Sections I or II to test an adjective nominal. Replace the “[NP]” in the chosen sentence pattern with “([Det]) [Adj.Nom.]”. We use the notation “[Det]” to denote the determinative element and “[Adj.Nom.]” to denote the adjective nominal. Below are some suggested patterns.

Pattern:	[Verb]	([Det])	[Adj.Nom.]	([PP])	
Example:	List	the	oldest	in the New York branch.	
Pattern:	[WH-Word]	[BE-Verb]	([Det])	[Adj.Nom.]	([PP])
Example:	Who	is	the	oldest	in Chicago?
Pattern:	[NP]	[Verb]	([Det])	[Adj.Nom.]	([PP])
Example:	Terrorists	killed	the	elderly	in Usulutun.
Pattern:	([Det])	[Adj.Nom.]	([PP])	[Verb]	[NP].
Example:	The	poor	in Usulutun	attacked	the Government House .

Criteria: Demonstrated understanding by interpreting the adjective nominal as expressing an entity or object.

Input:

Score:

Figure 4: The Adjective Nominal Tool Item

- the concepts, objects, and/or attributes in the domain that can be the focus of test inputs (e.g., one can query an employee database about certain attributes of the persons in the database, such as their branch, pay, sales, longevity with the company).

6.3 Tool Application Facility

In order to facilitate the use of the Tool, we developed an Emacs-based dual-window split-screen facility for an evaluator to use when applying the Evaluation Tool to an NLP system. The facility provides:

- inter-window text manipulations and
- storage of the completed (or partially completed) Evaluation Tool sections to file.

The dual-window interface is implemented on top of Emacs and presents the user with two tiled Emacs buffer windows above one another as shown in Figure 5. The Evaluation Tool is visible and accessible in the upper window and the particular NLP system being evaluated is accessible in the lower window. Figure 5 shows the Tool application facility being used on a SUN SPARCstation with a MUC-3 text processing system.

The Tool application facility supports the evaluator in applying the Tool to an NLP system and in recording test inputs, assigned scores, system outputs, and comments within the on-line version of the Tool for the NLP system. The Emacs-based Tool application facility enables an evaluator to edit text in either window and copy blocks of text between the two windows. This allows the evaluator to edit text in the Tool window and to execute the NLP system using the text copied from the Tool window as input. The evaluator can also mark and copy text back from the NLP system window to the Tool window to record selected system outputs. The evaluator records his/her score and comments for each Tool item in the Tool window. This facility has proven to be a great convenience to the evaluator in evaluation experiments with the Tool.

The Evaluation Tool is stored on-line with each major section in a different file. Each file is named using the Roman numeral of the section number. When an evaluator uses the application facility, he/she would use just one Tool file (major section) at a time. When an evaluator wishes to quit an evaluation session, he/she can logout of the Tool application facility and the Evaluation Tool file is saved with the evaluator's additions, comments, scores, etc., and is named with the Roman numeral of the particular section and the evaluator's initials as the file name extension.

The Emacs-based Tool application facility for a Sun SPARCstation is available from the authors.

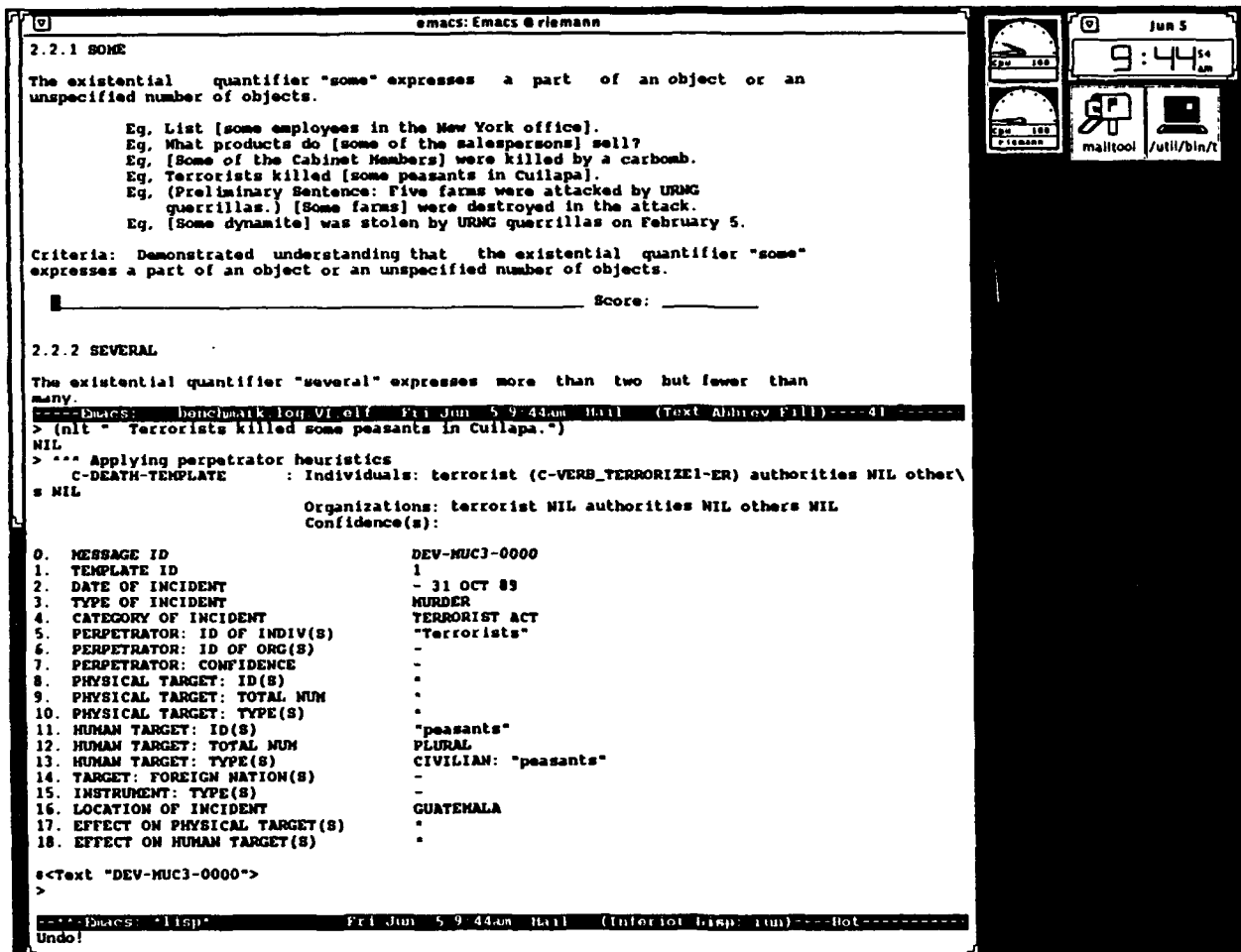


Figure 5: Dual Window Emacs-Based Application Facility

7. The Profiling Facility and NLP System Profiles

The NLP Evaluation Tool is designed to produce descriptive profiles that describe NLP systems in terms of the scores assigned for the processing of specified linguistic phenomena. The profiles are hierarchically organized according to the classification scheme discussed in Section 5. The profiles can be viewed or examined at any level of granularity (levels of granularity corresponding to the number of hierarchy levels to be displayed). At any hierarchy level N (N not the bottom level), the scores from the items or classes at level N are averaged to produce the score for the parent class or category at level N+1. Table 3 shows a sample system profile consisting of only the top level of the hierarchy. The percentages are the averages of the scores produced for the sub-categories or sub-items. The column entitled "Total Inputs" provides the number of actual NL test inputs that were submitted to the NLP system. Three test inputs were used for each Tool item so each entry in the "Total Inputs" column is three times the corresponding entry in the "Total Items" column.

Table 3: A System Profile: Top Level Only

Category	Total	Total	Success		Correct		Partial		Failure		No Output	
	Items	Inputs	#	%	#	%	#	%	#	%	#	%
1. Basic Sentences	16	48	39	81%	4	8%	2	4%	0	0%	3	6%
2. Interrogatives	9	27	26	96%	0	0%	0	0%	0	0%	1	4%
3. Noun Phrases	83	249	159	64%	17	7%	8	3%	11	4%	54	22%
4. Adverbials	6	18	13	72%	0	0%	0	0%	0	0%	5	28%
5. Verbs & Verb Phrases	19	57	27	47%	17	30%	0	0%	1	2%	12	21%
6. Quantifiers	45	135	79	59%	11	8%	4	3%	8	6%	33	24%
7. Comparatives	63	189	87	46%	2	1%	11	6%	6	3%	83	44%
8. Connectives	34	102	74	73%	2	2%	2	2%	5	5%	19	19%
9. Embedded Sentences	5	15	4	27%	0	0%	0	0%	0	0%	11	73%
10. Reference	16	48	22	46%	2	4%	3	6%	5	10%	16	33%
11. Ellipsis	17	51	21	41%	6	12%	2	4%	6	12%	16	31%
12. Event Semantics	39	117	37	32%	8	7%	3	3%	15	13%	54	46%

NLP system profiles are generated using the Microsoft ExcelTM spreadsheet tool. The Team designed a spreadsheet using the classification scheme as a basis. The scores assigned to each item in the Evaluation Tool are entered into the spreadsheet. The formulas embedded in the spreadsheet compute the averages for each of the classes in the hierarchy from the scores associated with each element or sub-class.

Graphical presentations of the evaluation results can also be generated using the spreadsheet software. Figure 6 displays a graph of the combined *Success* and *Correct* results of the evaluation of System #1 across the four Interface Technologists or evaluators.

The profile spreadsheet is available from the authors.

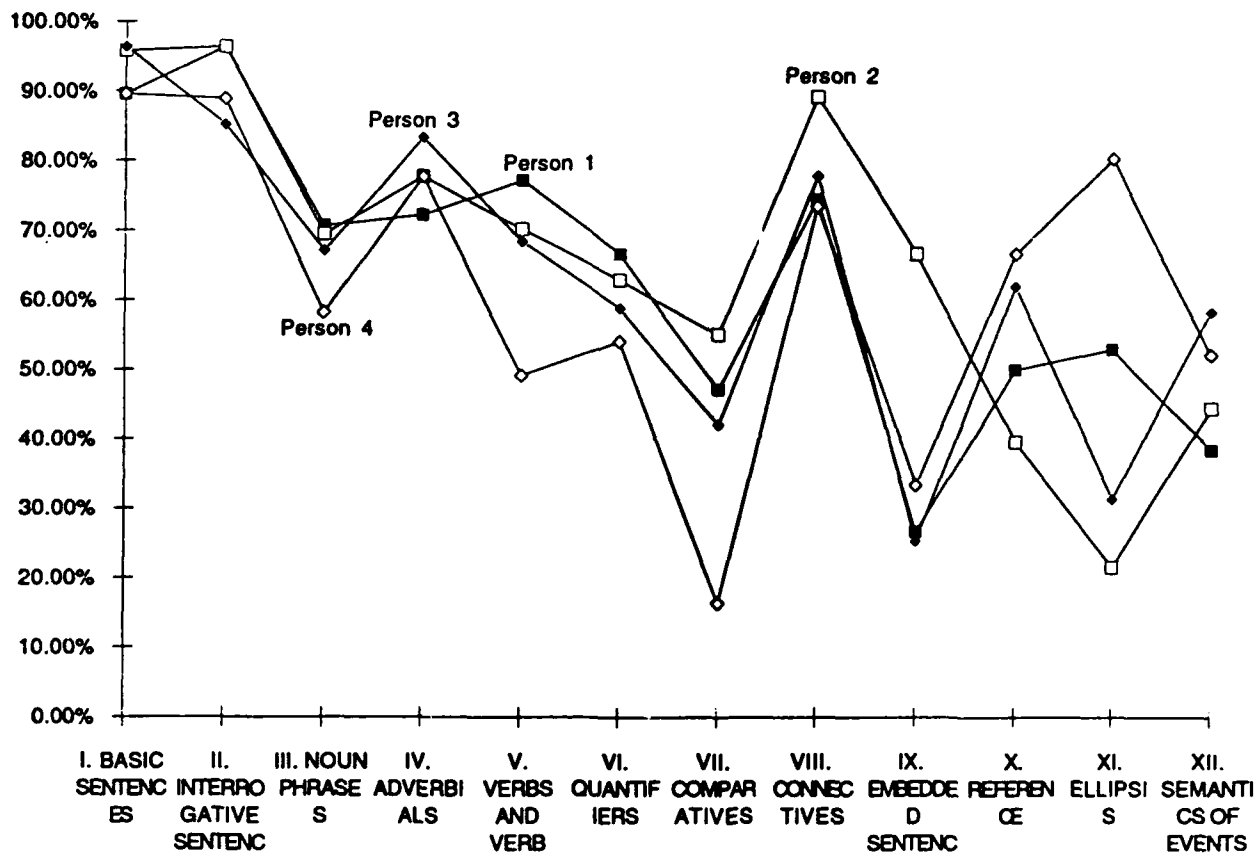


Figure 6: System #1 Combined Success/Correct Scores Across Evaluators

8. Assessment of the NLP Evaluation Tool

The purpose of the assessment exercises was to determine whether the objectives for the NLP Evaluation Tool were being met and to provide feedback to the developers to improve and refine the Tool during its development.

An assessment task (exercise) was performed at the end of each of the three six-month phases of the Benchmark I/I Program. For each of the first two assessment tasks, the Tool was applied to three different NLP systems by each of three evaluators, also called Interface Technologists. For the final assessment task, the Tool was applied to two different NLP systems by each of four evaluators. Together, these three assessment exercises provided a total of 26 applications of the Tool to NLP systems.

As part of each of the three assessment tasks, the Evaluation Tool was evaluated using several techniques: statistical analysis, item analysis, questionnaire, and critique during use. In this Final Report, we focus on the third and final assessment exercise. The evaluation techniques used in this final assessment exercise were:

- *Statistical disagreement analysis:* The data generated by the application of the Tool by the four Interface Technologists to two NLP systems (for a total of 8 applications) was statistically analyzed for consistency across Technologists, although the number of subjects was small. The results of this analysis are presented in Section 8.3.
- *Critique during use:* The Interface Technologists recorded problems, criticisms, and suggestions regarding individual Tool items during their application of the Tool. This item-by-item critique is too detailed for inclusion in this report.
- *Scoring trend analysis:* The data resulting from the application of the Evaluation Tool to both of the NLP systems by each of the four Interface Technologists was examined for trends or patterns in the scoring tendencies of the Technologists. The results of the scoring trend analysis is reported in Section 8.4.
- *Item analysis:* An item analysis was performed to identify the Tool items on which there was disagreement among the Technologists. The copies of the Tool completed by each Interface Technologist for each NLP system were examined to determine the nature and cause of the disagreements. Most of the disagreements were due to Technologist errors. Other factors included ill-defined evaluation criteria and NLP system behavior that was more complicated than anticipated. The results of the item analysis are discussed in Sections 8.5, 8.6, and 8.7.
- *Questionnaire:* The Interface Technologists completed an Assessment Questionnaire developed to evaluate the Evaluation Tool. The results of this subjective assessment are summarized in Section 8.8. Complete results are included in Appendix C.

The experimental design for the assessment exercises is described in the following subsection, with emphasis on the third and final exercise.

8.1 Experimental Design.

This section describes the important design features for the assessment exercises.

Evaluators (Interface Technologists).

- To achieve an impartial assessment of the Tool, the Interface Technologists had no involvement in the development of the Tool.
- To ensure that the Tool can be used by people who are not trained linguists, the Interface Technologists selected for participation in the assessment exercises were somewhat knowledgeable of interface technology, but had little to no formal education in linguistics, per se.

The Interface Technologists that served as evaluators for all the assessment tasks included one Calspan scientist and five graduate students at the State University of New York (SUNY) at Buffalo.

For the third and final assessment task, the four Interface Technologists were Computer Science graduate students at SUNY at Buffalo. Three of the Interface Technologists were new to the Tool and NLP systems and one had participated during earlier phases and was familiar with the Tool and one of the two NLP systems.

NLP Systems.

- To guard against biasing the Tool with regard to a particular type of NLP system and/or a particular application domain, two types of NLP systems with different application domains were used in the assessment exercises. One type of system was the database front-end NL query system and the other type was the text understanding system. The database query systems used an employee data base application and the text processing systems were applied to extract information on the MUC-3 terrorism domain.
- The NLP systems selected for use in the assessment experiments were among the most mature systems available at the current time. The selected NLP systems were a mix of commercially available systems and advanced research products. The intent was to use systems that provide a rich suite of NLP capabilities.
- To minimize bias with regard to particular NLP systems, at least one of the NLP systems used at each assessment milestone was a system that had not been used in the previous assessment activities.

Over the course of the entire project, the NLP Evaluation Tool was used with three commercial "off the shelf" (COTS) natural language database query front end systems and

three advanced research prototypes that were implemented for the MUC-3 evaluation exercise.

For the last (third) phase assessment exercise, we used a COTS database query front end system and one of the advanced research prototypes implemented for MUC-3.

Tool Application Procedure.

- To minimize bias due to order of Tool application by the Interface Technologists, a Latin square design was used for the Tool applications. This Latin square design is illustrated in Table 4.

Table 4: Latin Square Design for the Assessment Task

Phase	Evaluator	NLP System		
I	IT #1	SYS#1	SYS#2	SYS#3
I	IT #2	SYS#2	SYS#3	SYS#1
I	IT #3	SYS#3	SYS#1	SYS#2
II	IT #1	SYS#1	SYS#2	SYS#4
II	IT #2	SYS#2	SYS#4	SYS#1
II	IT #4	SYS#4	SYS#1	SYS#2
III	IT #1	SYS#1	SYS#5	
III	IT #5	SYS#1	SYS#5	
III	IT #6	SYS#5	SYS#1	
III	IT #7	SYS#5	SYS#1	

- To avoid confusion between NLP systems, each Interface Technologist applied the *complete* Tool to one NLP system and then, when finished with the one system, proceeded to apply the Tool to another. The Interface Technologists did not switch back and forth between systems while applying the Tool.
- For the third and final assessment exercise, each Technologist used three test inputs for each evaluation Tool item in an attempt to maximize the representativeness of the results with regard to the systems' capabilities. The NLP system's response to each of the three test inputs was scored individually by the Technologist.

8.2 Training

The Team developed a short training program and training materials to familiarize the Interface Technologists with the evaluation Tool, the NLP systems, and the Emacs-based dual-window facility. Some of the training materials also served as reference aids when the Interface Technologists began the task of formally applying the Tool to the NLP systems. Training was generally conducted over a two-day period and included instruction and

hands-on practice in applying the evaluation Tool to the two NLP systems. Each Interface Technologist was initially trained on the NLP system that he/she used first, and, after finishing the evaluation of the first NLP system, he/she was provided with training on the second NLP system just before beginning formal application of the Tool to the second system.

The following types of training materials were used. Copies are available from the authors.

1. Training Objectives and Materials
2. Training Outline
3. Overview of Purpose, Philosophy, and Objectives of the Evaluation Tool
4. Introduction to The Evaluation Tool
5. Evaluation Tool Procedures
6. Guide to Notation
7. Emacs Instructions
8. The NLP System Procedures
9. Using the NLP System
10. The NLP System Application Domain

The following is a summary of the guidelines that the Interface Technologists were instructed use:

- Take your time and apply each item thoughtfully (no time limits)
- Take breaks of 5 to 10 minutes each hour (more if tired)
- Submit multiple test inputs for each test item (record three)
- Use variety in test inputs (within allowed specifications) for each Tool item
- Carefully consider the NLP system output/response against evaluation criteria
- Record a score for each submitted test input
- Build on previously used language patterns processed successfully by the system (do not re-use failed linguistic phenomena)
- Make notes and comments
 - Clarify scores, if necessary
 - Note strengths and weakness of the Tool
- Do not fault the NLP system when its vocabulary has been exceeded (unless it is central to the phenomenon under test)

- Ask for help if problems occur or directions/instructions are needed

8.3 Reliability/Agreement Data Analysis

Data analysis for agreement or consistency across evaluators required the following major tasks:

- Determine a definition of a match or agreement across evaluators (on a per item basis).
- For each NLP system and for each Evaluation Tool item, apply the match definition to determine whether the scores of the four evaluators were in agreement.
- Using the Binomial Test for statistical significance, determine which sections and sub-sections produced reliable results. The Binomial Test was used since there are two possible outcomes (match or non-match) for each "trial" or evaluation item.

This approach to assessing reliability has some similarity to the reliability study performed by Hix and Schulman for their method of evaluating human-computer interface development tools [Hix91].

These tasks are discussed in the following subsections.

8.3.1 Measuring Agreement

The selection of the algorithm for measuring agreement among the Interface Technologists involved consideration of numerous candidate approaches. The selection was made by comparing the results of each of the candidate approaches to the combined results when three of the Evaluation Tool designers, working independently, applied their own heuristics and engineering judgement to a small sample (50) of possible score combinations. Based on this comparison study, one approach for measuring whether the four technologists agreed in their assessments was selected.

The candidate approaches can be classified in three categories: (1) combined spread methods; (2) raw pattern methods; and (3) numerical methods. The *combined spread* methods involve two steps: first, combine the three scores per Evaluation Tool item obtained from each Interface Technologist into a single composite score per Tool item; and then compare the degree of agreement of the composite scores across technologists. The *raw pattern* methods involve direct comparisons across all scores obtained by the four Interface Technologists. The degree to which all the scores line up under one or a cluster of scores defines the degree of agreement. The *numerical approaches* involve awarding points based on scores obtained by the Interface Technologists, weighted by frequency of occurrence, and assessing agreement between subjects mathematically.

The approach that was found to best align with the results of the Evaluation Tool designers was from the numerical method category. This method is discussed in the following paragraphs.

This approach consists of two major steps:

1. Calculate a combined numerical score (weighted average) for the three letter scores generated for each Tool item. (Recall from Section 6.2 that the possible letter scores are S,C,P,F, and N.) That is, the Technologist used three test inputs for each Tool item and assigned the NLP system a letter score for each of its three corresponding responses.
2. For each NLP system and for each Evaluation Tool item, determine whether the numerical scores of the four evaluators agree (match) based on the selected match definition.

Computing combined numerical scores.

The following paragraphs describe the method used to calculate a combined numerical score (weighted average) for each evaluator for each Tool item. First, a numerical score was assigned to each possible letter score:

- S = 20 (or 21 if two S scores obtained by a subject)
- C = 15,
- P = 10,
- F = 5, and
- N = 5.

When two or more S scores were obtained by an Interface Technologist, 21 points were used rather than 20 because it was felt that a success should be harder to match than other scores. Furthermore, this approach seemed to agree with the empirical studies performed by the developers when determining/designing the score combining method.

A weighted average was then calculated for each Interface Technologist based on the three scores given for each Evaluation Tool test item. The method for computing the weighted average was:

- If the three scores are the same or if the three scores are all different, then compute an average with the scores weighted equally.
- If there are two identical scores and one score that is different, then use weights of .60 and .40, respectively, for the two score values when computing the weighted average.

The reason for using a 60-40 split in the case where two scores are the same and one is different (rather than a 67-33 split), is because with three inputs scored, it is not possible to tell whether the theoretical likelihood of obtaining one or the other score is 50-50 or 67-33. Using a 60-40 split accommodates both possibilities while favoring the actual data obtained.

The following are three examples:

- Scores of S,C,and P result in a weighted average of $(20 + 15 + 10) / 3 = 15$
- Scores of C,C,and P result in a weighted average of $.6(15) + .4(10) = 13$
- Scores of S,S,and P result in a weighted average of $.6(21) + .4(10) = 16.6$

Since there are five (5) scores possible on each test item and each Interface Technologist submits 3 scores, there are 35 possible score combinations. These are shown in Table 5 below. The combined numerical score (weighted average) is also shown for each case.

Table 5. Possible Score Combinations

S:	C:	P:	F:	N:	Combined Score:
3.00	0.00	0.00	0.00	0.00	21.00
2.00	1.00	0.00	0.00	0.00	19.00
2.00	0.00	1.00	0.00	0.00	17.00
2.00	0.00	0.00	1.00	0.00	15.00
2.00	0.00	0.00	0.00	1.00	15.00
0.00	3.00	0.00	0.00	0.00	15.00
1.00	2.00	0.00	0.00	0.00	17.00
0.00	2.00	1.00	0.00	0.00	13.00
0.00	2.00	0.00	1.00	0.00	11.00
0.00	2.00	0.00	0.00	1.00	11.00
0.00	0.00	3.00	0.00	0.00	10.00
1.00	0.00	2.00	0.00	0.00	14.00
0.00	1.00	2.00	0.00	0.00	12.00
0.00	0.00	2.00	1.00	0.00	8.00
0.00	0.00	2.00	0.00	1.00	8.00
0.00	0.00	0.00	3.00	0.00	5.00
1.00	0.00	0.00	2.00	0.00	11.00
0.00	1.00	0.00	2.00	0.00	9.00
0.00	0.00	1.00	2.00	0.00	7.00
0.00	0.00	0.00	2.00	1.00	5.00
0.00	0.00	0.00	0.00	3.00	5.00

1.00	0.00	0.00	0.00	2.00	11.00
0.00	1.00	0.00	0.00	2.00	9.00
0.00	0.00	1.00	0.00	2.00	7.00
0.00	0.00	0.00	1.00	2.00	5.00
1.00	1.00	1.00	0.00	0.00	15.00
1.00	1.00	0.00	1.00	0.00	13.33
1.00	1.00	0.00	0.00	1.00	13.33
1.00	0.00	1.00	1.00	0.00	11.67
1.00	0.00	1.00	0.00	1.00	11.67
1.00	0.00	0.00	1.00	1.00	11.00
0.00	1.00	1.00	1.00	0.00	10.00
0.00	1.00	1.00	0.00	1.00	10.00
0.00	1.00	0.00	1.00	1.00	9.00
0.00	0.00	1.00	1.00	1.00	7.00

Determining agreement.

The **Match Definition** used to determine agreement across the four Interface Technologists on a per item basis is a function of the spread between the maximum and minimum of the four numerical scores for the Technologists. The match definition is:

- If (MaximumScore - MinumumScore) < 8, then the four scores match;
- Otherwise, the four scores do not match.

This criteria was applied to the Technologists' scores for each Tool item for both NLP systems. The following table shows two examples.

Table 6: An Example Set of Matching Scores and a Non-Matching Set

NO MATCH	MATCH
Technologist #1: 21	Technologist #1: 15
Technologist #2: 11	Technologist #2: 17
Technologist #3: 15	Technologist #3: 17
Technologist #4: 12	Technologist #4: 11
Max - Min = 21-11 = 10	Max - Min = 17-11 = 6

8.3.2 Statistical Analysis

After applying the match definition to the Technologists' scores to determine which Evaluation Tool items resulted in agreement across the Interface Technologists, the next step

was to determine whether the resulting level of agreement was statistically significant (i.e., significantly more than would be expected by chance alone). This was accomplished on a section-by-section basis using the Binomial Test. Since there is a finite probability of obtaining a match across subjects (using the approach described above) it is possible to calculate the likelihood of obtaining the number of matches obtained in each section by chance alone. This is done using the Binomial Probability Distribution. The method for calculating the probability of obtaining *X or more matches* in a section containing N items is shown below:

The probability of X or more matches in a section containing N items =

$$\sum_{I=X}^N \binom{N}{I} p^I (1-p)^{N-I}$$

where $\binom{N}{I} = N! / [I! (N-I)!]$ and

N = Number of test items

p = Probability of obtaining a match on each item by chance

A computer program was written in the C programming language to compute the probability p of obtaining a match on any arbitrary Tool item by chance alone. The program essentially iterates through all possible letter score combinations and corresponding weighted averages (see Table 5) for the four Technologists and identifies and counts the number of combinations that satisfy the match criteria. The program also computes the *total number* of combinations. The final step of the program yields the probability p of a match on an item by chance by dividing the total number of letter score combinations that satisfied the match criteria by the total count of all letter score combinations. This program is defined using the following algorithm.

ALGORITHM:

1. Enumerate ways of combining S, C, P, F, and F in an array called Scores[35][6], where:
 - 35 = the number of possible score combinations given 5 possible columns (S, C, P, F, N) in which to place a total of 3 results. The order of the 3 results does not matter, so a score containing one S and two Cs is not distinct from a score made up of one C, one S, and one C.
 - 6 = the five columns S, C, P, F, and N, plus a sixth column to hold the corresponding combined numerical score (weighted average).
2. Define an array called Points[5], where the numerical scores 20, 15, 10, 5, 5 are assigned to the columns S, C, P, F, and N, respectively.

3. Compute the value for each of the 35 possible score combinations in the Scores array (see Table 5).
4. Compute the agreement probability:

Given 4 Technologists and the 35 possible numerical combined scores (weighted averages), there are 1,500,265 ($35^4 = 1,500,265$) possible ways of combining the possible numerical combined scores (weighted averages). We use four nested loops, one for each Technologist, and each loop variable indexes through the 35 possible numerical combined scores (weighted averages) in the Scores array for the particular Technologist.

For the innermost nested loop, the loop variable indexes through all possible combined scores (weighted averages) for the one Technologist, holding the combined scores for the other Technologists constant. Each next outer loop cycles through the combined scores for the other Technologists. Thus the program considers and counts the total number of possible agreements given every permutation of combined scores (weighted averages) for the 4 Technologists.

The code follows the following basic structure:

```

For i = 1 to 35 do
  For j = 1 to 35 do
    For k = 1 to 35 do
      For l = 1 to 35 do
        Add 1 to the Total Number of Permutations.
        If the 4 scores represented by the counters i, j, k, l agree,
        that is, if (MaximumScore - MinimumScore) < 8,
        then add 1 to the Number of Agreements.
      End For-loop
    End For-loop
  End For-loop
End For-loop

```

At the end of the looping compute:

Agreement Probability = (Number of Agreements) / (Total Number of Permutations)

Agreement results were computed for all sections and subsections of the Tool. Table 7 presents the results of the reliability study for the twelve major sections of the Tool. The results for all the Tool subsections are not presented in this report due to the voluminous nature of the results, but are available from the authors.

Table 7 shows the results for each of the two NLP systems. The table shows the number of agreements per section, the likelihood of this number of agreements occurring by chance based on the Binomial Test, and the percentage of agreements. The rightmost two columns indicate whether the number of agreements per section for each of the two NLP systems was

Table 7: Reliability/Agreement Study Results for the Major Sections

	System 1:				System 2:			System 1	System 2		
	Number of Items	Number of Matches	Probability of >= this	Percentage Agreement	Number of Matches	Probability of >= this	Percentage Agreement			Match Significance	Match Significance
			Number of Matches			Number of Matches					
I. BASIC SENTENCES	16	14	0.00121	88%	13	0.00666	81%	YES	YES		
II. INTERROGATIVE SENTENCES	9	8	0.01417	89%	2	0.97352	22%	YES	NO		
III. NOUN PHRASES	83	50	0.01555	60%	48	0.04323	58%	YES	YES		
IV. ADVERBIALS	6	5	*0.09033	83%	3	0.61473	50%	*	NO		
V. VERBS AND VERB PHRASES	19	13	*0.05796	68%	15	0.00572	79%	*	YES		
VI. QUANTIFIERS	45	24	0.27742	53%	29	0.01841	64%	NO	YES		
VII. COMPARATIVES	63	29	0.65904	46%	27	0.8201	43%	NO	NO		
VIII. CONNECTIVES	34	21	*0.07269	62%	24	0.00613	71%	*	YES		
IX. EMBEDDED SENTENCES	5	3	0.45936	60%	4	*0.16155	80%	NO	*		
X. REFERENCE	16	9	0.33539	56%	12	0.02599	75%	NO	YES		
XI. ELLIPSIS	17	4	0.98971	24%	11	*0.12497	65%	NO	*		
XII. SEMANTICS OF EVENTS	39	22	*0.18077	56%	23	*0.10878	59%	*	*		
			*	-- close							

statistically significant using a 0.05 level of significance. The “YES” or “NO” indicate that the number of agreements was significant or not significant, respectively, while the asterisks flag the sections that were close to significant.

In order to understand the reasons for the lack of a significant level of agreement in some of the Tool sections, we studied the data from the Tool applications of each of the four Interface Technologists to each of the two NLP systems. This resulted in two products. The first study involved a trend analysis and the second involved an error analysis.

8.4 Scoring Trend Analysis

A study was undertaken to examine the data for trends or patterns in the tendencies of the Interface Technologists. The results of this trend analysis are shown in Table 8. The table shows that Interface Technologist #4 had a tendency to assign very low scores to NLP System #1 with disproportionate frequency in comparison to the other three Interface Technologists. The table also shows that Interface Technologist #4 had a tendency to assign very high scores to NLP System #2 with disproportionate frequency in comparison to the other three Interface Technologists. Overall, Interface Technologist #4 had almost twice

Table 8: Results of the Scoring Trend Analysis

**Technologist Scoring
Trend Analysis**
frequency (% of total items)

	Single Highest Scores	Single Lowest Scores	Total Extrema:
System 1:			
Technologist 1	40 (27.78)	31 (16.85)	71 (21.65)
Technologist 2	36 (25.00)	42 (22.83)	78 (23.78)
Technologist 3	31 (21.53)	33 (17.93)	64 (19.51)
Technologist 4	37 (25.69)	78 (42.39)	115 (35.06)
Totals:	144	184	328
System 2:			
Technologist 1	25 (10.87)	48 (35.29)	73 (19.95)
Technologist 2	50 (21.74)	21 (15.44)	71 (19.40)
Technologist 3	52 (22.61)	32 (23.53)	84 (22.95)
Technologist 4	103 (44.78)	35 (25.74)	138 (37.70)
Totals:	230	136	366
Overall:			
Technologist 1	65 (17.38)	79 (24.69)	144 (20.75)
Technologist 2	86 (22.99)	63 (19.69)	149 (21.47)
Technologist 3	83 (22.19)	65 (20.31)	148 (21.33)
Technologist 4	140 (37.43)	113 (35.31)	253 (36.46)
Grand Totals:	374	320	694

the number of extreme scores causing non-matches to occur. The reasons for this trend in scoring on the part of Interface Technologist #4 are not clear. The reasons could include: (1) inadequate training to the Tool and to the NLP systems, (2) partial misunderstanding of the score definitions and their applicability rules, and/or (3) a natural tendency to grade at the extremes. Our debriefing of this Interface Technologist indicated that there was some misunderstanding of the score definitions, which means that corrective action should focus on items (1) and (2), above, that is, improved training and providing more explicit definitions of the scores.

8.5 Evaluator Errors

We conducted an analysis of the errors committed by the Interface Technologists that contributed to the lack of consistency across technologists in the assessment exercise. The errors were categorized and the following list displays the error types in order of frequency of occurrence, with the most frequent listed first. Following the list of evaluator error types, each error type is discussed briefly and examples are provided for illustrative purposes.

1. Lack of variety in test inputs
2. Incorrect or inappropriate use of scores
3. Lack of understanding of scores
4. Misunderstanding of evaluation criteria
5. Test input includes a failed linguistic phenomenon
6. Test input that is outside of the system's application domain
7. Test input that does not test the described linguistic capability
8. Grammar or spelling mistakes
9. Inability to compose test input

1. Lack of variety in test inputs

In cases where an evaluator used very similar inputs for the three items in a test, the score would be erroneously high or low with respect to the system's behavior and with respect to the other evaluators' scores.

- Lack of variety with respect to **Syntax**.

Example: When testing the database natural language query front-end, one of the evaluators input the following three sentential test inputs when testing non-assertive comparatives with adjective gapping (Subsection 1.3.2 of Section VII):

“List an employee who is not so experienced as John Tower is.”

“List an employee who is not so old as John Tower is.”

“List an employee who is not so well paid as John Tower is.”

The system could not properly parse the input and gave very poor output, causing the evaluator to assign a score of "P". Another evaluator, however, tried the alternative recommended wording which was presented in the evaluation Tool in this item, namely, to use "not as ... as" in place of "not so ... as". When this is done, the system succeeds on the above inputs. Since the two wordings were given as alternatives, the evaluator should have tried the second option when the first failed.

- Lack of variety with respect to **Semantics**.

Example: In each of his test inputs for the database natural language query front-end, one of the evaluators made reference to or asked about the location of the residence of employees, although the system told the evaluator each time that it had no information in its database on the topic of where employees live. The evaluator could easily have found test inputs within the scope of the database. The evaluator gave the system an N (failing) score for each output.

2. Incorrect or inappropriate use of scores

Evaluators occasionally scored systems incorrectly (e.g., assigned an **F** to the system when the system's response was correct) and evaluators occasionally scored systems too liberally or too harshly (e.g., an evaluator would assign a score of **S** when the system did not fully satisfy the evaluation criteria for the test item).

Example: An example of an inappropriate score assignment was the assignment of a score of **S** that was too liberal. This occurred when the criteria was not applied stringently enough. For example, in Section III on Noun Phrases, 5.2, one of the evaluators assigned a score of **S** to the system for its response to the input:

"Terrorists kidnapped the son of the governor."

even though the criteria states:

Criteria: Demonstrated understanding of the relationship between the noun phrase being postmodified and the postmodifying of-phrase.

The template produced does not demonstrate that the system satisfied the criteria, namely, it shows no relation between the noun phrase being postmodified and the postmodifying of-phrase. Instead, the template simply repeats the phrase.

11. HUMAN TARGET: ID(S)	"son of the governor"
12. HUMAN TARGET: TOTAL NUM	1
13. HUMAN TARGET: TYPE(S)	CIVILIAN: "son of the governor"

Example: One of the evaluators assigned an **F** when the system processed the input correctly. This occurred in Section VI on Quantifiers when testing the system's processing of

ordinal number quantifiers. The evaluator used the following test input, which the system processed correctly.

"List the first woman employee in the New York branch."

The system responded with an acceptable statement of what was requested and presented information on the woman in table form, as follows:

The earliest female salesperson that works for the New York City branch and her start date.

first name		last name		year started
jennifer		ort		1988

3. Lack of understanding of scores

Evaluators occasionally assigned scores to system outputs that indicated that they did not understand the definitions of the scoring choices (i.e., S, C, P, F, N) or the conditions under which they were to be applied. (Refer back to Section 6 for the score definitions.)

Example: In Section IV, Subsection 1.1.2 on PPs as Adverbials, three evaluators each used the test input sentence (which was offered as an example by the Tool):

"In Guatemala City, the guerrillas bombed a bank."

The criteria for this Tool item is:

Criteria: Demonstrated understanding of the meaning expressed by the prepositional phrase in initial position.

The template produced by the system is shown here:

0. MESSAGE ID	DEV-MUC3-0000
1. TEMPLATE ID	1
2. DATE OF INCIDENT	- 31 OCT 89
3. TYPE OF INCIDENT	BOMBING
4. CATEGORY OF INCIDENT	TERRORIST ACT
5. PERPETRATOR: ID OF INDIV(S)	"guerrillas"
6. PERPETRATOR: ID OF ORG(S)	-

7. PERPETRATOR: CONFIDENCE	-
8. PHYSICAL TARGET: ID(S)	"bank"
9. PHYSICAL TARGET: TOTAL NUM	1
10. PHYSICAL TARGET: TYPE(S)	FINANCIAL: "bank"
11. HUMAN TARGET: ID(S)	-
12. HUMAN TARGET: TOTAL NUM	-
13. HUMAN TARGET: TYPE(S)	-
14. TARGET: FOREIGN NATION(S)	-
15. INSTRUMENT: TYPE(S)	*
16. LOCATION OF INCIDENT	GUATEMALA
17. EFFECT ON PHYSICAL TARGET(S)	-
18. EFFECT ON HUMAN TARGET(S)	-

The scores assigned by the three evaluators for this result were **F**, **P**, and **S**. It is clear that the system at least partially understood the prepositional phrase, but it has lost some of the locational information and the criteria is not completely satisfied.

Certainly an **S** is too accepting of the criteria, and certainly the **F** is too severe. Since the system's output is correct except for the loss of specificity in the locative information, a **C** score should have been assigned. Any score less than a **C** is an incorrect score.

4. Misunderstanding of evaluation criteria

Every Tool item includes a statement of an evaluation criteria designed especially for the particular linguistic phenomenon being testing in the item. On occasion, an evaluator seemed to misunderstand an evaluation criteria.

Example: In Section I, Subsection 1.1, the criteria is worded:

Criteria: Demonstrated understanding by producing an acceptable paraphrase.

During training, the evaluators were informed that the templates produced by the text processing system would be accepted as paraphrases, whenever the term "paraphrases" was used. However, one of the evaluators gave scores of **C** to all the test items in the subsection, and wrote: "System does not produce paraphrases. This test is not applicable". The system was indeed producing correct output and the output should have been scored as **S**, but the evaluator misunderstood the term "paraphrase."

5. Test input includes a failed linguistic phenomenon

This means that the evaluator entered a test input that violates the fundamental rule that each test input should consist solely of linguistic phenomena upon which the system already succeeded, except for the linguistic phenomenon being tested. Test inputs should *never*

include any phenomena on which the NLP system has already failed.

Example: When testing comparative adjective phrases in Section VII, one of the evaluators entered "list an employee who is more experienced than Carl Frank is." The system processed the comparative adjective phrase correctly and responded with correct output, but the evaluator gave the system a poor score because the system did not respond with information on just *one employee* ("an employee").

Example: When testing embedded sentences with an embedded yes-no interrogative in Section IX, Subsection 3, one of the evaluators entered an imperative using the word "state," namely

"State whether John Tower works in the New York branch."

However, the NLP system does not recognize the verb "state." The system succeeds on the input if the word "state" is changed to "tell me."

Example: One of the evaluators entered inappropriate declarative sentences to the database query system many times throughout the Tool application when declarative sentences were not the test focus and the system had already demonstrated that could only process limited types of declarative sentences.

Example: A example of this occurred when some of the evaluators used the phrase "the government house" as a target of terrorist activity when testing the MUC-3 text processing system. In spite of MUC rules to the contrary, the system being tested did not accept this phrase in object position, because of a typographical error in its own knowledge base. Evaluator #3 discovered that the misspelling "goverment house" was accepted by the system and used it. The other evaluators continued to use the correctly spelled version in subsequent test inputs, in spite of the system's having previously failed on the phrase.

6. Test input that is outside of the system's application domain

Another type of error that committed by one of the evaluators was to submit test input to the NLP system that was not within the application domain of the system. One of the rules for applying the Evaluation Tool is that all test inputs for the NLP systems be within their domains. Furthermore, if a test input is inadvertently used that violates this rule, then that test should be discarded (no score assigned) and the system should be re-tested using new input. Typically, the interface technologist should immediately be able to determine the admissibility of the input from the system's response.

Example: When testing the database query front-end system: one of the evaluators asked questions about the "degrees" of the employees, but the database has no information on the degrees of the employees and responded by stating this fact.

Example: When testing the NL database query system, one of the evaluators asked questions about or made reference to the place of residence for employees (e.g., "does John

Tower live in New York” or “employees who live in New York”), but the database has no information on where employees live and responded by stating this is the case.

7. Test input that does not test the described linguistic capability

Each Tool item is designed to test a particular linguistic capability. One type of evaluator error consisted of the evaluator composing a test input for a Tool item such that the test input did not test the particular linguistic capability identified in the Tool item.

Example: In the section on verb tenses, when testing future tense the evaluator enters an input using past tense.

Example: In Section III Noun Phrases, Subsection 5.1.2.6, when testing a *partitive genitive*, one of the evaluators used the following item which contains a *possessive genitive*, instead:

“The city’s public buses were burned by the terrorists,”

8. Grammar or spelling mistakes

Occasionally an evaluator used a test input that was ungrammatical or contained a spelling error.

Example: In Section III Noun Phrases, Subsection 4.6 (d) Premodifier Combinations, one of the evaluators used the following test input that includes a grammatical error:

“The very new working Prime was kidnapped Minister by terrorists.”

Example: In Section III Noun Phrases, Subsection 5.1.2.3 Objective Genitive, one of the evaluators used the following test input that includes a spelling error: the word “endorced” should have been spelled “endorsed.”

“ARENA endorced the terrorist’s defiance.”

9. Inability to compose test input

In this case, the evaluator is unable to compose a test input that meets the specifications for testing the linguistic capability identified in the particular Tool item and assigns a score of N.

Example: When testing comparative adverbials, one evaluator could not think of any adverbs to use for the database query front-end and assigned an N score, but other evaluators came up with and used adverbs such as “earlier,” “later,” and “more recently” that the system could process.

Example: In Section III, Subsection 4.5.11 on the "PURPOSE-IS Nominal Compound Type," the evaluators had trouble thinking up test inputs. This type of nominal compound is defined to be a noun-noun phrase in which the first noun expresses the purpose of the the entity or object expressed by the first noun. Examples include "delivery truck" and "bombing raid." One of the evaluators used these two examples given in the Tool and then stated that he "Could not think of a third example" and assigned the system a score of N to complete his three tests of the Tool item.

8.6 Flawed Evaluation Criteria or Procedure

Another factor contributing to the lack of agreement across interface technologists in the consistency study seemed to be that the procedure or evaluation criteria in some of the individual test items in the Tool are either under-defined or flawed.

Example: In Section II on Interrogatives, when testing the text processing system, the manner of testing consisted of evaluators entering a declarative statement to inform the system of some fact(s) and then entering a query to determine whether the system retained knowledge of the fact(s). When the facts in declarative form were entered, the system built a template(s) to represent the information. When queried, the system simply presented the template(s) it had just built.

More specifically, Subsection 1.1 covers the use of "what" as an interrogative pronoun. The criteria for the Tool item is stated as:

Criteria: Provided the information requested.

The issue is that the system may present the requested information, but only since it was just entered. Thus any correctness in its output is an artifact of the manner in which the test is being conducted.

Example: In Section VI on Quantifiers, Subsection 1.1.2.2 covers Failed Presuppositions and the criteria is stated as:

Criteria: Demonstrated understanding that an error occurred because the amount expressed by the postdeterminer quantifier following the definite article "the" differed from the known amount of the entity expressed by the noun phrase being quantified.

When given a sentence in which the presupposition fails, that is, a sentence where the quantity mentioned is incorrect with respect to the context (e.g., if one refers to "the three managers" then it is presupposed that there are three managers) the MUC-3 text processing system seems to understand that there is an incongruity between the quantities of the entity

being talked about and any entity already within its current knowledge. Instead of expressing that there is an error, however, the system assumes that the input refers to some new entity rather than referring incorrectly to some known entity. This is a satisfactory response as noted by one of the evaluators, yet our criteria did not account for this possibility. As we see below, when there is no incongruity a final template is created which reflects the specified number of the entities. When there is an incongruity the final template reflects the system's understanding that there is more than one group of entities and thus the number of targets is additive.

> (nlt "Terrorists bombed two banks in Anduhua. The two banks were destroyed.")
NIL

...

0. MESSAGE ID	DEV-MUC3-0000
1. TEMPLATE ID	1
2. DATE OF INCIDENT	- 31 OCT 89
3. TYPE OF INCIDENT	BOMBING
4. CATEGORY OF INCIDENT	TERRORIST ACT
5. PERPETRATOR: ID OF INDIV(S)	"Terrorists"
6. PERPETRATOR: ID OF ORG(S)	-
7. PERPETRATOR: CONFIDENCE	-
8. PHYSICAL TARGET: ID(S)	"banks"
9. PHYSICAL TARGET: TOTAL NUM	2
10. PHYSICAL TARGET: TYPE(S)	OTHER: "banks"
11. HUMAN TARGET: ID(S)	-
12. HUMAN TARGET: TOTAL NUM	-
13. HUMAN TARGET: TYPE(S)	-
14. TARGET: FOREIGN NATION(S)	-
15. INSTRUMENT: TYPE(S)	*
16. LOCATION OF INCIDENT	EL SALVADOR
17. EFFECT ON PHYSICAL TARGET(S)	DESTROYED: "banks"
18. EFFECT ON HUMAN TARGET(S)	-

> (nlt "Terrorists bombed three banks in Anduhua. The two banks were destroyed.")

0. MESSAGE ID	DEV-MUC3-0000
1. TEMPLATE ID	1
2. DATE OF INCIDENT	- 31 OCT 89
3. TYPE OF INCIDENT	BOMBING
4. CATEGORY OF INCIDENT	TERRORIST ACT
5. PERPETRATOR: ID OF INDIV(S)	"Terrorists"
6. PERPETRATOR: ID OF ORG(S)	-

7. PERPETRATOR: CONFIDENCE	-
8. PHYSICAL TARGET: ID(S)	"banks"
	"banks"
9. PHYSICAL TARGET: TOTAL NUM	5
10. PHYSICAL TARGET: TYPE(S)	OTHER: "banks"
	OTHER: "banks"
11. HUMAN TARGET: ID(S)	-
12. HUMAN TARGET: TOTAL NUM	-
13. HUMAN TARGET: TYPE(S)	-
14. TARGET: FOREIGN NATION(S)	-
15. INSTRUMENT: TYPE(S)	*
16. LOCATION OF INCIDENT	EL SALVADOR
17. EFFECT ON PHYSICAL TARGET(S)	DESTROYED: "banks"
18. EFFECT ON HUMAN TARGET(S)	-

8.7 Complicating Factors from NLP System Behavior

We observed a couple factors with respect to the behavior of the NLP systems that complicated the scoring process and contributed to the lack of agreement across Interface Technologists. These particular factors did not occur frequently, however. The following two items describe the types of system behavior and provide examples.

1. Conditional system behavior

One type of system behavior that made the evaluation process more difficult was system behavior that was variable, depending on the existing conditions, when the evaluator entered different inputs to test the system's ability to handle the same linguistic phenomenon.

For example, in Section VI on Quantifiers, for inputs testing a failed presupposition combined with a cardinal number quantifier (e.g., "the two women in the NY branch"), the database query system ignores the failed presupposition and treats the phrase as a query about *any* of the women in the branch when the number mentioned is less than the actual number in the database, but acknowledges the failed presupposition when the number mentioned exceeds the actual number. Thus, the evaluator needs to test the different possible cases in order to avoid an inaccurate score assignment for the system. The evaluation Tool could be improved to account for such system behavior.

2. Ignoring Test Input

Another type of system behavior that made the evaluation process more complicated was the phenomenon of the system ignoring the critical part of the test input. That is, a complicating factor was the fact that an NLP system would occasionally ignore a critical part of the NL

input, and process and respond to a modified input.

For example, when testing the ability of the database query front-end system to understand the word “neither,” the following test input was used. Note that there are two people with a last name of “Smith” in the employee database. When the sentence is input to the system, it ignores the critical word “neither” and responds with information about each department that *does* include a Smith.

“List the department that includes neither Smith.”

8.8 Subjective Assessment of the NLP Evaluation Tool

Following the application of the Evaluation Tool each Technologist was asked to complete a questionnaire designed to assess how well the Technologist felt the Tool worked. Informal interviews were held following completion of the questionnaires to clarify and expand on the responses, as needed. This section contains a high-level summary of information obtained from the questionnaires. A more detail presentation of the information from the questionnaires and informal interviews is included in Appendix B. In some areas there was significant agreement across subjects while in other areas opinions differed.

The results of the questionnaire and subsequent interviews brought out many issues and provided insights into the strengths and weaknesses of the evaluation tool. Some of the more relevant points are shown below:

- Technologists all felt that the scoring criteria need to be made more explicit. They called for criteria that could applied without special training or ill-defined judgements. For example, there was some objection to the term “demonstrated understanding.” The technologists also wanted more explicit instructions about the standard of comparison. They asked whether understanding was to be demonstrated to a level that would be expected of a human, or whether standards could be relaxed to overlook small shortcomings since a machine was being evaluated.
- The examples illustrating each test item were found to be valuable for understanding what was being evaluated. In addition, the examples were used by the technologists to form NLP inputs directly. It was possible to use the examples in this way because they were directly relevant to the NLPs that were evaluated. This will not always be the case and there is a danger of inconsistent results across NLPs due to varying degrees of relevance of the examples. One technologist felt that the direct relevance and use of examples limited the range of inputs that were tested and that examples should be more generic.
- The technologists felt that the tool did not provide equally valid results for both NLP systems that were evaluated. Some felt that the evaluation of the database NL query system provided more valid results than the evaluation of the MUC-3 text processing system. Part of the problem is that technologists believed the text processing system was not understanding NL inputs even though outputs were essentially correct. Part of the problem was that the text processing system provided outputs in the form of a template. It was not always possible to adequately assess “understanding” from the template.
- All technologists felt that the training they received was necessary for the proper use of the evaluation Tool. This seemed to apply primarily to the application of the criteria and score assignment aspects of the evaluation process rather that the mechanics and rules for using the Tool. Some expressed the feeling that more explicit criteria could reduce the need for training.

- A few technologists stated that they needed to go back and review test items that were evaluated early in the Tool because of new insights gained while evaluating later items. This problem (if it is a problem) may be overcome or reduced with more extensive training. Some technologists expressed their feeling that the tool should be applied in two passes to take advantage of this learning effect and thereby increase consistency of scoring.
- Some of the technologists suggested that the scores be refined to allow more fine-grained identification of NLP shortcomings (e.g., wouldn't parse input vs. produced garble as output).
- The greatest strength according to most of the technologists is that it is very comprehensive. This strength should be understood in the context of what was generally felt to be the Tool's greatest weakness, that it is very tedious and time-consuming to apply. One technologist described it as a "brain-dead work." Two of the technologists suggested limiting evaluation sessions to two to four hours and expressed concern that boredom would affect scoring.
- One technologist stated that the exhaustiveness of the tool is useful in evaluating NLP systems because it forces evaluators to experience all NL structures. This technologist notes that after applying the tool you have a pretty good sense of the usefulness of the NLP for the considered application irrespective of the actual scores produced. The experience itself is valuable.
- One technologist expressed the idea that the tool is valuable not only for evaluating existing NLPs, but is also potentially useful as a tool for guiding the development of NLPs.

9. Conclusions and Recommendations

9.1 Conclusions

The NLP Evaluation Tool fulfills the program objectives:

- Produces profiles of NLP system capabilities:
 - Descriptive, Quantitative, Hierarchical
- Applicable across application domains
- Applicable to different types of NLP systems
- Does not require the evaluator to be a trained linguist
- Repeatable, with consistent results across evaluators (consistency partially fulfilled)
- Unbiased with respect to linguistic theory
- Based on current and future needs and capabilities
- Based on human-human NL communication as a model

The NLP Evaluation Tool provides:

- A test-construction facility
- A test application facility
- A profiling facility
- Analysis capability

The Interface Technologists who participated in the final assessment exercise seemed to feel that the greatest strength of the Tool is that it is very comprehensive. When you get through, there is a sense that the NLP system has been exhaustively tested in a very structured manner. Additional positive comments by the technologists included:

- The exhaustiveness of the tool is useful in evaluating NLP systems because it forces evaluators to experience all NL structures.
- After applying the tool you have a pretty good sense of the usefulness of the NLP for the considered application even without the actual scores produced.
- The Tool is potentially useful as a tool for guiding the development of NLPs.

The Tool is not without its drawbacks, however. Primarily, the shortcomings are that (1) the Tool is very tiring and time-consuming to apply and that (2) the Interface Technologists applying the Tool as part of the reliability study at the end of the program did not produce consistent system profiles in all sections of the Tool. These issues were discussed at length in Section 8.

As a result of the shortcomings of the Tool, we have identified a set of tasks that we recommend to improve the Tool in the areas listed below. These recommendations are discussed in more detail in the following subsection.

- Improvement of the Tool application process
- Improvement, refinement, and completion of the Tool
- Development of a computer-based version of the Tool
- Improvement and standardization of evaluator training
- Development of a Qualifying Test
- Performance of a follow-on assessment exercise

9.2 Recommendations

Recommendation # 1. Tool Application Process

Training and Testing:

The evaluators (interface technologists) should definitely undergo training on the Tool and the NLP systems and their application domains. This was done in each of our assessment exercises and was viewed as essential by the participating interface technologists. We feel that the training should be made more standardized and should be supplemented by a standardized qualifying test. Standardized training and testing will ensure consistent results/profiles from the Tool. This topic is discussed in more detail as part of Recommendation #2.

Score Choices:

Retain the scoring choices and their definitions: S, C, P, F, N. The feedback from the interface technologists that participated in the final assessment exercise indicates that the score choices are adequate.

Number of tests per Tool item:

It should be made a rule for applying the NLP Evaluation Tool that each evaluator enters as many test inputs as necessary, for each evaluation item, to feel confident that the score being assigned by the evaluator is truly representative of the capability of the NLP system on the particular linguistic phenomenon being tested. We further recommend that the evaluator enter just one score for each evaluation item and that the evaluator may split the score among the possible score choices (e.g., 75% S, 25% C), if the evaluator feels that this is representative of the system's behavior on the given linguistic phenomenon.

During the last exercise to assess the Evaluation Tool, the evaluators entered three test inputs for each Tool evaluation item and entered a score for the system's processing of each test input, but there was no effort on the part of the evaluators to be sure that the scores entered were truly representative of the system's behavior. For example, sometimes an evaluator would "count" a test input that used a word or object that is not within the domain of the system (e.g., asking the database query system about the residences of employees). This type of input should not be counted against the system, but should be disregarded and ignored.

Splitting Scores:

Since we recommend that the evaluator be given the responsibility for determining a representative score for each Tool item, we feel that the evaluator should be allowed to split his/her score among the possible score choices (e.g., 75% S, 25% C). From our experience, it seems that it is not always possible for the evaluator to determine a score that is representative across all the variations in test inputs allowable according to the specification of a Tool item (see Section 8.6) and therefore a split would be appropriate in such cases.

Recommendation # 2. Improvement/Refinement of the Tool

The contents of the Tool should be improved and revised using:

- information gathered from the Phase 3 Tool assessment exercise such as:
 - agreement/disagreement data and analysis results,
 - comments made by the interface technologists on individual items during their application of the Tool,
 - feedback from the interface technologists in response to the Assessment Questionnaire
- input from two experienced computational linguists after their review of the Tool.

Selected recommended modifications include:

- Make some of the evaluation criteria more specific, where necessary,

- Provide more detailed instructions on how to test certain of the more difficult items,
- Provide more definitive explanations of what is acceptable output for some of the more difficult items,
- Provide example output for some items, especially in some of the early sections and for the more difficult items throughout the Tool,
- Provide scoring guidance for items, where needed.

Recommendation # 3. Computer-based Tool

Develop a computer-based version of the NLP Evaluation Tool tool that provides the evaluator with automated support in areas such as:

- Access to the NLP system's lexicon by lexical category
- Access to examples of different types of words/phrases/clauses, indexed by category
- Editing, retrieving, assembling, and storing test text/sentences
- Spelling checker
- Grammar checker
- Indexed storage and retrieval of the types of linguistic phenomena on which the NLP system has succeeded and failed
- Storage and retrieval of actual test inputs indexed by system performance and by linguistic category
- Automatic submission of test input to the NLP system
- Recording the session with the NLP system
- Automatic aggregation of scores for each linguistic phenomenon class
- Automatic generation of NLP system profiles at different levels of granularity of the linguistic classification scheme
- Automatic generation of NLP system profiles showing different emphasis or perspective within the classification scheme

Recommendation # 4. Training/Tutorial

A short formal self-instructional tutorial (mini-course) should be designed to train interface technologists in the use of the NLP Evaluation Tool. The tutorial should culminate in a qualifying test that the interface technologist should pass before actually applying the Tool to any NLP system. This tutorial should be designed to cover all the important features and issues associated with using the Tool and all problem areas that have been identified. At a high level, coverage should include:

- The purpose of the NLP Evaluation Tool
- Organization and use of the Evaluation Tool
- The procedure for applying the Tool
- How to use the computer-based facilities
- The NLP systems

At a more detailed level, the Tutorial should cover the important issues associated with using the Tool:

- The Tool application principle of using only linguistic phenomena on which the NLP system has succeeded, except for the particular phenomenon being tested
- Constructing NL inputs that test the particular linguistic phenomenon
- Using variety in test inputs
- Application of evaluation criteria
- Judging acceptable output
- Scoring a system's output

Important design features for the Tutorial are:

- The tutorial should be computer-based, if possible
- Include illustrative examples with explanatory material
- Include exercises that require the interface technologist to work through selected pre-scored items from the Evaluation Tool
- Include exercises to test understanding and provide immediate feedback (e.g., multiple choice questions)

- Include questions that require the interface technologist to find the errors in negative examples of Tool application
- Include “hands-on” application of selected Tool sections to at least one NLP system

Recommendation # 5. Qualifying Test

Develop a qualifying test that is designed to follow after the tutorial. A standard qualifying test would help ensure consistency of the Tool results (i.e., NLP system profiles) across evaluators.

Desireable features for the Test include:

- Coverage should include all the important Tool application features and issues covered in the tutorial
- The test should be computer-based, if possible
- Use question types that provide immediate feedback (e.g., multiple choice)

Recommendation # 6. Follow-On Assessment Exercise

We recommend that another assessment exercise be conducted after accomplishment of one or more of the above listed recommended actions. The objective of the exercise would be to determine the reliability of the Tool after having developed a tutorial and improved training, revised the evaluation Tool, developed computer-based facilities to assist the evaluator in applying the Tool, and improved the procedure for applying the Tool.

We recommend that the exercise be conducted in a manner that is similar to the last Phase 3 exercise, but with some changes. The following summarizes the key features of the recommended exercise:

- NLP systems: At least two (2) mature systems
- Interface Technologists:
 - At least four (4) people
 - Separate and distinct from Tool development and review people
 - Competent users of English, but not trained linguists
- Perform thorough training of the interface technologists
 - Tutorial
 - Qualifying test

– Training on NLP application domain

- Use a Latin Square design to avoid bias due to order
- For each NLP system, have one of the developers review the evaluation results
- Perform consistency analysis

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APPENDIX A

NLP Evaluation Tool and Application Procedure for Evaluating Natural Language Processing Systems

NLP Evaluation Tool and Application Procedure

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Introduction

1. Objective

The NLP Evaluation Tool is designed to test NLP systems to determine which linguistic capabilities they possess and which they do not possess. This Tool is designed to produce a profile of an NLP system identifying the lexical, syntactic, semantic, and discourse phenomena that the system can handle and those that it cannot. Although this Tool provides detailed coverage of a wide variety of linguistic phenomena, we make no claim of completeness. A few subsections are marked "t.b.d." to indicate areas that we have identified to be developed.

2. Design Principle

The Tool is designed to progress from elementary sentence types containing simple constituents to more complex sentence types. The principle is that each time test sentences are presented to the NLP system being evaluated, the sentences should contain only one new (untested) linguistic phenomenon or one new untested combination of tested phenomena. The other capabilities that are required for processing the input should already have been tested and the NLP system should already have succeeded on these other phenomena. If the NLP system clearly fails on a certain type of linguistic phenomenon or feature, then the evaluator should not include that phenomenon or feature again in subsequent test sentences.

In this way, each Tool test item tests just one untested NLP capability at a time, to the extent possible, and combinations are tested after the individual capabilities are tested. The intent is to make the Tool sensitive to each individual linguistic capability.

3. Evaluation Tool Features

The Evaluation Tool is designed to be *domain independent*. It therefore does not include nor rely on a predefined set of natural language texts or sentences. Instead, the test sentences or paragraphs to be processed by the NLP system are composed or provided by the evaluator either during, or prior to, the administration of the Tool. The Tool is designed to assist the evaluator with the creation, modification, or tailoring of test sentences.

Since the Tool is designed for use by people who are not well versed in linguistics, the Tool includes explanatory material that is intended to provide sufficient instruction to enable the evaluator to compose proper test sentences. A glossary is provided to aid the evaluator.

4. Structure

Each Procedure item consists of the following components:

- A brief explanation and definition of the linguistic capability being tested, along with any special instructions for testing. This is particularly important for evaluators that do not have any linguistic background.

- Patterns that define the structure and features of the test sentences to be composed and submitted to the NLP system under evaluation. The specific words of the test sentences are supplied by the evaluator, appropriate for the particular application for which the NLP system has been installed and with which it executes.
- Example sentences to aid the evaluator in composing test sentences.
- Criteria against which to evaluate the NLP system's behavior.
- A place for the evaluator's test sentences.
- A place for the evaluator's score.

5. Scoring

For each test item in the Tool, the evaluator submits natural language test inputs to the NLP system being evaluated and determines whether or not the responses indicate that the system understood and processed the inputs correctly. The evaluator has five choices of scores to award to the system for each test item as listed below.

- Success (**S**): The system successfully met the evaluation criteria stated for the particular test item.
- Correct (**C**): The system did not successfully meet the evaluation criteria, but produced acceptable/correct output.
- Partially Correct (**P**): The system did not successfully meet the evaluation criteria, and only produced partially acceptable/correct output.
- Failure (**F**): The system did not successfully meet the evaluation criteria and produced no correct output.
- No Output (**N**): The system produced no output.

Guide to Notation

Abbreviation	Meaning	Page
[Adj]	Adjective	I-5,VII-1
[Adj.Nom]	Adjective Nominal	III-2
[Adjective]	Adjective	I-5,III-8
[Adjective + <small>COMPARE</small>]	Comparative Adjective	VII-1
[Adjective + <small>SUPER</small>]	Superlative Adjective	VII-18
[Adverb]	Adverb	IV-1
[Adverb + <small>COMPARE</small>]	Comparative Adverb	VII-20
[Adverbial]	Adverbial	IV-4
[AdvP]	Adverb Phrase	IV-1
[Anaphoric NP]	Anaphoric Noun Phrase	X-8,X-1
[Antecedent NP]	Antecedent Noun Phrase	X-3
[Antecedent S]	Antecedent Sentence	X-7
[Antecedent VP]	Antecedent Verb Phrase	X-6
[Aux]	Auxiliary Verb	I-4
[Aux-Verb]	Auxiliary Verb	X-11
[BE-Verb]	Form of the verb "to be"	I-10
[Central]	Central	III-7
[Central Premodifier]	Central Premodifier	III-7
[Complement]	Complement	I-3
[Conj + <small>SUBORD</small>]	Subordinating Conjunction	X-3
[Copular]	Copular Verb	I-3
[Count Noun]	Count Noun	I-1,I-7
[Def Article]	Definite Article	I-7
[Det]	Determiner	I-8,III-7
[Determinative]	Determinative element	III-1,III-4,III-7
[Determiner]	Determiner	I-1,I-8
[DO-Verb]	Form of the verb "do"	I-4
[Have-Verb]	Form of the verb "have"	V-17
[Head]	Head of a phrase	III-1
[Indef Article]	Indefinite Article	I-6
[Indef Quant Pronoun]	Indefinite Quantifier Pronoun	VI-21
[Mass Noun]	Mass Noun	I-9
[Noun]	Noun	I-1
[NP]	Noun Phrase	I-1
[NP + <small>CONJUNCTION</small>]	Noun Phrase with conjunction	VIII-4
[NP - <small>DET</small>]	Noun Phrase minus determinative	III-4,VI-1

Guide to Notation (Continued)

Abbreviation	Meaning	Page
[NP + _{DET} QUANT]	Noun Phrase with determiner quantifier	VI-2
[NP + _{GENITIVE}]	Noun Phrase in genitive case	III-20,III-24
[NP + _{PRO}]	Pronoun	X-2
[Object]	Object	I-12,VII-31,XI-9
[Participle]	Participle	III-3,V-8
[Participle (-ed)]	Passive Participle	I-2,III-3
[Participle (-ing)]	Progressive Participle	I-2,III-4
[Postcedent NP]	Postcedent Noun Phrase	X-14
[PP]	Prepositional Phrase	I-8,III-1
[Prep]	Preposition	III-1,X-9
[Precentral]	Precentral	III-7
[Postmodification]	Postmodification of a Noun Phrase	III-1
[Preposition]	Preposition	II-5,III-1
[Proper Noun]	Proper Noun	I-9
[Premodification]	Premodification of a Noun Phrase	III-1
[Rel Pronoun]	Relative Pronoun	III-32
[Relative Clause]	Relative Clause	III-32
[SubjCompl]	Subject Complement	I-3,I-10
[Verb]	Verb	I-10,V-1
[Verb (-ed)]	-ed participle	I-2,V-8
[Verb (-ing)]	-ing participle	I-2,V-12
[Verb + _{ACTIVE}]	active verb	I-15
[Verb + _{DITRANS}]	Ditransitive Verb	I-14
[Verb + _{INF}]	Infinitive Verb	III-45
[Verb + _{INTRANS}]	Intransitive Verb	I-12
[Verb + _{PASSIVE}]	-ed participle of verb	I-15,V-8
[Verb + _{PRES}]	Present tense of Verb	V-6
[Verb + _{PAST}]	Past tense of Verb	V-7
[Verb + _{FUTURE}]	Future tense of Verb	V-8
[Verb + _{PROG}]	Progressive Verb	III-38
[Verb + _{TRANS}]	Transitive Verb	I-12
[Verb Group]	Verb Group	
[Verb Head]	Verb Head	XI-7
[VG]	Verb Group	
[VP]	Verb Phrase	I-3,V-1
[Wh-Word]	Word beginning with Wh	I-4

THE EVALUATION PROCEDURE

I. BASIC SENTENCES

Noun phrases and *verb phrases* are the basic components of English sentences. We will describe these components before testing the three basic sentence types: *declarative*, *imperative*, and *interrogative*. First we will discuss determiners and nouns, which are the basic parts of noun phrases.

Simple Determiners

The only determiners we will use in this section are the *articles*. These are:

- Definite article: *the*
- Indefinite article: *a, an*

Nouns

- Count Nouns: Nouns which denote individual countable entities, such as
 - Singular: *Chairman, employee, department, salary, mayor, civilian, terrorist, mouse, etc.*
 - Plural: *Chairmen, employees, departments, salaries, mayors, civilians, terrorists, mice, etc.*
- Proper Nouns: Nouns which name specific persons, places, and things such as *John Smith, Peru, Santa Elena, Andahua, San Salvador, etc.*
- Mass Nouns: Noun which denote an undifferentiated mass or continuum such as *experience, money, information, work, water, bread, grass, warmth, music, sand, overhead, etc.*

Simple Noun Phrases

The noun phrase, denoted [NP], is an important component of English sentences. Simple noun phrases frequently consist of a noun alone, or a determiner followed by a noun.

In the following pattern-example diagram, we include two patterns. The second pattern (below the first) is an elaboration of the first. Parentheses are used to enclose optional elements of the structure or pattern.

Pattern:	[NP]	
	((Determiner))	[Noun]
Examples:	an	employee salespersons John Smith
	the	president information
	the	data

Verbs

The purpose of this section is to introduce some of the basic categories and attributes of verbs. The information introduced here is extended in subsequent sections later in the Procedure. This section and the subsequent section on simple verb phrases should provide sufficient information about verbs and verb phrases to enable you to compose simple sentences.

There are three major categories of verbs:

- The Full Verbs (or lexical verbs) such as *call, leave, walk, explode*, etc. Note: This category is called an *open class* since new verbs can continually be added to this class and therefore the number of words in the class is unlimited.
- The Primary Verbs : *be, have, do*. Note: This category is called a *closed class* since new words are rarely added to this class.
- The Modal Auxiliary Verbs : *will, might, could*, etc. Note: This is a *closed class* also.

The full verbs can only act as main verbs in a verb phrase, the modal auxiliary verbs can act only as auxiliary verbs, and the primary verbs can act as either main or auxiliary verbs.

Regular full verbs have four morphological forms while irregular full verbs vary in this respect. Some of these morphological forms will be used in the explanation of simple verb phrases. They will be used more extensively in a later section on more complex verb phrases.

Verb Forms				
Form	Regular Verbs	Irregular Verbs		
Base Form	walk	leave	build	speak
-s Form	walks	leaves	builds	speaks
-ing Form	walking	leaving	building	speaking
Past Form	walked	left	built	spoke
-ed Participle	walked	left	built	spoken

Simple Verb Phrases

The purpose of this section is to provide sufficient discussion of simple verb phrases to enable you to compose simple sentences. The discussion in this section is very basic and is extended in later sections of this Procedure.

A simple verb phrase consists of the present tense form of a *full verb* (*call, leave, walk*), perhaps followed by a noun phrase.

Below are some simple verb phrases. As seen above, in the noun phrase examples, certain pattern-example diagrams have two patterns. The second pattern (below the first) is an elaboration of the first.

Pattern: [VP]
[Verb]

Examples: walks
leave

Pattern: [VP]
[Verb] [NP]

Examples: hire employees
kidnap the mayor

Examples of sentences with simple verb phrases:

Pattern: [NP] [VP]
Examples: The manager hires employees.
John Smith works.
Terrorists kidnapped the mayor.

A simple *copular* verb phrase consists of the present tense form of the BE-verb (*am, is, are*) followed by a *subject complement*, that is, an adjective or a noun phrase which provides additional description or specification of the subject of the sentence. A simple type of copular verb phrase consists of:

Pattern: [BE-Verb] [Subject complement]
[BE-Verb] [NP] or [Adjective]

Examples: is intelligent
is male
are managers

Examples involving the use of the copular:

Declarative Sentences.

Pattern: [NP] [VP]
[NP] [BE-Verb] [Subject Complement].

Examples: The manager is a woman.
John Smith is an employee.
President Cerezo is unpopular.

Yes/No-Questions.

Pattern:	[BE-Verb]	[NP]	[Subject Complement]?
Examples:	Is	John Smith	an employee?
	Is	John Smith	male?

The verb *DO* can be used both as an auxiliary and as a main verb. The main uses of *DO* as an auxiliary are:

- in indicative clauses negated by *not* as in "*she did not complete the M.A. program*"
- in questions and other constructions that involve subject-verb inversion, where the verb is in the simple present or past tense, as in "*Did John finish the report?*"
- in emphatic constructions where the verb is simple present or simple past tense, as in "*the chairman does want you to attend the meeting.*"
- in reduced clauses where *DO* acts as a dummy operator preceding ellipsis of a predication, as in "*John received a bonus and so did Mary.*"

In this section on simple verb phrases, we will cover the use of *DO* in interrogatives and emphatic constructions. The other cases will be covered and used in later sections of the Procedure.

The structure of a verb phrase which includes the auxiliary verb *DO* is generally as follows:

Pattern:		[VP]	
	[DO-Verb]	[Verb]	[(NP)]
Examples:	did	work	
	does	earn	\$30,000
	did	join	Xidec

Examples involving the use of *DO*:

Wh-Questions.

Pattern:	[Wh-Word]	[(NP)]	[DO-Verb]	[NP]	[VP] ?
Examples:	What		does	John	earn?
	When		did	John	join Calspan?
	What	department	did	John Smith	join?

Yes/No-Questions.

Pattern:	[DO-Verb]	[NP]	[VP] ?
Examples:	Does	John	have a degree ?
	Does	John	earn \$30,000 ?

Declarative Sentences.

Pattern:	[NP]	[DO-Verb]	[VP]
Examples:	The terrorists	did	kidnap the mayor.
	The ELN	did	bomb the bank.

1. Basic Sentence Types

1.1 Declarative Sentences

A declarative sentence is primarily used to convey information, that is, to state propositions and make assertions. Typically a declarative sentence consists of a noun phrase (subject) followed by a verb phrase, which may be a full verb or a full verb followed by a [NP], or may be a copular verb phrase (a [BE-Verb] followed by a [NP] or [Adjective]).

Pattern: [NP] [VP]
[NP] [Verb] [NP].
Examples: John Smith earns \$30,000.
Terrorists kidnapped the mayor.
Guerrillas attacked the farm.

Pattern: [NP] [VP]
[NP] [BE-Verb] [Adjective].
Examples: John Smith is married.
Jane Doe is female.
The assassin was clever.

Pattern: [NP] [VP]
[NP] [BE-Verb] [NP].
Examples: Jane Doe is a manager.
John Smith is a man.
Arturo Rubio was the assassin.

Criteria: Demonstrated understanding by producing an acceptable paraphrase.

Score: _____

1.2 Imperative Sentences

An imperative sentence expresses a command or directive and commonly consists solely of a verb phrase, that is, there is no overt grammatical subject. The verb phrase typically has a verb in base form followed by a [NP].

Pattern: [Verb] [NP].
Examples: List the departments.
Show the salespersons.
Display the NYS map.

Criteria: Demonstrated understanding by performing the commanded action.

Score: _____

1.3 Interrogative Sentences

An interrogative sentence is primarily used to ask questions. For more information on interrogatives, see Section II, *Interrogative Sentences*.

Pattern:	[WH-Word]	([NP])	[BE-Verb]	[NP]?
Examples:	What		are	the products?
	Which	employees	are	women?
	Who		are	the salespersons?

Pattern:	[WH-Word]	([NP])	[DO-Verb]	[NP]	[Verb]?
Examples:	What		does	John Smith	earn?
	What	salary	does	John Smith	earn?
	Where		does	John Smith	work?
	What		did	the guerrillas	attack?

Pattern:	[BE-Verb]	[NP]	[Adjective]?
Example:	Is	Mary Smith	experienced ?

Pattern:	[BE-Verb]	[NP]	[NP]?
Example:	Is	John Smith	a salesperson ?

Pattern:	[DO-Verb]	[NP]	[Verb]	[NP]?
Example:	Does	John Smith	have	a degree ?

Criteria: Demonstrated understanding by responding with at least the requested information.

Score: _____

2. Simple Determiners

A *determinative* element of a noun phrase determines what kind of reference a noun phrase has: definite (*“the”*), indefinite (*“a”*, *“an”*), partitive (*“some”*), or universal (*“all”*). Each type of reference has meaning. For example, the meaning of a noun phrase with a definite determiner (*“the”*) frequently is that the entity expressed by the noun phrase is known to both speaker and hearer.

The purpose of this section is to test for acceptance of simple determiners. The simple determiners are the *articles*, which include the *definite article* *“the”*, and the *indefinite articles* *“a”* and *“an”*.

More advanced determinative issues are covered in Section III, subsection 3, *Determinatives*. Reference issues concerning determinatives are covered in Section X, *Reference*. Quantifier determinatives are tested in Section VI, *Quantifiers*.

2.1 The Indefinite Article

The primary use of the indefinite article *“a”* or *“an”* is to indicate that the head of the noun

phrase in which it is the determiner denotes an individual member of a class, but which member is not specified.

The noun head following the indefinite articles must be singular, though the indefinite article places emphasis on the type of entity expressed by the noun phrase and not the number (singular) of the entity being expressed. Compare the following two sentences:

Can a boy carry that plank? — No, but a man can.
Can one boy carry that plank? — No, but two boys can.

The generic sense of the indefinite article will be covered in Section X, *Reference*.

You may use any of the successful basic sentence patterns from subsection 1 to test a noun phrase which has a count noun. Replace the “[NP]” in the chosen sentence with “[Indef Article] [Noun].” Below are some suggested sentence patterns.

Pattern:	[Verb]	[Indef Article]	[Noun].
Example:	List	a	department.

Pattern:	[BE-Verb]	[NP]	[Indef Article]	[Noun].
Example:	Is	John Smith	a	salesperson?

Pattern:	[WH-Word]	[BE-Verb]	[Indef Article]	[Noun].
Example:	Who	is	an	employee?

Pattern:	[NP]	[Verb]	[Indef Article]	[Noun].
Examples:	Terrorists	kidnapped	a	civilian.
	Guerrillas	attacked	a	farm.

Criteria: Accepted the indefinite article and produced a correct response.

Score: _____

2.2 The Definite Article

The primary use of the definite article, “*the*”, is that it signals that the object or entity expressed by the noun head should be familiar to the speaker and hearer. For example, in the phrase “the manager of the company” it is supposedly understood which manager is being referred to, either because there is only one manager, or because the manager has already been mentioned in the current discourse.

The definite article may also be used with a singular nominal in a *generic* sense to make an assertion about a whole class, equally applicable to each member of the class.

Section X, *Reference* covers the different types of usage of definite articles in noun phrases.

The noun head which follows the definite article may be a mass noun or a singular or plural count noun.

You may use any of the successful basic sentence patterns from subsection 1 to test a noun

phrase which has a count noun. Replace the "[NP]" in the chosen sentence with "[Def Article] [Noun]." Below are some suggested sentence patterns.

Pattern:	[Verb]	[Def Article]	[Noun].
Example:	List	the	departments.
Pattern:	[WH-Word]	[BE-Verb]	[Def Article] [Noun].
Example:	Who	are	the employees?
Pattern:	[NP]	[Verb]	[Def Article] [Noun].
Examples:	Terrorists	killed	the Mayor.
	Guerrillas	attacked	the farm.

Criteria: Accepted the definite determiner and produced a correct response.

Score: _____

3. Simple Noun Phrases

3.1 Count Nouns

Count nouns denote individual countable entities, such as "*chairman*", "*employee*", "*departments*", "*children*", etc. A simple noun phrase can consist of a determiner followed by a count noun, as in "*an employee*", "*the governor*", or a count noun with no determiner, as in "*employees*", "*terrorists*". This is represented as:

Pattern:	([Determiner])	[Count Noun]
Examples:	an	employee
		salespersons
		terrorists
	the	mayor

You may use any of the successful basic sentence patterns from subsection 1 to test a noun phrase which has a count noun. Replace the "[NP]" in the chosen sentence with "([Determiner]) [Count Noun]." Below are some suggested sentence patterns.

Pattern:	[Verb]	([Determiner])	[Count Noun]
Example:	List	the	departments.
Pattern:	[BE-Verb]	[NP]	([Determiner]) [Count Noun]
Example:	Is	John Smith	a salesperson ?
Pattern:	[WH-Word]	[BE-Verb]	([Determiner]) [Count Noun]
Examples:	Who	are	employees?
	Who	are	the salespersons?

Pattern:	[NP]	[Verb]	([Determiner])	[Count Noun]
Examples:	Terrorists	kidnapped	the	mayor.
	Terrorists	kidnapped		civilians.
	Guerrillas	killed	the	security guard.

Criteria: Demonstrated understanding by responding with output which included information pertaining to the object or objects specified by the count noun.

Score: _____

3.2 Proper Nouns

Proper nouns name specific persons, places, and things such as *“John Smith”*, *“Peru”*, *“Santa Elena”*, etc. A noun phrase can consist of a proper noun with no determiner. This is represented as:

Pattern:	[Proper Noun]
Examples:	John Smith
	San Salvador

You may use any of the successful basic sentence patterns from subsection 1 to test a noun phrase consisting of a proper noun. Replace the “[NP]” in the chosen sentence with “[Proper Noun]”. Below are some suggested sentence patterns.

Pattern:	[BE-Verb]	[Proper Noun]	[NP]
Example:	Is	John Smith	a salesperson ?

Pattern:	[Proper Noun]	[BE-Verb]	[NP]
Example:	Mary Jones	is	a salesperson.

Pattern:	[NP]	[Verb]	[Proper Noun]
Examples:	Terrorists	kidnapped	Arturo Rubio.
	Guerrillas	attacked	President Cerezo.

Criteria: Demonstrated understanding by responding with output which included information pertaining to the object specified by the proper noun.

Score: _____

3.3 Mass Nouns

Mass nouns denote an undifferentiated mass or continuum such as *“experience”*, *“money”*, *“information”*, *“work”*, etc. A simple noun phrase can consist of a mass noun or the definite article *“the”* followed by a mass noun. This is represented as:

Pattern:	([Determiner])	[Mass Noun]
Examples:		data
	the	information

You may use any of the successful basic sentence patterns from subsection 1 to test a noun

phrase consisting of a mass noun with an optional determiner. Replace the “[NP]” in the chosen sentence with “([Determiner]) [Mass Noun]”. Below are some suggested sentence patterns. (Note that although we have not yet tested prepositional phrases ([PP]) as part of a noun phrase, they may be helpful in forming coherent sentences. See Section III subsection 1, for more information on prepositional phrases as postmodifiers of a noun phrase.)

Pattern: [Verb] ([Determiner]) [Mass Noun] ([PP])
 Example: Show information on Mary Smith.

Pattern: [WH-Word] [BE-Verb] ([Determiner]) [Mass Noun] ([PP])
 Example: What is the information about salespersons?

Pattern: [NP] [Verb] ([Determiner]) [Mass Noun] ([PP])
 Examples: Terrorists destroyed information.
 Terrorists destroyed the information about the uprising.
 The guerrillas stole food.

Criteria: Demonstrated understanding by responding with output which included information pertaining to the entity specified by the mass noun.

Score: _____

4. Simple Verb Phrases

4.1 Copular Verb Phrases

A simple *copular* verb phrase consists of a form of the BE-Verb (*am, is, are*) followed by a *subject complement*, that is, an adjective or a noun phrase which describes the subject of the sentence. Thus a simple type of copular verb phrase consists of:

Pattern: [Verb] [Subject Complement]
 [Verb] [NP] or [Adjective]
 Examples: is intelligent
 is male
 are managers

The following example sentences contain copular verb phrases. According to the MUC rules, templates are only generated for reports of terrorist activities. For a MUC example we may use a preliminary sentence to express a terrorist activity in order to generate a MUC template. The preliminary sentence may follow a different pattern than that which we are testing.

Pattern: [NP] [BE-Verb] [Subject Complement].
 Examples: Jane Doe is a manager.
 Jane Doe is educated.

Example: (Preliminary Sentence: The Mayor of Andahua was killed.)
 The assassin was Arturo Rubio.

Example: (Preliminary Sentence: The guerrillas killed a man.)
 The murder victim is a civilian.

Pattern: [WH-Word] ([NP]) [BE-Verb] [Subject Complement] ?
 Examples: Who are the salespersons?
 Which employees are female?

Note that in certain Yes/No Questions the regular sentence order is altered so that the BE-Verb precedes the subject of the sentence (the first noun phrase). The following example yes/no questions contain copular verb phrases.

Pattern: [BE-Verb] [NP] [Subject Complement]
 Examples: Is John Smith an employee?
 Is John Smith old?

Criteria: Demonstrated understanding that the subject complement defines or elaborates the primary noun phrase.

Score: _____

4.2 Verb Phrases Involving the Auxiliary Verb *DO*

Common uses of *DO* as an auxiliary are:

- in questions and other constructions that involve subject-verb inversion, where the verb is in the simple present or past tense, as in "*Did John finish the report?*"
- in emphatic constructions where the verb is simple present or simple past tense, as in "*the chairman does want you to attend the meeting.*"

The structure of a verb phrase which includes the auxiliary verb *DO* is generally as follows:

Pattern: [VP]
 [DO-Verb] [Verb] ([NP])
 Examples: did work
 does earn \$30,000
 did join Calspan

4.2.1 *DO* Used in Interrogatives

Certain utterances are marked as questions because the standard sentence order ([NP] [Aux] [Verb] ([NP])) is altered. In some of these questions, the auxiliary *DO* verb, marked with number and tense, precedes the subject of the sentence:

Pattern:	[DO-Verb]	[NP]	[VP] ?
Examples:	Does	John	have a degree?
	Does	John	earn \$30,000?
	Did	the guerrillas	attack the farm?

In other questions, a WH-word, or WH-word followed by a noun phrase occurs first, followed by the auxiliary DO verb. The subject and verb phrase follow:

Pattern:	[Wh-Word]	([NP])	[DO-Verb]	[NP]	[VP] ?
Examples:	What		does	John	earn?
	When		did	John	join Calspan?
	What	department	did	John Smith	join?
	Who		did	the guerrillas	kill?

Criteria: Accepted the DO verb and produced a correct response.

Score: _____

4.2.2 The Emphatic DO

The auxiliary verb DO precedes the main verb in the verb phrase, in emphatic DO sentence constructions.

Pattern:	[NP]	[DO-Verb]	[Verb]	[NP] .
Examples:	The terrorists	did	kidnap	the Andahua mayor.
	The terrorists	did	bomb	the Santa Elena bank.
	The guerrillas	did	attack	the farm.

Pattern:	[DO-Verb]	[Verb]	[NP]
Example:	Do	show	the employees.

Criteria: Accepted the DO verb and produced a correct response.

Score: _____

4.3 Transitivity

A *transitive verb* is followed by an object (commonly called the direct object), as in "*the manager hired John.*" An *intransitive verb* is not followed by an object, for example the verbs in the sentences "*Bill studies*", "*the chairman resigned.*" A *ditransitive verb* is followed by two objects (commonly called "the indirect object" and "the direct object", respectively), as in "*Bill gave John a football*", "*the chairman allowed John a respite.*" Note that some verbs are in more than one of these three categories.

4.3.1 Simple transitive verb phrase

A simple transitive verb phrase consists of a transitive verb followed by a noun phrase:

Pattern: [Verb +_{TRANS}] [NP]
 Examples: hired John Smith
 earn \$30,000
 kidnap the mayor

You may use any of the basic sentence patterns from subsection 1 to test a transitive verb phrase. Replace the "[VP]" in the chosen sentence with "[Verb +_{TRANS}] [NP]." Below are some suggested sentences.

Pattern: [Verb +_{TRANS}] [NP].
 Examples: List the departments.

Pattern: [WH-Word] (([NP])) [Verb +_{TRANS}] [NP]?
 Examples: Who hired John Smith?
 Which personnel earn \$30,000?

Pattern: [DO-Verb] [NP] [Verb +_{TRANS}] [NP]?
 Example: Does John Smith have a degree?

Pattern: [NP] [Verb +_{TRANS}] [NP].
 Examples: Terrorists kidnapped the mayor.
 The guerrillas attacked the farm.

Criteria: Demonstrated understanding that the noun phrase following the verb expresses the object of the event or relationship specified by the transitive verb.

Score: _____

4.3.2 Simple Intransitive Verb Phrase

A simple intransitive verb phrase consists of an intransitive verb, that is, one which does not take an object.

Pattern: [Verb +_{INTRANS}]
 Examples: cleans
 runs

You may use any of the basic sentence patterns from subsection 1 to test an intransitive verb phrase. Replace the "[VP]" in the chosen sentence with "[Verb +_{INTRANS}]." Below are some suggested sentence patterns. Remember that a preliminary sentence may be given prior to a test input. The preliminary sentence may follow a different pattern than that which we are testing.

Pattern: [WH-Word] ([NP]) [Verb +INTRANS]
 Examples: Which department sells ?
 Who hires ?

Pattern: [NP] [Verb +INTRANS].
 Example: (Preliminary Sentence: Terrorists kidnapped the mayor.)
 The Mayor died.

Example: (Preliminary Sentence: The guerrillas kidnapped a civilian.)
 The murder victim died.

Criteria: Demonstrated understanding that the subject acts or acted in the way specified by the intransitive verb.

Score: _____

4.3.3 Simple Ditransitive Verb Phrase

A simple ditransitive verb phrase consists of a ditransitive verb followed by two noun phrases, commonly called the indirect object and the direct object, respectively:

Pattern: [Verb +DITRANS] [NP] [NP]
 Examples: gave John a raise
 shows the chairman the report

You may use any of the basic sentence patterns from subsection 1 to test an ditransitive verb phrase. Replace the "[VP]" in the chosen sentence with "[Verb +DITRANS] [NP] [NP]." Below are some suggested sentences. Remember that a preliminary sentence may be given prior to a test input. The preliminary sentence may follow a different pattern than that which we are testing.

Pattern: [Verb +DITRANS] [NP] [NP].
 Example: Show me the departments.

Pattern: [WH-Word] [Verb +DITRANS] [NP] [NP]?
 Examples: Who gave John Smith a raise?
 Who shows the chairman the report?

Pattern: [NP] [Verb +DITRANS] [NP] [NP]
 Example: Terrorists sent the mayor a letter bomb
 (which exploded).

Example: (Preliminary Sentence: The government suspects the URNG
 guerrillas in the bombing at the Government house.)
 The Mayor showed a journalist the burned building.

Criteria: Demonstrated understanding that

- the second noun phrase following the verb expresses the object of the verb's action

- the first noun phrase following the verb expresses the recipient.

Score: _____

4.4 Voice

Verbs of the English language have two voices: *active* and *passive*. Most propositions can be expressed using either voice. All the sentences in the previous sections are given in the active voice, which is unmarked. A *passive verb phrase* is formed with the BE-verb, used as an *auxiliary*, followed by the *-ed* participle form of the main verb, called the "*passive participle*" followed by an optional noun phrase and an optional *by-phrase* (the word "by" followed by a [NP]):

Pattern:	[BE-Verb]	[Verb + <i>PASSIVE</i>]	([NP])	(<i>by</i> [NP])
Examples:	is	hired		
	was	sold	a book	by John
	were	given	notice	
	was	kidnapped		by terrorists

Any sentence which includes a transitive or ditransitive verb phrase can be expressed using either the active or passive voice. An active voice sentence can be converted into a passive voice sentence, and vice versa. The simple active-passive correspondence can be expressed by the following rule:

[NP]₁ [Verb +*ACTIVE*] [NP]₂ maps into [NP]₂ [BE-Verb] [Verb +*PASSIVE*] *by* [NP]₁

Note that since the *by-phrase* in the passive is optional, the agent of the expressed action is not always present.

The following pairs of sentences provide examples of active-passive sentences. In each pair of sentences, both sentences express the same proposition.

Active Example: John Smith sells CPUs.

Passive Example: CPUs are sold by John Smith.

Active Example: What does John Smith sell ?

[Alternative Version of the Active Example:
John Smith sells what ?]

Passive Example: What is sold by John Smith?

Active Example: Does John Smith sell printers ?

[Alternate Version of the Active Example:
John Smith sells printers ?

Passive Example: Are printers sold by John Smith?

[Alternate Version of the Passive Example:
Printers are sold by John Smith?]

Active Example: The manager gave John Smith a promotion.

Passive Example: John Smith was given a promotion by the manager.

Active Example: Terrorists kidnapped the governor.

Passive Example: The governor was kidnapped by terrorists.

Active Example: The guerrillas attacked the farm.

Passive Example: The farm was attacked by the guerrillas.

4.4.1 Active Voice

In this subsection we will test an active sentence which we will later passivize. Choose an active sentence with a transitive or ditransitive verb for testing. You may also use any sentence which has been successfully tested and enter it below.

Criteria: Demonstrated understanding that the object was acted upon in the way specified by the verb.

_____ Score: _____

4.4.2 Passive Voice

Passivize the sentence which you used in subsection 4.4.1.

Criteria: Demonstrated understanding that the subject was acted upon in the way specified by the verb.

_____ Scoer: _____

II. INTERROGATIVE SENTENCES

An interrogative sentence expresses a question. In this section, you should use simple component phrases (i.e., simple [NP]s and [VP]s). In this set of interrogative sentences, we will be testing for the capability to handle the basic sentence structure and we do not want to make the component phrases at all complicated. These complications will come later.

According to the MUC rules, templates are only generated for reports of terrorist activities. For a MUC example we may use a preliminary sentence to express a terrorist activity in order to generate a MUC template. The preliminary sentence may follow a different pattern than that which we are testing.

1. What-questions

1.1 *What* as a pronoun.

Create a test sentence that starts with the word "*what*" used as an interrogative pronoun (and not as a determiner followed by a noun - this is tested in the next item).

Pattern: What [BE-Verb] [NP] ?
Examples: What are the departments?
What are the products?

Example: (Preliminary Sentence: The guerrillas killed five civilians.)
What are the fatalities?

Pattern: What [DO-Verb] [NP] [VP] ?
Example: What does John Smith earn?

Example: (Preliminary Sentence: The URNG guerrillas attacked the farm.)
What did the guerrillas attack?

Criteria: Provided the information requested.

Score: _____

1.2 *What* as a determiner.

Create a test sentence that starts with the word "*what*" followed by a noun or noun phrase (reference to a type of object), (e.g., "*what salary*") so that the word "*what*" is used as a determiner.

Pattern: What [NP] [Verb] [NP] ?
 Examples: What personnel are women?
 What personnel are engineers?

Pattern: What [NP] [BE-Verb] [Adjective] ?
 Examples: What departments are small?
 What salespersons are married?

Example: (Preliminary Sentence: The guerrillas attacked the Santo Tomas farm.)
 What farm was damaged?

Pattern: What [NP] [DO-Verb] [NP] [VP] ?
 Examples: What salary does John Smith earn?
 What department did John Smith join?
 What experience does John Smith have?

Example: (Preliminary Sentence: URNG guerrillas attacked the Santo Tomas farm.)
 What farm did guerrillas attack?

Criteria: Restricted its response to information about objects in the class or class type named by the expression "what [NP]" (e.g., "what personnel") and restricted its response by the predicate expressed in the rest of the sentence.

Score: _____

2. Who-questions.

Create a test sentence that starts with the word "who" used as an interrogative pronoun.

Pattern: Who [Verb] [NP] ?
 Examples: Who is a department head ?
 Who are the salespersons ?
 Who hired John Smith?

Example: (Preliminary Sentence: URNG guerrillas attacked the Santo Tomas farm.)
 Who attacked the farm?

Pattern: Who [DO-Verb] [NP] [VP] ?
 Examples: Who did Ted Black hire?
 Who does the sales department employ?

Example: (Preliminary Sentence: The guerrillas attacked President Cerezo.)
 Who did the guerrillas attack?

Criteria: Responded by identifying the person(s) that satisfies the criteria expressed.

3. Where-questions.

Create a test sentence that starts with the word "where" and requests locative information.

Pattern: Where [BE-Verb] [NP] ?

Examples: Where is the Computer Science Department ?
Where is the California branch ?

Example: (Preliminary Sentence: The guerrillas attacked a farm in Flores.)
Where is the farm?

Pattern: Where [DO-Verb] [NP] [VP] ?

Examples: Where does Ted Black live?
Where does John Smith work?

Example: (Preliminary Sentence: The guerrillas attacked a farm in Flores.)
Where did the guerrillas attack?

Criteria: Responded with the requested LOCATIVE information?

4. When-questions.

Create a test sentence that starts with the word "when" and requests temporal information.

Pattern: When [BE-Verb] [NP] ?

Examples: When is Thanksgiving ?
When is William's birthday ?

Example: (Preliminary Sentence: Guerrillas attacked a farm on February 2.)
When was the attack?

Pattern: When [DO-Verb] [NP] [VP] ?

Examples: When did Ted Black join Xidec?
When did John Smith graduate?

Example: (Preliminary Sentence: Guerrillas attacked a farm on February 2.)
When did the guerrillas attack?

Criteria: Responded with the requested TEMPORAL information.

5. Which-questions.

Create a test sentence that starts with the word "which" (as a determiner) followed by a noun or noun phrase so that information is requested about members of the class specified by the noun phrase (e.g., "which personnel").

Pattern: Which [NP] [Verb] [NP] ?
Examples: Which personnel are engineers?
Which personnel are women?

Pattern: Which [NP] [Verb] [NP] ?
Examples: Which personnel have degrees ?
Which personnel earn \$30,000 ?

Example: (Preliminary Sentence: URNG guerrillas attacked the Santo Tomas farm.)
Which guerrillas attacked the farm?

Pattern: Which [NP] [BE-Verb] [Adjective] ?
Examples: Which departments are small?
Which salespersons are male?

Pattern: Which [NP] [DO-Verb] [NP] [VP] ?
Examples: Which department did John Smith join?
Which degree did John Smith earn?

Example: (Preliminary Sentence: URNG guerrillas attacked the Santo Tomas farm.)
Which farm did URNG guerrillas attack?

Criteria: Restricted its response to information about objects in the class or class type named by the expression "which [NP]" (e.g., "which personnel") and restricted its response by the predicate expressed in the rest of the sentence.

Score: _____

6. How-questions.

Create a test sentence that starts with the word "how" followed by an adjective or an adverb so that information is requested about the property specified by the expression "how [Adjective]" or "how [Adverb]".

Pattern: How [Adjective] [BE-Verb] [NP] ?
Examples: How old is John Smith ?
How large is the sales department ?
How experienced is John Doe ?

Example: (Preliminary Sentence: The URNG guerrillas burned the Santo Tomas farm.)
How extensive was the damage?

Pattern: How [Adverb] [BE-Verb] [NP] ?
 Examples: How often is payday ?
 How soon is Ted William's birthday ?

Example: (Preliminary Sentence: Guerrillas attack the Santo Tomas farm daily.)
 How often are the attacks?

Criteria: Responded with information about the property specified by the phrase "how [Adjective]" or "how [Adverb]".

Score: _____

7. Wh-Word in Prepositional Phrase

Create a test question that uses a Wh-word or Wh-phrase as the object of a prepositional phrase. Examples of such prepositional phrases are "for whom", "by whom", "in which year", "in which department". The prepositional phrase can appear at the beginning of the question OR the preposition and its following noun phrase can be separated with the preposition appearing at the end of the sentence with its object noun phrase at the beginning of the sentence. Sentence patterns with examples are shown below. See the glossary for a listing of prepositions.

Pattern: [Preposition] [Wh-Phrase] [BE-Verb]/ [NP] [Verb] ?
 [DO-Verb]
 Examples: For whom does John Smith work ?
 In which department is Mary Jones employed ?
 In which year was John Smith born ?

Example: (Preliminary Sentence: Guerrillas attacked the Santo Tomas farm on February 2.)
 On which day was the attack?

Pattern: [Wh-Phrase] [BE-Verb]/ [NP] [Verb] [Preposition] ?
 [DO-Verb]
 Examples: Whom does John Smith work for ?
 Which department is Mary Jones employed in ?
 Which year was John Smith born in ?

Criteria: Responded with information about the object or entity specified by the noun phrase that belongs with the preposition. For example, if asked "Which department is Mary Jones employed in?", the system responded with information about the appropriate department.

Score: _____

8. Yes/No-Questions.

Create a test sentence to which a "yes/no" answer is expected, possibly with additional information. The common forms of such questions are provided below.

Pattern:	[BE-Verb]	[NP]	[NP] ?
Examples:	Is	the President	John Doe ?
	Is	John Smith	a salesman ?

Example: (Preliminary Sentence: Guerrillas attacked the presidential farm.)
 Was the president a victim?

Pattern:	[BE-Verb]	[NP]	[Adjective] ?
Examples:	Is	the Computer Science Department	large ?
	Is	Mary Smith	experienced ?

Pattern:	[DO-Verb]	[NP]	[VP] ?
Examples:	Does	John	have a degree ?
	Does	John	earn \$30,000 ?

Example: (Preliminary Sentence: URNG guerrillas attacked the presidential farm.)
 Did guerrillas attack the presidential farm?

Criteria: Responded either with a "yes/no" answer (additional information is also acceptable) or with a statement (without the "yes/no") that answered the question.

_____ Score: _____

9. Why-questions. (t.b.d.)

III. NOUN PHRASES

A noun phrase consists of four parts:

([Determinative]) ([Premodification])* [Head] ([Postmodification])*

of which any, but the Head, may be omitted, and there may be more than one instance of premodification and postmodification (indicated by the “*”). Henceforth, we will use the notation “[Det]” to denote the determinative element.

A noun phrase expresses an object or entity, which may be either abstract or concrete.

1. Prepositional Phrase as Postmodifier in a Noun Phrase

A prepositional phrase, denoted “[PP]”, consists of a preposition followed by a complement, which is typically a noun phrase. Some prepositional phrases are:

Pattern:	[PP]	
	[Preposition]	[NP]
Examples:	in	the department
	for	Joe Smith
	on	December 12

A noun phrase can consist of a simpler noun phrase followed by a prepositional phrase as the postmodification element. The prepositional phrase helps define the referent (who or what is being referred to) of the preceding noun phrase which it postmodifies. A noun phrase can consist of the following structure:

Pattern:	[NP]	
	[NP]	[PP]
Examples:	the name	of the ship
	the director	of the project
	the employees	in New York
	the farm	of President Cerezo
	a peasant	in Flores

Prepositional phrases can also serve as adverbials and complements of verbs or adjectives. These uses of prepositional phrases are covered in later sections of this procedure.

The following is a fairly complete list of the *prepositions*:

<i>as</i>	<i>at</i>	<i>but</i>	<i>by</i>	<i>down</i>	<i>for</i>	<i>from</i>	<i>in</i>
<i>near</i>	<i>of</i>	<i>off</i>	<i>on</i>	<i>out</i>	<i>past</i>	<i>per</i>	<i>since</i>
<i>through</i>	<i>till</i>	<i>to</i>	<i>up</i>	<i>with</i>	<i>about</i>	<i>above</i>	<i>across</i>
<i>after</i>	<i>against</i>	<i>along</i>	<i>among</i>	<i>around</i>	<i>atop</i>	<i>before</i>	<i>behind</i>
<i>below</i>	<i>beneath</i>	<i>beside</i>	<i>between</i>	<i>beyond</i>	<i>during</i>	<i>except</i>	<i>inside</i>
<i>into</i>	<i>onto</i>	<i>outside</i>	<i>over</i>	<i>throughout</i>	<i>toward</i>	<i>under</i>	<i>underneath</i>
<i>until</i>	<i>upon</i>	<i>within</i>	<i>without</i>				

You may use any of the successful sentence patterns from Sections I or II to test the system's ability to process PPs. Replace the "[NP]" in the chosen sentence with "[NP] [PP]." Below are some suggested patterns. The prepositional phrase is shown explicitly in the following examples.

Pattern:	[Verb]	[NP]	[PP]	
Example:	List	the employees	in New York.	
Pattern:	[BE-Verb]	[NP]	[NP]	[PP]
Example:	Is	John Smith	a salesman	in Chicago ?
Pattern:	[WH-Word]	[BE-Verb]	[NP]	[PP]
Example:	Who	are	the salespersons	in Chicago?
Pattern:	[NP]	[Verb]	[NP]	[PP]
Examples:	Terrorists	kidnapped	the mayor	of Andahua.
	Guerrillas	attacked	the farm	of President Cerezo.
	Guerrillas	killed	a peasant	in Flores.

Criteria: Demonstrated understanding of the qualification imposed on the noun phrase by the prepositional phrase which immediately follows it as postmodifier.

Score: _____

2. The Noun Head

2.1 Nouns

2.1.1 Count Noun (Covered in Section I, Basic Sentences)

2.1.2 Proper Noun (Covered in Section I, Basic Sentences)

2.1.3 Mass Nouns (Covered in Section I, Basic Sentences)

2.2 Nominals

Nominals are non-noun parts of speech used as the head of a noun phrase.

2.2.1 Adjective Nominal

An *adjective nominal* consists of an optional determiner followed by an adjective used as the head of the noun phrase. Examples: "the elderly", "the poor", "the youngest", "the smartest".

You may use any of the successful sentence patterns from Sections I or II to test an adjective nominal. Replace the "[NP]" in the chosen sentence with "([Det]) [Adj.Nom.]". We use the notation "[Det]" to denote the determinative element and "[Adj.Nom.]" to denote the adjective nominal.

Below are some suggested patterns.

Pattern:	[Verb]	[(Det)]	[Adj.Nom.]	[(PP)]	
Example:	List	the	oldest	in the New York branch.	
Pattern:	[WH-Word]	[BE-Verb]	[(Det)]	[Adj.Nom.]	[(PP)]
Example:	Who	is	the	oldest	in Chicago?
Pattern:	[NP]	[Verb]	[(Det)]	[Adj.Nom.]	[(PP)]
Example:	Terrorists	killed	the	elderly	in Usulutun.
Pattern:	[(Det)]	[Adj.Nom.]	[(PP)]	[Verb]	[NP].
Example:	The	poor	in Usulutun	attacked	the Government House .

Criteria: Demonstrated understanding by interpreting the adjective nominal as expressing an entity or object.

Score: _____

2.2.2 Passive Participle as Nominal

The *passive participle*, denoted by [Participle (-ed)], is a form of a verb with the “-ed” or “-en” ending, as in “hired”, “arrested”, or “spoken”, or certain irregular verbs such as “sung”.

A *passive participle nominal* consists of an optional determiner followed by a passive participle used as the head of the noun phrase. Examples: “the employed”, “the injured”.

You may use any of the successful sentence patterns from Sections I or II to test a passive participle nominal. Replace the “[NP]” in the chosen sentence with “[(Det)] [Participle (-ed)]”. Below are some suggested patterns.

Pattern:	[Verb]	[(Det)]	[Participle (-ed)]	[(PP)]	
Example:	List	the	employed	in the New York branch.	
Pattern:	[WH-Word]	[BE-Verb]	[(Det)]	[Participle (-ed)]	[(PP)]
Example:	Who	are	the	employed	in Chicago?
Pattern:	[NP]	[Verb]	[(Det)]	[Participle (-ed)]	[(PP)]
Example:	(Preliminary Sentence: Twelve men were injured in an explosion.)				
	Terrorists	killed	the	injured.	
Example:	The result of	was	one	killed.	
	the attack				

Criteria: Demonstrated understanding by interpreting the passive participle nominal as expressing an entity or object.

Score: _____

2.2.3 Progressive Participle as Nominal

The *progressive participle*, denoted by [Participle (-ing)], is a form of a verb with an “-ing” ending, as in “*hiring*”, and “*consulting*”.

A *progressive participle nominal* consists of an optional determiner followed by a progressive participle used as the head of the noun phrase. Examples: “*the hiring*”, “*the selling*”.

You may use any of the successful sentence patterns from Sections I or II to test a progressive participle nominal. Replace the “[NP]” in the chosen sentence with “([Det]) [Participle (-ing)]”. Below are some suggested patterns.

Pattern:	[WH-Word]	[DO-Verb]	([Det])	[Participle (-ing)]	([PP])
Examples:	Who	does	the	selling	in Chicago?
	Who	does	the	hiring	in Chicago?
Pattern:	([Det])	[Participle (-ing)]	([PP])	[VP]	.
Examples:	The	hiring		is performed by	John Smith.
	The	bombing	of the Government House	killed 20 civilians.	
	The	burning	of the presidential farm	caused the death	of one guard.

Criteria: Demonstrated understanding by interpreting the progressive participle nominal as expressing an entity or object.

Score: _____

3. Determinatives in More Detail

A *determinative* element of a noun phrase determines what kind of reference a noun phrase has: definite (“*the*”), indefinite (“*a*”, “*an*”), partitive (“*some*”), or universal (“*all*”). Each type of reference has meaning. For example, the meaning of a noun phrase with a definite determiner (“*the*”) frequently is that the entity expressed by the noun phrase is known to both speaker and hearer.

The determinative element contains up to three elements (see table below). We can distinguish three classes of determiners, based on their position in the determinative. These are the *predeterminers*, the *central determiners*, and the *postdeterminers*.

The *predeterminers* include “*all*”, “*both*”, “*half*”, the multipliers (“*double*”, “*twice*”, etc.), the fractions (“*one-third*”, “*one-fifth*”, etc.), “*such*”, and “*what*”. The *central determiners* include the articles (“*the*”, “*a*”, “*an*”), the demonstrative determiners (“*this*”, “*that*”, “*these*”, “*those*”), the possessive determiners (“*my*”, “*our*”, “*your*”, “*his*”, “*her*”, “*its*”, “*their*”), certain quantifiers, and so on. The *postdeterminers* include the cardinal numerals, ordinal numerals, and a small set of quantifiers (i.e., “*many*”, “*few*”, “*several*” with plural count nouns and “*much*” and “*little*” with non-count nouns).

In this section on determinatives, we will use “[NP -DET]” to denote a complete noun phrase

Determinative		
Predeterminer	Central Determiner	Postdeterminer
all/both/half	the	few
such	a	
twice/double	a/an	
	this/that	three
	these/those	
	every/each	
	some/any	
	no	
one-third	my/our/your/his/its/their	
	which/what/whose	
	either/neither	

minus the determinative we are testing.

3.1 Predeterminers

3.1.1 Quantifier Predeterminers (Covered in Section VI, Quantifiers)

3.1.2 Multipliers, Fractions (Covered in Section VI, Quantifiers)

3.1.3 *WHAT, SUCH* (t.b.d.)

3.2 Central Determiners

3.2.1 Articles (Covered in Section I, Basic Sentences.)

3.2.2 Demonstrative Determiners (t.b.d.)

3.2.3 Quantifier-type (Covered in Section VI, Quantifiers)

3.2.4 Quantitative Determiners (t.b.d.)

3.2.5 Possessive Determiners (Covered in Section X, Reference.)

3.2.6 Relative Determiners

The relative determiners "*whose*" and "*which*" are determiners which are used to introduce relative clauses. In the following two examples the relative clause is enclosed by brackets for ease of identification:

The lady [*whose car* you hit] was upset
 Call again at 11 [*by which time* the meeting will be over].

Relative determiners are covered in the subsection on relative clauses.

3.2.7 Interrogative Determiners (Covered in Section II, Interrogative Sentences)

3.4 Determinative Combinations (Covered in Section VI, Quantifiers)

4. Premodification

The premodifier of a noun phrase may contain *adjectives*, *adverbs* modifying these *adjectives*, *passive participles*, *progressive participles*, and *nouns*. The accompanying table shows the noun phrase structure with examples.

Noun Phrase Structure without Postmodification					
Deter- minative	Premodification				Head
	Precentral	Central	Postcentral	Prehead	
all the			newly hired	tourist	attraction
our	very	large	costly	research	engineers
a	very	tall	faded yellow	Gothic	debt
the	extremely	young	educated	computer	building scientist

The ordering of the premodification group is generally as follows:

1. Precentral - intensifiers, down-toners, or, more generally, adverbs which modify the central premodifier (e.g., “*very*”, “*more*”, “*often*”)
2. Central - an adjective head (e.g., “*great*”, “*big*”, “*small*”, “*round*”)
3. Postcentral - the passive participle (e.g., “*hired*”, “*paid*”), the progressive participle (e.g., “*talking*”, “*working*”), color adjectives (e.g., “*yellow*”)
4. Prehead - the most nominal elements, such as denominal adjectives (e.g., “*Dutch*”, “*brick*”, “*stone*”, “*Gothic*”), nouns

4.1 Minimal Relation (t.b.d.)

4.2 Central Premodifiers

Central premodifiers in a noun phrase express attributes of the entity expressed by the subsequent portion of the noun phrase. In general, the central premodifiers are *gradable* adjectives. Gradable adjectives express properties for which there is an associated scale with the property ranging from low intensity, strength, or amount to high intensity, strength, or amount. For example, the adjective “*hungry*” expresses the property of *having hunger*, which can be measured on a scale ranging from being *a little hungry* to being *very hungry(!)*.

In the following subsections we will test noun phrases of the form:

[Det] [Central Premodifier] [Noun]

4.2.1 Simple Adjectives

In this section we use an adjective as central premodifier. The noun phrase we are testing here has the pattern "[Det] [Adjective] [Noun]". You may replace the [NP] in any of the basic sentence patterns with this pattern. Below are some suggested sentence patterns.

Pattern:	List	[Det]	[Adjective]	[Noun].	
Example:	List	the	top	salary.	
Pattern:	[WH-Word]	[BE-Verb]	[Det]	[Adjective]	[Noun] ?
Example:	Who	are	the	new	employees?
Pattern:	[Det]	[Adjective]	[Noun]	[VP].	
Example:	The	liberal	president	was killed by terrorists.	
Pattern:	[NP]	[Verb]	[Det]	[Adjective]	[Noun].
Examples:	Terrorists	kidnapped	the	new	president.
	Guerrillas	burned	the	new	facilities.

Criteria: Demonstrated understanding by correctly interpreting the adjective as qualifying the noun in accordance with the attribute expressed by the adjective.

Score: _____

4.2.2 Superlative Adjectives

Superlative adjectives, denoted by [Adjective +_{SUP}], are formed by using the word *most* before an adjective, or by adding the *-est* suffix. Adjectives generally express gradable attributes, and superlative adjectives express the very top end of the scale associated with that attribute.

Pattern:	List	[Det]	[Adjective + _{SUP}]	[Noun].	
Example:	List	the	highest	salary.	
Pattern:	[WH-Word]	[BE-Verb]	[Det]	[Adjective + _{SUP}]	[Noun] ?
Example:	Who	is	the	newest	employee?
Pattern:	[Det]	[Adjective + _{SUP}]	[Noun]	[VP].	
Example:	The	most liberal	cabinet member	was killed by terrorists.	
Patterns:	[NP]	[Verb]	[Det]	[Adjective + _{SUP}]	[Noun].
Examples:	Terrorists	kidnapped	the	newest	president.
	Guerrillas	destroyed	the	newest	bank in Anduhua.

Criteria: Demonstrated understanding by correctly interpreting the superlative adjective as qualifying the noun in accordance with the attribute expressed by the adjective. The attribute has a scale associated with it, and the entity expressed by the noun is understood to be at the top end of that scale.

4.3 Precentral Premodifiers

The precentral premodifiers include *adverbs* which qualify the gradable adjective which functions as the central premodifier. These adverbs further specify a location on the scale associated with the gradable adjective. For example, if an adjective expresses a property, then an intensifier (“*very*”) intensifies or raises the amount of that property (“*very hungry*”). Down-toners (“*little,*”) lower the amount of that property (“*a little hungry*”).

Pattern:	List	[Det]	[Precentral]	[Central]	[Noun].
Example:	List	the	very	high	salaries.

Pattern:	[WH-Word]	[BE-Verb]	[Det]	[Precentral]	[Central]	[Noun] ?
Example:	Who	is	the	very	newest	employee?

Pattern:	[Det]	[Precentral]	[Central]	[Noun]	[VP] .
Example:	The	very	liberal	president	was kidnapped by terrorists.

Pattern:	[NP]	[Verb]	[Det]	[Precentral]	[Central]	[Noun]
Examples:	Terrorists	kidnapped	the	brand	new	president.
	Guerrillas	burned	the	very	newest	facilities.

Criteria: Demonstrated understanding by interpreting the [Precentral] as qualifying the [Central] which expresses a gradable attribute of the noun.

Score: _____

4.4 Postcentral Premodifiers

The postcentral premodifiers include passive participles (e.g., “*hired*”, “*paid*”), progressive participles (e.g., “*talking*”, “*working*”), color adjectives (e.g., “*yellow*”), and others. They are called “postcentral” because they are most likely to occur after the gradable adjectives which function as central premodifiers and right before the noun head.

In the examples in the following subsections, the postcentral premodifiers are bracketed for easy identification.

4.4.1 Passive Participle as Premodifier

The *passive participle*, denoted by [Participle (-ed)], is a form of a verb with the “-ed” or “-en” ending, as in “*hired*”, “*arrested*”, or “*spoken*”, or certain irregular verbs such as “*sung*”.

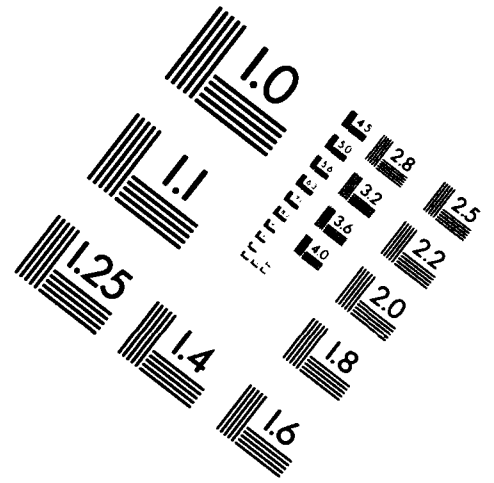
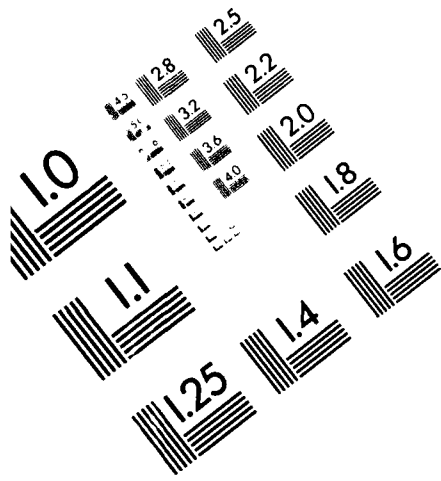


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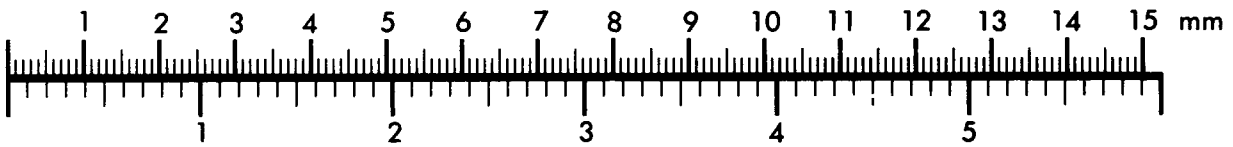
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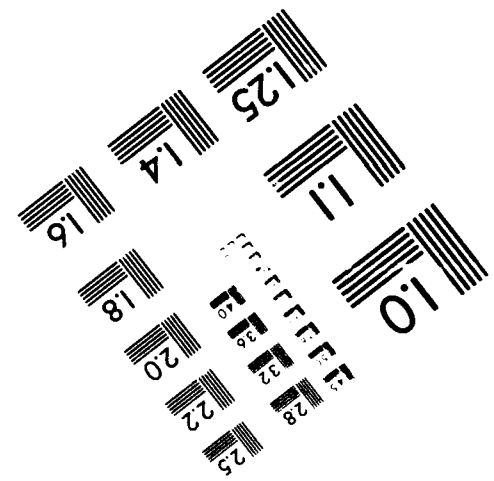
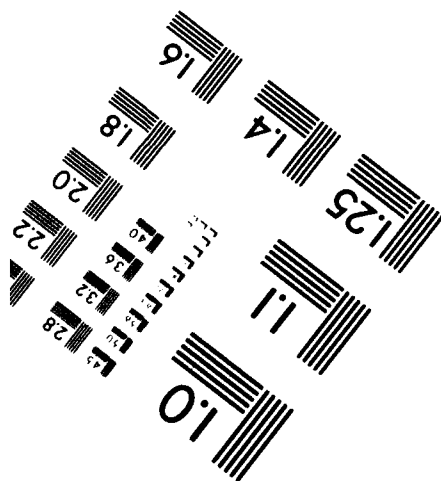
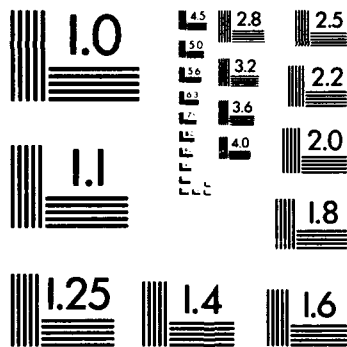
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Pattern: List [Det] [Participle (-ed)] [Noun].
 Example: List the married employees .

Pattern: [WH-Word] [BE-Verb] [Det] [Participle (-ed)] [Noun] ?
 Example: Who are the commissioned employees?

Pattern: ([Det]) [Participle (-ed)] [Noun] [VP].
 Examples: The elected official was killed by terrorists.
 Armed men attacked the farm.

Pattern: [NP] [Verb] [Det] [Participle (-ed)] [Noun].
 Example: Terrorists kidnapped the worried president.

Criteria: Demonstrated understanding by interpreting the [Participle (-ed)] as expressing a defining attribute of the entity expressed by the noun which it premodifies.

Score: _____

4.4.2 Progressive Participle as Premodifier

The *progressive participle*, denoted [Participle (-ing)], is a form of a verb with an “-ing” ending.

Pattern: List [Det] [Participle (-ing)] [Noun].
 Example: List the working employees .

Pattern: [WH-Word] [BE-Verb] [Det] [Participle (-ing)] [Noun] ?
 Example: Who is the hiring manager?

Pattern: [Det] [Participle (-ing)] [Noun] [VP].
 Example: The kidnapping terrorists killed the mayor.

Pattern: [NP] [Verb] [Det] [Participle (-ing)] [Noun].
 Examples: Terrorists kidnapped the working president.
 Guerrillas attacked a passing civilian.

Criteria: Demonstrated understanding by interpreting the [Participle (-ing)] as expressing a defining attribute of the entity expressed by the noun which it premodifies.

Score: _____

4.4.3 Infinitive as Premodifier (t.b.d.)

4.5 Noun-Noun Phrases or Nominal Compounds

A nominal compound is a noun phrase that consists of a sequence of nouns. In the current version of this Procedure, we restrict the nominal compounds to two nouns. Nominal compounds can be semantically categorized according to the relationship that exists between the two nouns of the compound. The following subsections list of some of the primary recognized relationships that can exist between the two nouns of a nominal compound. In this section, [Noun]₁ and [Noun]₂ represent the first and second nouns of the compound, respectively.

The type of noun phrases we will test in this section has the pattern:

(([Det]) [Noun]₁ [Noun]₂ ([PP]))

Using any of the basic sentence patterns, replace the noun phrase with this nominal compound noun phrase. Noun-noun phrases will be bracketed in all sentence examples for ease of identification.

4.5.1 AT-TIME Nominal Compound Type

The AT-TIME nominal compound type refers to a noun-noun phrase in which the object expressed by the second noun occurs at or during the time expressed by the first noun. We summarize this briefly as:

[Noun]₁ is the time at which [Noun]₂ occurs **OR**
[Noun]₂ occurs at time [Noun]₁

An example of such a nominal compound is "*April showers*" since the showers occur during April.

Noun-noun Phrase Examples:

Eg, December absences, October wages, March birthdate
Eg, April showers, winter storm, December attack

Full Sentence Examples:

Eg, Does John Smith have a [December birthdate]?
Eg, Two civilians were killed in the [January 10 attack] on Santa Elena.
Eg, The [December bombing] of the First National Bank was carried out by the FMLN.
Eg, URNG guerrillas carried out the [February 2 attack] on the Santo Tomas farm.

Criteria: Demonstrated understanding that the first noun expresses the time at/during which the second noun occurs.

4.5.2 AT-LOCATION Nominal Compound Type

The AT-LOCATION nominal compound type refers to a noun-noun phrase in which the object expressed by the second noun is located or used at the location expressed by the first noun. We summarize this briefly as:

[Noun]₁ is the place at/in which [Noun]₂ is located (or used) **OR**
[Noun]₂ is (used) at location [Noun]₁

An example of such a nominal compound is "*kitchen table*" since this type of table is (intended to be) used in a kitchen.

Noun-noun Phrase Examples:

Eg, kitchen table, shop vacuum, camp stove
Eg, New York office, Usulután village, Andahua bank

Full Sentence Examples:

Eg, Does John Doe work in the [New York branch]?
Eg, Three people were killed in an explosion at an [Andahua bank].
Eg, Three civilians were injured in a terrorist attack on an [Usulután village].
Eg, The guerrillas bombed a [Guatemala City bank].

Criteria: Demonstrated understanding that the first noun expresses the place where the second noun is located or used.

4.5.3 PURPOSE-CONCERNS Nominal Compound Type

The PURPOSE-CONCERNS nominal compound type refers to a noun-noun phrase in which the purpose expressed by the second noun concerns the object expressed by the first noun. We summarize this briefly as:

[Noun]₁ names the item about which [Noun]₂ is concerned **OR**
The purpose of [Noun]₂ concerns [Noun]₁

An example of such a nominal compound is "*milk bottle*" since the purpose of the bottle concerns milk, specifically as a container for milk.

Noun-noun Phrase Examples:

Eg, bread knife, milk bottle, income tax, flea collar
Eg, water pipe, house paint, pepper mill, oil truck, ski mask
Eg, tax law, price war, product brochure, linguistics book
Eg, war bulletin, news bulletin

Full Sentence Examples:

Eg, A [news bulletin] announced that the mayor was kidnapped yesterday.
Eg, In a [news bulletin], the government reported the guerrilla attack on the embassy.

Criteria: Demonstrated understanding that the object expressed by the second noun is used for a purpose which is concerned with the object expressed by the first noun.

_____ Score: _____

4.5.4 BELONGS-TO Nominal Compound Type

The BELONGS-TO nominal compound type refers to a noun-noun phrase in which the object expressed by the first noun has possession of, or responsibility for, the object expressed by the second noun. We summarize this briefly as:

[Noun]₂ belongs to [Noun]₁

An example of such a nominal compound is "*rebel positions*" since the positions belong to the rebels.

Noun-noun Phrase Examples:

Eg, department computer
Eg, rebel positions, rebel casualties, government spokesman, FAL rifle

Full Sentence Examples:

Eg, A [government spokesman] announced that terrorists kidnapped the mayor.
Eg, A [URNG spokesman] claimed responsibility for the attack on the Santo Tomas farm.

Criteria: Demonstrated understanding that the object expressed by the second noun belongs to the object expressed by the first noun .

_____ Score: _____

4.5.5 PART-OF Nominal Compound Type

The PART-OF nominal compound type refers to a noun-noun phrase in which the object expressed by the second noun is an intrinsic part of the object expressed by the first noun. We summarize this briefly as:

[Noun]₁ is an object of which [Noun]₂ is a part **OR**
[Noun]₂ is part of [Noun]₁

An example of such a nominal compound is "car wheel" since the wheel is (intended to be) part of a car.

Noun-noun Phrase Examples:

Eg, department head, car wheel, church bell, garage door
Eg, National Guard units, FMLN troops, patrol leader

Full Sentence Examples:

Eg, Is John Smith a [department head] ?
Eg, [FMLN troops] kidnapped the mayor on June 12.

Criteria: Demonstrated understanding that the object expressed by the second noun is an intrinsic part of the object expressed by the first noun.

Score: _____

4.5.6 PRODUCES Nominal Compound Type

The PRODUCES nominal compound type refers to a noun-noun phrase in which the object expressed by the first noun is produced by the object expressed by the second noun. We summarize this briefly as:

[Noun]₁ is produced by [Noun]₂ **OR**
[Noun]₂ produces [Noun]₁

An example of such a nominal compound is "coffee machine" since this type of machine produces (the drink) coffee.

Noun-noun Phrase Examples:

Eg, coffee machine, tear gas, oil well, coffee region

Full Sentence Examples:

Eg, Terrorists attacked farmers in the [coffee region] of Peru.
Eg, The guerrillas attacked the [oil wells].

Criteria: Demonstrated understanding that the object expressed by the first noun is produced by the entity expressed by the second noun.

Score: _____

4.5.7 EXECUTED-BY Nominal Compound Type

The EXECUTED-BY nominal compound type refers to a noun-noun phrase in which the action expressed by the second noun was executed or carried out by the object expressed by the first noun. We summarize this briefly as:

[Noun]₁ executed the action or activity [Noun]₁ **OR**
[Noun]₂ was executed by [Noun]₁

An example of such a nominal compound is "*terrorist attack*" since the attack was carried out by the terrorists.

Noun-noun Phrase Examples:

Eg, terrorist attack, FMLN bombing

Full Sentence Examples:

Eg, The mayor was killed in the [terrorist attack].
Eg, A civilian was killed in the [guerrilla attack].
Eg, The [FMLN bombing] of the bank injured three civilians.

Criteria: Demonstrated understanding that the action expressed by the second noun was executed or carried out by the object expressed by the first noun.

Score: _____

4.5.8 MADE-OF Nominal Compound Type

In this and the following subsections, we provide only the succinct summary of the relation and examples.

[Noun]₁ is a material from which [Noun]₂ is made **OR**
[Noun]₂ is made of material [Noun]₁

Eg, glass bottle, cardboard box, bran muffins
Eg, dynamite sticks, wood houses

Eg, The URNG guerrillas threw [dynamite sticks] at the embassy
Eg, Guerrillas burned the [wood houses] in Flores.

Criteria: Demonstrated understanding that the object expressed by the first noun is a substance of which the object expressed by the second noun is made.

Score: _____

4.5.9 PRODUCED-BY Nominal Compound Type

[Noun]₁ produces [Noun]₂ **OR**
[Noun]₂ is produced by [Noun]₁

Eg, artillery fire, bomb blast

Eg, Three civilians were injured by [artillery fire] in a terrorist attack on Andahua.

Eg, (Preliminary Sentence: Guerrillas planted a bomb at the Central Bank.) The [bomb blast] killed the bank manager.

Criteria: Demonstrated understanding that the object expressed by the second noun is produced by the object expressed by the first noun.

Score: _____

4.5.10 PURPOSE-BENEFITS Nominal Compound Type

[Noun]₁ is a beneficiary of [Noun]₂ **OR**
The purpose of [Noun]₂ benefits [Noun]₁

Eg, employee benefits, baby food

Eg, What [employee benefits] does John Smith have?

Eg, The guerrillas stole [baby food] from the clinic.

Criteria: Demonstrated understanding that the object or entity expressed by the first noun benefits from the object expressed by the second noun.

Score: _____

4.5.11 PURPOSE-IS Nominal Compound Type

[Noun]₁ names the purpose of [Noun]₂ **OR**
The purpose of [Noun]₂ is [Noun]₁

Eg, delivery truck, bombing raid

Eg, Guerrillas conducted a [bombing raid] on the Santo Tomas farm.

Eg, Guerrillas robbed the [delivery truck].

Criteria: Demonstrated understanding that the object or entity expressed by the second noun is for the purpose of that which is expressed by the first noun.

Score: _____

4.5.12 HAS-TYPE Nominal Compound Type

[Noun]₁ names the type of [Noun]₂ **OR**
[Noun]₂ is of type [Noun]₁

Eg, laser printer, apple tree

Criteria: Demonstrated understanding that the object or entity expressed by the complete noun phrase is a subtype of the type of object expressed by the second noun. The subtype specification is given by the first noun.

Score: _____

4.5.13 USES Nominal Compound Type

[Noun]₁ is used by [Noun]₂ **OR**
The object [Noun]₂ uses the object [Noun]₁

Eg, steam iron, oil furnace, gasoline generators

Eg, The guerrilla attack on the farm destroyed the [gasoline generators].

Criteria: Demonstrated understanding that the object expressed by the second noun uses the object expressed by the first noun.

Score: _____

4.5.14 HAS-PART Nominal Compound Type

[Noun]₁ is a part of [Noun]₂ **OR**
[Noun]₂ has [Noun]₁ as a part

Eg, goose-neck lamp, roll-top desk
Eg, tank truck, double-barrel shotgun

Eg, The guerrillas burned the [tank truck].

Eg, The guerrilla assassinated the President with a [double-barrel shotgun].

Criteria: Demonstrated understanding that the object expressed by the second noun has the object expressed by the first noun as a part.

Score: _____

4.6 Premodifier Combinations

In this subsection, we will test combinations of the noun phrase premodifiers covered in the several preceding sections.

(a) [[Det] [Central] [Central] [Noun]]

Pattern: List [[Det] [Central] [Central] [Noun]].
Example: List the new young employees.

Pattern: [WH-Word] [Verb] [[Det] [Central] [Central] [Noun]].

Pattern: [[Det] [Central] [Central] [Noun]] [VP].
Example: The expensive new Government House was attacked.

Pattern: [NP] [Verb] [[Det] [Central] [Central] [Noun]].
Example: The terrorists attacked the expensive new Government house.

Criteria: Demonstrated understanding of the attributes indicated of the noun phrase by the central premodifier combination.

Score: _____

(b) [[Det] [Central] [Precentral] [Central] [Noun]]

Pattern: List [[Det] [Central] [Precentral] [Central] [Noun]].
Example: List the new very young employees.

Pattern: [WH-Word] [Verb] [[Det] [Central] [Precentral] [Central] [Noun]].

Pattern: [[Det] [Central] [Precentral] [Central] [Noun]] [VP].
Example: The new very expensive Government House was attacked.

Pattern: [NP] [Verb] [[Det] [Central] [Precentral] [Central] [Noun]].

Criteria: Demonstrated understanding of the attributes indicated of the noun phrase by the central and precentral premodifier combination.

Score: _____

(c) [[Det] [Central] [Participle] [Noun]]

Pattern: List [[Det] [Central] [Participle] [Noun]].
Example: List the current hiring manager.

Pattern: [WH-Word] [Verb] [[Det] [Central] [Participle] [Noun]].

Pattern: [[Det] [Central] [Participle] [Noun]] [VP].
Example: The Marxist kidnapping terrorists demanded a high ransom.

Pattern: [NP] [Verb] [[Det] [Central] [Participle] [Noun]].
Example: The guerrillas conducted a quick bombing raid.

Criteria: Demonstrated understanding of the attributes indicated of the noun phrase by the central and participle premodifier combination.

_____ Score: _____

(d) [[Det] [Precentral] [Central] [Participle] [Noun]]

Pattern: List [[Det] [Precentral] [Central] [Participle] [Noun]].
Example: List the brand new hiring manager.

Pattern: [WH-Word] [Verb] [[Det] [Precentral] [Central] [Participle] [Noun]].

Pattern: [[Det] [Precentral] [Central] [Participle] [Noun]] [VP].
Example1: The very new working Prime Minister was kidnapped by terrorists.
Example2: A very quick bombing raid killed a civilian.

Pattern: [NP] [Verb] [[Det] [Precentral] [Central] [Participle] [Noun]].

Criteria: Demonstrated understanding of the attributes indicated of the noun phrase by the precentral, central, and participle premodifier combination.

_____ Score: _____

(e) [[Det] [Participle] [Participle] [Noun]]

Pattern: List [[Det] [Participle] [Participle] [Noun]].
Example: List the retired supervising manager.

Pattern: [WH-Word] [Verb] [[Det] [Participle] [Participle] [Noun]].

Pattern: [[Det] [Participle] [Participle] [Noun]] [VP].
Examples: The frightened kidnapping terrorists demanded a high ransom.
 The injured kidnapped peasants escaped from the guerrillas.

Pattern: [NP] [Verb] [[Det] [Participle] [Participle] [Noun]].

Criteria: Demonstrated understanding of the attributes indicated of the noun phrase by the participle premodifier combination.

Score: _____

(f) [[Det] [Central] [Participle] [Participle] [Noun]]

Pattern: List [[Det] [Central] [Participle] [Participle] [Noun]].
Example: List the young newly hired married employees.

Pattern: [WH-Word] [Verb] [[Det] [Central] [Participle] [Participle] [Noun]].

Pattern: [[Det] [Central] [Participle] [Participle] [Noun]] [VP].
Example: The young frightened kidnapping terrorists demanded a high ransom.
 The young injured kidnapped peasants escaped from the guerrillas.

Pattern: [NP] [Verb] [[Det] [Central] [Participle] [Participle] [Noun]].

Criteria: Demonstrated understanding of the attributes indicated of the noun phrase by the central and participles premodifier combination.

Score: _____

(g) [[Det] [Precentral] [Participle] [Noun]]

Pattern: List [[Det] [Precentral] [Participle] [Noun]].
Example: List the most experienced manager.

Pattern: [WH-Word] [Verb] [[Det] [Precentral] [Participle] [Noun]].

Pattern: [[Det] [Precentral] [Participle] [Noun]] [VP].
Examples: The newly appointed President was kidnapped by terrorists.
 The badly injured peasants escaped from the guerrillas.

Pattern: [NP] [Verb] [[Det] [Precentral] [Participle] [Noun]].

Criteria: Demonstrated understanding of the attributes indicated of the noun phrase by the participle premodifier combination.

Score: _____

5. Genitives and Alternative Forms

5.1 Genitives

The genitive case for regular nouns is indicated with an apostrophe followed by the letter "s" (called "*apostrophe s*") for singular nouns not ending in "s" ("*boy's*"), and with a final apostrophe for plural nouns ending in "s" ("*boys'*"). For irregular plural nouns which do not end in *s*, the *apostrophe s* is also used. For example, for the irregular noun "*child*", the singular genitive is "*child's*" and the plural genitive is "*children's*".

With singular nouns and names ending in the phonetic /z/ sound (“Jones”, “Dickens”, “Socrates”) the genitive inflection is written as either a final apostrophe or *apostrophe s*, with a preference for the solo apostrophe. The spoken inflection is also variable, with a preference towards the extra /iz/ sound in single syllable words and names, and no extra sound in two or more syllable words. With singular nouns and names ending in the phonetic /s/ sound (“Ross”, “niece”) the genitive inflection is *apostrophe s* and the extra /iz/ sound is pronounced.

The genitive is formed from a noun phrase and functions as either a central determiner or a premodifier in a larger, *superordinate* noun phrase.

As a central determiner, the genitive fills a slot in the superordinate noun phrase equivalent to a central determiner such as “the”, and may follow a precentral determiner or precede noun phrase modifiers:

the (new) desk.
Jenny’s (new) desk.
(both) *the* (new) teachers.
(both) *Jenny’s* (new) teachers.

Both the noun phrase from which the genitive is formed, and the superordinate noun phrase of which it is the determiner, can have modifiers. In the following examples the genitive noun phrase is enclosed by brackets for ease of identification.

[*John’s*] *new job*
[*the manager’s*] *salary*
[*the previous manager’s*] *retirement date*

Note that a genitive case-marker marks a complete noun phrase, not just a noun. In the following example the genitive case-marker is on the end of the prepositional phrase “*of underwriting*” which is a post-modifier of the noun phrase “*the director*”, although it is the director that has the secretary. Both the major noun phrase and its premodifying genitive noun phrase are enclosed with brackets for ease of identification.

[[*The director of underwriting’s*] *secretary*] *is retiring.*

The following example indicates that there are what might be considered “performance” constraints (what a language user is able to understand) on how large a genitive-marked noun phrase may be.

??[[*That director who called the meeting last week’s*] *secretary*] *is retiring.*

NOTE: “??” signifies that the sentence which it marks is unacceptable to most speakers.

The main use of the genitive is to express *possession*, ranging from the strict sense of ownership (“*John’s book*”) to a looser sense of *relationship* (“*Mary’s husband*”, “*Paul’s doctor*”).

Other uses include, but are not limited to:

- the *subjective genitive*, in which the noun phrase being premodified expresses an event and the genitive case-marked noun phrase expresses the subject of that event. For example, in:

the boy's application to college

the event is *applying to college* and the subject is *the boy*.

- the *objective genitive*, in which the noun phrase being premodified expresses an event and the genitive case-marked noun phrase expresses the object of that event. For example, in:

the boy's release from jail

the event is *a release from jail* and the object is *the boy*.

- the *genitive of origin*, in which the noun phrase being premodified expresses an object or entity and the genitive case-marked noun phrase expresses the origin of that object or entity, as in:

the girl's story

the general's letter

- the *genitive of measure*, in which the noun phrase being premodified expresses an object or entity and the genitive case-marked noun phrase expresses a measure of that object or entity, as in:

a ten day's absence

- the *genitive of attribute*, in which the noun phrase being premodified expresses an attribute of the object or entity expressed by the genitive case-marked noun phrase, as in:

the man's height

John Smith's birthday

- the *partitive genitive*, in which the premodified noun phrase expresses an intrinsic part of the object or entity expressed by the genitive case-marked noun phrase, for example, in:

the earth's crust

the baby's blue eyes

- the *descriptive genitive*, in which the genitive case-marked noun phrase has a classifying role with respect to the noun phrase being premodified. The premodified noun phrase does not have a descriptive relationship of any sort to the object or entity expressed by the genitive case-marked noun phrase. For example, in the sentences:

a women's college

a ship's doctor

“college” does not describe *“women”*, nor does *“doctor”* describe the *“ship”*. Rather, *“women’s”* describes the kind of college, and *“ship’s”* describes the kind of doctor. A distinguishing mark of this type of genitive is the fact that any modifiers and determiners preceding it generally belong to the head noun, rather than to the genitive noun.

In the following example, there are three interpretations of the genitive, one in which John owns the paintings (the *possessive genitive*), one in which John is the painter (the *subjective genitive*), and one in which he is the object of the painting (the *objective genitive*):

John’s portraits are very valuable now.

Which interpretation will be preferred depends a great deal on situational or other pragmatic considerations. However, there also seems to be a hierarchical organization to the assignment of semantic roles, in which possession is the highest, then agency, then patient or theme (i.e., the animate or inanimate object upon which the action operates). Thus, in the sentence

I like Mary’s husband’s painting,

the most salient interpretation is probably that which has Mary as the possessor of her husband, loosely speaking, and her husband as either the owner or the painter. The less salient reading is that which has Mary as the possessor and the husband as the subject of the painting. On the other hand, in a sentence like

This manager’s annual performance evaluation was very good,

the preference is not nearly as obvious, due to pragmatics, and in fact it may be as likely for *this manager* to be interpreted as the subject of the evaluation than as the agent performing the evaluation. Thus, it is clear that both predisposition and pragmatics must be taken into consideration in order to correctly assign meaning to this type of construction.

Possessives

There are a number of ways of expressing possession in English, the three most important being 1) use of the genitive case, 2) use of a preposition, 3) use of an explicit verb of possession. The three cases are illustrated by the examples below:

- 1) *John’s book*
Whose book
- 2) *The children of the senator*
The senator with the attractive wife
- 3) *I have a book*
I own a book

The system for expressing possession is very rich in English because of the possibility of using not only these three basic syntactic means for indicating possession, but also because of the possibility of having combinations of the three. Thus, possessives can be expressed by using both genitive case and the preposition *of*:

That book of John's.

both the genitive and an explicit verb of possession:

John has Harry's book.

both a preposition and a verb:

The senator has the children of his first wife.

or all three:

I still have that record of John's that I borrowed last week.

In addition to all of this, we have the possibility, in principle, of stringing together an unlimited number of genitive case-marked nouns:

John's book

John's supervisor's book

John's supervisor's associate's book

In this section on noun phrases, we will not test possessives which are expressed using a verb.

5.1.1 Genitive Constructions

5.1.1.1 Genitive with Simple Noun Phrase

Test a simple noun phrase, that is, one without premodifiers or postmodifiers, with the genitive case marking.

Pattern: List [NP +GENITIVE] [NP].

Example: List John Smith's address.

Pattern: [WH-Word] ([NP]) [BE-Verb] [NP +GENITIVE] [NP] ?

Example: What is Smith's salary ?

Pattern: [NP] [Verb] [NP +GENITIVE] [NP].

Examples: Terrorists kidnapped the Governor's son.
Guerrillas kidnapped the Mayor's wife.

Pattern: [NP +GENITIVE] [NP] [VP].

Example: The Governor's son was kidnapped by terrorists.

Criteria: Demonstrated understanding of the relationship between the entities expressed by the noun phrase with the genitive case marking and the noun phrase being premodified.

Score: _____

5.1.1.2 Genitive with Complex Noun Phrase

In this test, use a complex noun phrase (i.e., one which includes premodification or post-modification) as the noun phrase with the genitive case marking.

Pattern: List [NP +GENITIVE] [NP].

Examples: List the largest department's members.

List the Chairman of the Board's members.

Pattern: [WH-Word] ([NP]) [BE-Verb] [NP +GENITIVE] [NP] ?

Example: What is the newest employee's name ?

Pattern: [NP] [Verb] [NP +GENITIVE] [NP].

Examples: Terrorists kidnapped the Mayor of Cuilapa's son.

Guerrillas kidnapped the Mayor of Flore's wife.

Pattern: [NP +GENITIVE] [NP] [VP].

Example: The Mayor of Cuilapa's son was kidnapped by terrorists.

Criteria: Demonstrated understanding of the relationship between the entities expressed by the noun phrase with the genitive case marking and the noun phrase being premodified.

Score: _____

5.1.1.3 Multiple Genitives

Multiple genitives have the following pattern:

Pattern: [NP +GENITIVE]₁ [NP +GENITIVE]₂ [NP]₃

Example: the Chairman's secretary's salary

where there is a genitive relationship between [NP]₂ and [NP]₃ and between [NP]₁ and [NP]₂.

Pattern: List [[[NP +GENITIVE] [NP +GENITIVE]] [NP]].

Examples: List the company's department's names .

List the Chairman of the Board's secretary's salary?

Pattern: [WH-Word] ([NP]) [BE-Verb] [[[NP +GENITIVE] [NP +GENITIVE]] [NP]] ?

Example: What is John Smith's supervisor's name?

Pattern: [NP] [Verb] [[[NP +GENITIVE] [NP +GENITIVE]] [NP]].

Example: Terrorists kidnapped the Mayor of Cuilapa's son's wife.

Pattern: [[[NP +GENITIVE] [NP +GENITIVE] [NP']] [VP].
 Examples: Cuilapa's Mayor's son was kidnapped by terrorists.
 The Mayor of Flore's son's wife was kidnapped by guerrillas.

Criteria: Demonstrated understanding of the relationship between the first [NP +GENITIVE] and the second, and the relationship between the second [NP +GENITIVE] and the noun phrase following.

Score: _____

5.1.2 Semantics of Genitives

5.1.2.1 Possessive Genitive

The *possessive genitive* expresses a number of related concepts, ranging from the strict sense of ownership ("*John's book*") to a looser sense of *relationship* ("*Mary's husband*", "*Paul's doctor*"), with the genitive case-marked noun phrase expressing the "owner" and the premodified noun phrase expressing the "possession".

Pattern: List [NP +GENITIVE] [NP].

Example: List John Smith's salary.

Pattern: [WH-Word] [BE-Verb] [NP +GENITIVE] [NP] ?

Example: Who are Smith's past employers ?

Pattern: [NP] [Verb] [NP +GENITIVE] [NP].

Example: Terrorists bombed the Government's offices.

Pattern: [NP +GENITIVE] [NP] [VP].

Example: The Governor's son was kidnapped by terrorists.

Criteria: Demonstrated understanding of the possessive relationship (in the loose sense of "possession") between the entities expressed by the noun phrase with the genitive case marking and the noun phrase being premodified.

Score: _____

5.1.2.2 Subjective Genitive

In the *subjective genitive*, the noun phrase being premodified expresses an event and the genitive case-marked noun phrase expresses the subject of that event. For example, in:

the boy's application to college

the event is *applying to college* and the subject is *the boy*.

Pattern: List [NP +GENITIVE] [NP].

Example: List John Smith's sales.

Pattern: [WH-Word] [BE-Verb] [NP +GENITIVE] [NP] ?

Example: What were the Chicago branch's sales?

Pattern: [NP] [Verb] [NP +GENITIVE] [NP].
Example: ARENA sponsored the terrorists' attacks.

Pattern: [NP +GENITIVE] [NP] [VP].
Example: The terrorists' attacks destroyed the Government House.

Criteria: Demonstrated understanding of the subject–event relationship between the entities expressed by the noun phrase with the genitive case marking and the noun phrase being premodified.

_____ Score: _____

5.1.2.3 Objective Genitive

In the *objective genitive*, the noun phrase being premodified expresses an event and the genitive case-marked noun phrase expresses the object of that event. For example, in:

the boy's release from jail

the event is *a release from jail* and the object is *the boy*.

Pattern: List [NP +GENITIVE] [NP].
Example: List John Smith's hiring.

Pattern: [WH-Word] [BE-Verb] [NP +GENITIVE] [NP] ?
Example: What was John Smith's promotion?

Pattern: [NP] [Verb] [NP +GENITIVE] [NP].
Example: ARENA sponsored the Governor's assassination.

Pattern: [NP +GENITIVE] [NP] [VP].
Example: The Mayor's kidnapping was done by Shining Path.

Criteria: Demonstrated understanding of the object–event relationship between the entities expressed by the noun phrase with the genitive case marking and the noun phrase being premodified.

_____ Score: _____

5.1.2.4 Attributive Genitive

In the *genitive of attribute*, the noun phrase being premodified expresses an attribute of the object or entity expressed by the genitive case-marked noun phrase, as in:

the man's height
John Smith's birthday

Pattern: List [NP +GENITIVE] [NP].
Example: List John Smith's hire date.

Pattern: [WH-Word] [BE-Verb] [NP +GENITIVE] [NP] ?
Example: What is Smith's education ?

Pattern: [NP +GENITIVE] [NP] [VP].
Example: The government's size was diminished by repeated kidnappings.

Criteria: Demonstrated understanding that the noun phrase being premodified expresses an attribute of the object expressed by the noun phrase with the genitive case marking.

Score: _____

5.1.2.5 Partitive Genitive

In the *partitive genitive*, the premodified noun phrase expresses an intrinsic part of the object or entity expressed by the genitive case-marked noun phrase, for example, in:

the earth's crust
the baby's blue eyes

Pattern: List [NP +GENITIVE] [NP].
Example: List the company's branches.

Pattern: [WH-Word] [BE-Verb] [NP +GENITIVE] [NP] ?
Example: What are the company's branches?

Pattern: [NP] [Verb] [NP +GENITIVE] [NP].
Example: Terrorists exploded the Government House's roof.

Pattern: [NP +GENITIVE] [NP] [VP].
Example: The Mayor's arm was broken by terrorists.

Criteria: Demonstrated understanding of the part-whole relationship between the entities expressed by the noun phrase with the genitive case marking and the noun phrase being premodified.

Score: _____

5.1.2.6 Descriptive Genitive

In cases where a genitive is a *descriptive genitive*, it is used as a modifier of a noun head, and fills a premodification slot in the superordinate noun phrase. Descriptive genitives have a classifying role similar to that of noun modifiers. In the following examples, the descriptive genitive noun phrase and the superordinate noun phrase into which it is embedded are enclosed by brackets.

There are [several [women's] colleges] in New York.
John wants to become [a [ship's] doctor] when he graduates.

A distinguishing mark of descriptive genitives is the fact that any modifiers and determiners

preceding it generally belong to the noun head, rather than to the genitive noun. For example,

a quaint old shepherd's cottage

probably comments on the age and quaintness of the cottage, not the shepherd.

Most systems will not be able to discern the subtleties of the descriptive nature of descriptive genitives. However, a system should hopefully be able to distinguish which noun head the determiners and premodifiers belong to. In order to test descriptive genitives, make sure there is premodification or predetermination of the noun head in addition to the genitive case marked noun phrase.

Pattern: List ([Det]) ([Premodification]) [NP +GENITIVE] [Head].

Example: List the largest employee's salary.

Pattern: [WH-Word] [BE-Verb] ([Det]) ([Premodification]) [NP +GENITIVE] [Head] ?

Example: What is the largest employee's salary ?

Pattern: [NP] [Verb] ([Det]) ([Premodification]) [NP +GENITIVE] [Head].

Example: Terrorists attacked the many Government's offices.

Pattern: ([Det]) ([Premodification]) [NP +GENITIVE] [Head] [VP].

Example: Well-trained ARENA's guards kidnapped the Prime Minister.

Criteria: Demonstrated understanding that the genitive case-marked noun phrase, and the determiners and modifiers preceding it all modify the noun head following the genitive.

Score: _____

5.2 OF as an Alternative to the Genitive

An alternative form to the genitive for expressing many of the same relationships is the prepositional *of*-phrase. Below are some examples of genitives and the corresponding *of*-phrase forms:

The possessive genitive: *"Mary's husband"*

Corresponding *of*-phrase: *the husband of Mary*

The subjective genitive: *the boy's application to college*

Corresponding *of*-phrase: *the application of the boy to college*

The objective genitive: *the boy's release from jail*

Corresponding *of*-phrase: *the release of the boy from jail*

The genitive of measure: *a ten day's absence*

Corresponding *of*-phrase: *an absence of ten days*

The genitive of attribute: *John Smith's birthday*

Corresponding *of*-phrase: *the birthday of John Smith*

The partitive genitive: *the earth's crust*

Corresponding *of*-phrase: *the crust of the earth*

An *of*-construction has the pattern:

Pattern: [NP]₁ *of* [NP]₂
Example: the address *of* John Smith

Test the *of*-phrase as an alternative form to the genitive. You may test it with any of the above semantic relationships.

Pattern: List [(NP) *of* (NP)].
Example: List the address *of* John Smith.

Pattern: [WH-Word] ((NP)) [BE-Verb] [(NP) *of* (NP)] ?
Example: What is the salary *of* John Smith ?

Pattern: [NP] [Verb] [(NP) *of* (NP)].
Example: Terrorists kidnapped the son *of* the Governor.

Pattern: [(NP) *of* (NP)] [VP].
Example: The son *of* the Governor was kidnapped by terrorists.

Criteria: Demonstrated understanding of the relationship between the noun phrase being postmodified and the postmodifying *of*-phrase.

Score: _____

5.3 WITH as an Alternative to the Genitive

An alternative form to the genitive for expressing possession is the prepositional *with*-phrase. The *with*-construction has the pattern:

Pattern: [NP]₁ *with* [NP]₂
Example: the woman *with* the child

where [NP]₁ is postmodified by [NP]₂.

Test the *with*-phrase as an alternative form to the genitive. You may test it with any of the above semantic relationships.

Pattern: List [(NP) *with* (NP)].
Example: List the employees *with* PhDs.

Pattern: [WH-Word] ([NP]) [BE-Verb] [[NP] with [NP]] ?
Example: What is the department with the highest salaries.

Pattern: [NP] [Verb] [[NP] with [NP]].
Example: Terrorists kidnapped the Governor with Marxist ideals.

Example: (Preliminary Sentence: The guerrillas attacked the farms.)
The Santo Tomas farm is the farm with damage.

Pattern: [[NP] with [NP]] [VP].
Example: The Governor with Marxist ideals was kidnapped by terrorists.

Criteria: Demonstrated understanding of the possessive relationship between the noun phrase preceding the "with" and the noun phrase following it.

Score: _____

5.4 Combinations of Genitives and Alternatives

5.4.1 Genitive and *OF*-Phrase

In this combination, the noun phrase to be marked with the genitive case marking will consist of a noun phrase postmodified by a prepositional phrase *of*-phrase.

The genitive marking in the construction "[[NP] *of* [NP] +_{GENITIVE}] [NP]" marks the "[NP] *of* [NP]". For example, in the sentence fragment:

the oldest employee of the company's salary

the genitive marks: "*the oldest employee of the company*".

Test the *of*-phrase as part of a noun phrase which is case-marked by the genitive.

Pattern: List [[NP] *of* [NP] +_{GENITIVE}] [NP].

Example: List the oldest employee of the company's salary.

Pattern: [WH-Word] ([NP]) [BE-Verb] [[NP] *of* [NP] +_{GENITIVE}] [NP] ?

Example: What is the president of the company's salary ?

Pattern: [NP] [Verb] [[NP] *of* [NP] +_{GENITIVE}] [NP].

Example: Terrorists kidnapped the son of Cuilapa's mayor.

Pattern: [[NP] *of* [NP] +_{GENITIVE}] [NP] [VP].

Examples: The son of Cuilapa's mayor was kidnapped by terrorists.
The manager of President Cerezo's farm was killed in the guerrilla attack.

Criteria: Demonstrated understanding of

- the relationship between the noun phrase following the "of" and the noun phrase

preceding it.

- the relationship between $[[\text{NP}] \text{of} [\text{NP}] +_{\text{GENITIVE}}$ and the noun phrase immediately following.

Score: _____

5.4.2 Combination of the *OF*-Phrase and the *WITH*-Phrase

In this combination, a noun phrase will be postmodified by the prepositional *of*-phrase. The noun phrase in the *of*-phrase will itself be postmodified by the prepositional phrase *with*-phrase.

Test the *of*-phrase as part of a noun phrase which is case-marked by the genitive.

Pattern: List [NP] of [[NP] with [NP]].

Example: List the name of the employee with the highest salary.

Pattern: [WH-Word] ([NP]) [BE-Verb] [NP] of [[NP] with [NP]] ?

Example: What is the sales of the employee with the highest sal

Pattern: [NP] [Verb] [NP] of [[NP] with [NP]].

Example: Terrorists kidnapped the son of the Governor with Marxist ideals.

Pattern: [NP] of [[NP] with [NP]] [VP].

Example: The son of the Governor with Marxist ideals was kidnapped by terrorists.

Criteria: Demonstrated understanding that

- the noun phrase following the preposition "of" in the *of*-phrase is postmodified by the *with*-phrase
- the complete *of*-phrase, including its postmodification, postmodifies the noun phrase which immediately preceded it.

Score: _____

6. Postmodification

6.1 Relative Clauses

A *relative clause* is an embedded sentence that is found in the postmodification position of a noun phrase. A full relative clause consists of a *relative pronoun* followed by a sentence or verb phrase with some omitted constituent(s). For example, the sentence

The plane [that we saw] was a DC-10

includes the relative clause "that we saw" (in brackets). This relative clause consists of the relative pronoun "that" followed by the sentence

we saw (the plane)

where “*the plane*” has been omitted.

Relative pronouns have the double role of referring to its *antecedent*, the head of the noun phrase being modified, and of filling a grammatical function in the relative clause (that of the omitted phrase). For example, in:

The woman [who hired Mark Jones] is a PhD.

“*who*” refers to the woman, and functions grammatically as the subject in the relative clause. In:

The man [whom we saw] was the President.

“*whom*” refers to the man, and functions grammatically as the object in the relative clause.

Relative pronouns are categorized as *personal* or *non-personal*. The personal pronouns are “*that*”, “*who*”, “*whose*”, “*whom*” and the non-personal pronouns are “*which*” and, again, “*that*” and “*whose*”. Personal relative pronouns are used to refer to human beings as well as other entities that are thought to have human characteristics or are thought of in a human-like role. For example, in the sentences:

*The angel [who was making faces] had a tilted halo
Rover, [who was barking], frightened the children.*

the *personal* pronoun is used to refer to an angel, or a pet. *Non-personal* pronouns are used to refer to non-human objects:

The plane [which we saw] was a DC-10

and they may refer to collective entities that are composed of humans:

The committee [which is responsible for facilities] has postponed a decision.

When the relative pronoun is used as an object in the embedded sentence, it may be omitted from the relative clause. Thus the relative pronoun can be omitted from the relative clause “*which we saw*”, in the sentence:

The plane [which we saw] was a DC-10

yielding the equivalent sentence:

The plane [we saw] was a DC-10.

Relative clauses are of two types: *restrictive* and *non-restrictive*. Restrictive relative clauses impose a limitation on the referent of the antecedent, as in:

The person [that is head of the C.S. Department] has a Ph.D. from Princeton.

Non-restrictive relative clauses are parenthetical comments which provide additional information about the referent of the antecedent, but do not further restrict the referent, as in:

The head of the Accounting Department, [who previously worked for Unisys], has been promoted to V.P. for Finance.

The relative pronouns “*who*”, “*whose*”, “*whom*”, and “*which*” can be used in either restrictive or non-restrictive relative clauses, but the relative pronoun “*that*” is **only** used in restrictive relative clauses and is usually the preferred choice.

The following subsections consist of test items that cover the issues discussed above. Be sure to use sentence types that the system has successfully processed. The only new element to be added to a previously tested sentence is the relative clause as postmodifier of a noun phrase. Refer back to the beginning of this current Section III, titled “Noun Phrases”, for the structure of the basic sentence patterns.

6.1.1 Relative Pronoun as Subject

The structure of this type of relative clause is:

Pattern:	[Rel Pronoun]	[VP]
Example:	that	hired Mary Smith
	who	joined the C.S. Department

with the relative pronoun functioning as the grammatical subject. Note that the relative pronoun acts as a [NP] preceding the [VP].

In the next three test items, use this type of relative clause in the postmodification position of a noun phrase.

6.1.1.1 The Relative Pronoun *THAT* - Restrictive Only

Test “*that*” as the relative *subject* pronoun in a relative clause postmodifying a noun phrase.

Eg, Is John Smith the person [that is V.P. of Finance] ?

Eg, Who is the person [that is V.P. of Finance] ?

Eg, List the person [that is V.P. of Finance].

Eg, The terrorists [that attacked the Government house] killed three civilians.

Eg, Terrorists killed the official [that was kidnapped].

Eg, The guerrillas [that attacked the presidential farm] killed a security guard.

Criteria: Demonstrated understanding of the qualification imposed on the noun phrase by the immediately following relative clause.

Score: _____

6.1.1.2 Personal Relative Pronoun *WHO*

Test "*who*" as the relative *subject* pronoun in a relative clause postmodifying a noun phrase.

Eg, Was the man [who boarded the plane in Syracuse] a professor ?

Eg, Is the person [who is head of Department 77] a male ?

Eg, Is John Smith the person [who is head of Department 77] ?

Eg, The terrorists [who attacked the Government house] killed three civilians.

Eg, Terrorists killed the official [who was kidnapped].

Eg, The guerrillas [who attacked the presidential farm] killed a security guard.

Criteria: Demonstrated understanding of the qualification imposed on the noun phrase by the immediately following relative clause with personal relative pronoun.

Score: _____

6.1.1.3 Non-Personal Relative Pronoun *WHICH*

Test "*which*" as the relative *subject* pronoun in a relative clause postmodifying a noun phrase.

Eg, Was the plane [which flew to Syracuse] a DC-10 ?

Eg, Is D77 the department [which includes John Smith] ?

Eg, The terrorist group [which attacked the Government house] killed three civilians.

Eg, ARENA was responsible for the bombing of the government house [which killed three people].

Eg, The guerrilla group [which attacked the presidential farm] killed a security guard.

Criteria: Demonstrated understanding of the qualification imposed on the noun phrase by the immediately following relative clause with non-personal relative pronoun.

Score: _____

6.1.2 Possessive Relative Pronoun (*WHOSE*) as a Determiner

The structure of this type of relative clause is:

Pattern: [Rel Pronoun] [NP -DET] [VP]

Example: whose salary exceeds \$35,000

with the relative pronoun **it WHOSE** functioning as the determinative element of the noun phrase which is the grammatical subject of the relative clause.

Eg, List the employees [whose field is Computer Science].

Eg, List the employees [whose salary exceeds \$35,000].

Eg, Terrorists attacked peasants [whose land was in their territory].

Eg, The guerrillas attacked the president [whose farm is the Santo Tomas farm].

Criteria: Demonstrated understanding:

- that the *whose* functions as a determiner in the relative clause which it begins.
- of the qualification imposed on the noun phrase postmodified by the relative clause introduced by *whose*.

Score: _____

6.1.3 Relative Pronoun as Object

The structure of this type of relative clause is:

Pattern:	[Rel Pronoun]	[NP]	[Verb]
Examples:	that	James Harris	hired
	who	the Chairman	promoted

with the relative pronoun functioning as the (otherwise omitted) grammatical object. Note that there is no [NP] following the [Verb].

In the next three test items, use this type of relative clause in the postmodification position of a noun phrase.

6.1.3.1 The Relative Pronoun *THAT* as Object - Restrictive Only

Test "*that*" as the relative *object* pronoun in a relative clause postmodifying a noun phrase.

Eg, Is John Smith the person [that the V.P of Finance fired] ?

Eg, The Government house [that ARENA attacked] was completely destroyed.

Eg, The farm [that the guerrillas attacked] was the presidential farm.

Criteria: Demonstrated understanding that the noun phrase being postmodified expresses the object of the event or relationship specified by the immediately following relative clause.

Score: _____

6.1.3.2 Personal Relative Pronoun *WHOM* as Object

Test "*whom*" as the relative *object* pronoun in a relative clause postmodifying a noun phrase.

Eg, Was the man [whom we saw] a professor ?

Eg, The government official [whom terrorists killed] was the Honduran Prime minister.

Eg, The government official [whom the guerrillas attacked] was President Cerezo.

Criteria: Demonstrated understanding that the noun phrase being postmodified expresses a person who is the object of the event or relationship specified by the immediately following relative clause.

Score: _____

6.1.3.3 Non-Personal Relative Pronoun *WHICH* as Object

Test "*which*" as the relative *object* pronoun in a relative clause postmodifying a noun phrase.

Eg, Was the plane [which we saw] a DC-10 ?

Eg, Fifty government employees died in the Government house [which terrorists attacked].

Eg, The farm which the guerrillas attacked was the presidential farm.

Criteria: Demonstrated understanding that the noun phrase being postmodified expresses a (non-human) object of the event or relationship specified by the immediately following relative clause.

Score: _____

6.1.4 Deletion of Relative Pronoun Object.

This type of relative clause consists of a noun phrase followed by a verb phrase with its relative pronoun deleted or omitted. The relative pronoun which was used in the initial position in the relative clauses discussed in the preceding sections has been deleted or omitted.

Pattern:	[NP]	[Verb]
Examples:	John Smith the department head	hired promoted

Use a test input with this type of relative clause in the postmodification position of a noun phrase. Be sure that the noun phrase being postmodified expresses the object of the relative clause.

Eg, Was the plane [we saw] a DC-10 ?

- Eg, Is D77 the department [John Smith administers] ?
- Eg, The Honduran Prime minister was the government official [terrorists killed].
- Eg, The Government house [terrorists bombed] was completely destroyed.
- Eg, The farm [the guerrillas attacked] was the presidential farm.

Criteria: Demonstrated understanding that the noun phrase being postmodified expresses the object of the event or relationship specified by the immediately following relative clause.

Score: _____

6.1.5 Relative Pronoun Prepositional Object

Often, a relative pronoun functions as the object of a preposition, as in the sentences:

- The man [for whom Jim Davis works] is a lawyer.*
- The man [who Jim Davis works for] is a lawyer.*

6.1.5.1 Preposition First in the Relative Clause

The structure of this type of relative clause is:

Pattern:	[Preposition]	[Rel Pronoun]	[NP]	[Verb]
Example:	for	whom	Jim Davis	works

Use a test input with this type of relative clause in the postmodification position of a noun phrase.

- Eg, Is John Smith a person [to whom a salary is paid] ?
- Eg, List the employees [for whom John Smith is supervisor].
- Eg, The terrorist leader [for whom ARENA kidnapped the Prime Minister] assassinated the Prime Minister.
- Eg, The government official [against whom the URNG guerrillas conducted an attack] was President Cerezo.
- Eg, Was the plane [of which we spoke] a VSTOL aircraft ?
- Eg, Is D77 the department [of which John Smith is a member] ?
- Eg, Is D77 the department [of which Mary Jones is head] ?
- Eg, The rightwing terrorist alliance [for which ARENA kidnapped the Honduran Prime Minister] attacked Government houses in four countries.
- Eg, The farm [against which the URNG guerrillas conducted an attack] was the Santo Tomas farm.

Criteria: Demonstrated understanding of the qualification imposed on the referent of the noun phrase by the postmodifying relative clause introduced by the preposition.

Score: _____

6.1.5.2 Preposition Following the Verb in the Relative Clause

A frequently occurring form of the relative pronoun acting as the object of a preposition, has the preposition following the verb. The structure of this type of relative clause is:

Pattern: [Rel Pronoun] [NP] [Verb] [Preposition]
Example: whom Jim Davis works for

Use a test input with this type of relative clause in the postmodification position of a noun phrase.

- Eg, Was the man [whom we spoke of] a professor ?
- Eg, Was the man [whom we spoke of] a professor ?
- Eg, Is John Smith the person [whom Tom Harris works for] ?
- Eg, The terrorist leader [whom ARENA kidnapped the Prime Minister for] assassinated the Prime Minister.
- Eg, The government official [whom the URNG guerrillas conducted an attack against] was President Cerezo.
- Eg, Was the plane [which we spoke of] a VSTOL aircraft ?
- Eg, Is D77 the department [that John Smith is a member of] ?
- Eg, The rightwing terrorist alliance [which ARENA kidnapped the Honduran Prime Minister for] attacked Government houses in four countries.
- Eg, The farm [which the URNG guerrillas conducted an attack against] was the Santo Tomas farm.

Criteria: Demonstrated understanding of the qualification imposed on the referent of the noun phrase by the postmodifying relative clause.

Score: _____

6.1.6 Relative Pronoun as Adverbial

A relative pronoun as the object of a preposition can function as an adverbial. For adverbial expressions of time, place, and cause, the preposition and following relative pronoun can be replaced by special adverbs such as "where", "when", "why".

The structure of a relative clause with relative pronoun as adverbial is:

Pattern:	[Preposition]	[Rel Pronoun]	[NP]	[VP]
		<i>or</i>		
		[WH-Adverb]	[NP]	[VP]
<i>Place:</i>				
Examples:	at	which	John Smith	works
		where	John Smith	works
<i>Time:</i>				
Examples:	during	which	John Smith	works
		where	John Smith	works

6.1.6.1 Relative Pronoun as Adverbial for *Place*

6.1.6.1.1 With Preposition and Relative Pronoun

Eg, List the address [at which John Smith resides].

Eg, The country [in which terrorists bombed the Government house] is Honduras.

Eg, The city [in which the guerrillas robbed peasants] is Flores.

Criteria: Demonstrated understanding of the locative qualification imposed on the noun phrase by the immediately following relative clause.

_____ Score: _____

6.1.6.1.2 With *WHERE*

Eg, List the address [where John Smith resides].

Eg, The country [where terrorists bombed the Government house] is Honduras.

Eg, The city [where the guerrillas robbed peasants] is Flores.

Criteria: Demonstrated understanding of the locative qualification imposed on the noun phrase by the immediately following relative clause.

_____ Score: _____

6.1.6.2 Relative Pronoun as Adverbial for *Time*

6.1.6.2.1 With Preposition and Relative Pronoun

Eg, List the date [on which John Smith was hired].

Eg, The date [on which terrorists bombed the Government house]

was December 15.

Eg, The date [on which the guerrillas attacked the farm] is
February 2.

Criteria: Demonstrated understanding of the temporal qualification imposed on the noun phrase by the immediately following relative clause.

_____ Score: _____

6.1.6.2.1 With *WHEN*

Eg, List the date [when John Smith was hired].

Eg, The date [when terrorists bombed the Government house]
was December 15.

Eg, The date [when the guerrillas attacked the farm] is
February 2.

Criteria: Demonstrated understanding of the temporal qualification imposed on the noun phrase by the immediately following relative clause.

_____ Score: _____

6.1.6.3 Omitted Relative Pronoun - Adverbial Case

Eg, List the date [John Smith was hired].

Eg, List the place [John Smith works].

Eg, The date [terrorists bombed the Government house] was
December 15.

Criteria: Demonstrated understanding of the temporal or locative qualification imposed on the noun phrase by the immediately following relative clause.

_____ Score: _____

6.1.7 Multiple Relative Clauses Within the Same Noun Phrase

A noun phrase can have more than one relative clause in postmodifying one noun phrase. The structure of this type of noun phrase is

Pattern:	([Det])	([Premodification])	[Head]	[Relative Clause]	[Relative Clause]
Example:	the		employee	D77 hired	that worked for IBM.

Eg, Is John Smith the employee [D77 hired] [that worked for IBM].
Eg, The terrorist [police captured] [who attacked the Government
house] killed three civilians.

Criteria: Demonstrated understanding of the qualifications imposed on the noun phrase by
the relative clauses which postmodified it.

_____ Score: _____

6.2 Reduced Relative Clauses

Reduced relative clauses are postmodifiers formed by a relative clause from which the relative pronoun and the auxiliary BE-Verb have been deleted.

Pattern:		[NP]	[Postmodification]
Examples:			
Subject Compl. Clause as Postmodifier	Full:	My brother,	who is an engineer,
	Reduced:	My brother,	an engineer,
Progressive Clause as Postmodifier	Full:	the man	who is reading a book
	Reduced:	the man	reading a book
Passive Clause as Postmodifier	Full:	the employee	who was hired yesterday
	Reduced:	the employee	hired yesterday

6.2.1 Subject Complement Clauses

In this subsection, test reduced relative clauses using a noun phrase as subject complement. A full relative clause consisting of a copular sentence such as "*who is an engineer*" is transformed into the noun phrase "*an engineer*" as a reduced relative.

Pattern:		[NP]	[Postmodification]
Examples:			
	Full:	My brother,	who is an engineer,
	Reduced:	My brother,	an engineer,

Use a noun phrase as a reduced relative clause to provide additional description or specification of the noun phrase that it immediately follows as a postmodifier. For more information on subject complements, see *Simple Verb Phrases* in Section I, *Basic Sentences*.

A noun phrase with this type of postmodification looks like:

Pattern:		[NP]	[Subject Comp. Clause]	
	[[([Det))	[(Premodification)]	[Head]]	[Subject Complement]
Examples:	the	new	John Smith,	an employee
			president,	Mary Jones
			ARENA,	a terrorist organization

or more simply, a second noun phrase directly following the head of the postmodified noun phrase.

Full sentence examples with the reduced relative clauses bracketed for ease of identification:

Eg, List the salary of John Smith, [an employee].

Eg, ARENA, a terrorist organization, [killed three civilians].

Criteria: Demonstrated understanding of the qualification imposed on the referent of the noun phrase by the reduced relative clause which immediately follows it as a postmodifier.

Score: _____

6.2.1 Passive Clauses

A passive clause consists of a verb phrase with a passive participle (for regular verbs, a passive participle is the form of a verb with an “-ed” or “-en” ending) as the head of the verb phrase. The verb may be a transitive verb followed by a noun phrase, or it may be an intransitive verb. Test a passive clause as postmodifier of a noun phrase. A noun phrase with this type of postmodification looks like:

Pattern:	[NP]	[Passive Clause]
	[[([Det]) ([Premodification]) [Head]]	[[[Verb + _{PASSIVE}] ([NP])]
Example:	the employee	paid \$35,000

Full sentence examples with the reduced relative clauses bracketed for ease of identification:

Eg, List the employees [paid \$35,000].
Eg, List the female employees [paid \$40,000].
Eg, The Mayor [kidnapped by ARENA] died.

Criteria: Demonstrated understanding of the qualification imposed on the referent of the noun phrase by the passive clause which immediately follows it as a postmodifier.

Score: _____

6.2.2 Progressive Clauses

A progressive clause consists of a verb phrase with a progressive participle (for regular verbs, a progressive participle is the form of a verb with an “-ing” ending) as the head of the verb phrase. The verb may be a transitive verb followed by a noun phrase, or it may be an intransitive verb. Test a progressive clause as postmodifier of a noun phrase. A noun phrase with this type of postmodification looks like:

Pattern:	[NP]	[Progressive Clause]
	[[([Det]) ([Premodification]) [Head]]	[[[Verb + _{PROG}] ([NP])]
Example:	the new employee	selling CPUs.

Full sentence examples with the reduced relative clause bracketed for ease of identification:

Eg, List the employees [selling CPUs].
Eg, The terrorists [attacking the government house] killed the Mayor.

Criteria: Demonstrated understanding of the qualification imposed on the referent of the noun phrase by the progressive clause which immediately follows it as a postmodifier.

Score: _____

6.2.3 Infinitive Clauses

An infinitive clause consists of the infinitive verb (an unmarked verb following the word "to") as the head of a verb phrase. It may be a transitive verb followed by a noun phrase, or it may be an intransitive verb. Test an infinitive clause as a postmodifier of a noun phrase. A noun phrase with this type of postmodification looks like:

Pattern:	[NP]	[Infinitive Clause]
	[([Det]) ([Premodification]) [Head]]	[[Verb + <i>INF</i>] ([NP])]
Example:	the employee	to sell cpus.

Eg, List the names of the employees [to earn \$35,000].

Eg, The terrorists [to be arrested] killed the Mayor.

Criteria: Demonstrated understanding of the qualification imposed on the referent of the noun phrase by the infinitive clause which immediately follows it as a postmodifier.

Score: _____

IV. ADVERBIALS

Following usual principles of classification, such as the similarity of word meaning within a class and where these words may appear, **adverbials** are the most heterogeneous word class.

Words or phrases used to modify anything other than a noun have traditionally been called adverbs or adverbials. Adverbs and adverbials can modify adjectives, other adverbs, verb phrases, clauses, and even sentences. The term "adverbials" refers to both single words adverbs as well as multi-word phrases.

Adverbials (including adverbs) are traditionally classified according to *form* (how they are composed), *function* (what part of a sentence or text they modify), *semantics* (the meaning expressed by the adverbial), and *position* (where in a sentence the adverbial occurs).

There are correspondences between subclasses of adverbials classified by one criteria and subclasses classified by other criteria. For example, the semantic category **attitudinal adverbials** includes those adverbials which express the speaker's attitude. The adverbials in this group will functionally be defined as **meta-sentential adverbials** and will give information outside the scope of the events described by the sentence.

In this section we will only test adverbials according to *form* and *position*, but not according to *function* or *semantics*. With regard to semantics, adverbials express a range of elements which we conceptualize as part of an event, for instance *time* or *space* or *manner*. In Section XII *Semantics of Events*, we discuss and test some of the standard semantic elements of an event including those expressed by adverbials.

Classification According to Form

Adverbials may be classified by form, that is, how they are composed, as follows:

Simple Adverbs are single word items which include:

derivational adverbs, that is, adverbs formed by the process of suffixing *-ly* to an adjective stem, as in *quickly* from *quick*, or *carefully* from *careful*.

non-derivational adverbs, including words which are also adjectives, such as *fast* or *loud*, or lexical items such as *well*, *very*, *how*, *just*, *so*, *soon*, *yet* and so on.

pronominal adverbs including:

demonstrative: *here*, *there*, *now*, *then*, ...

interrogative: *where*, *when*, *how*, *why*, ...

indefinite: *somewhere*, *anywhere*, *everywhere*, *nowhere*, *ever*, *never*, *always*,
...

Prepositional phrases may be used as adverbials. Examples are :

I work in a factory.

Until 8 o'clock I'll be at the store.

Noun phrases are sometimes used as adverbials. Examples are :

I worked *yesterday*.
I am going to London *this year*.

Finite clauses can also be used as adverbials. Finite clauses are subordinate clauses having a finite verb, i.e., one that is tensed and inflected for person. Examples are:

David plays chess *as his father taught him*.
David gave William money *whenever he needed it*.

Non-finite clauses, clauses with a non-finite verb phrase, can function as adverbials. They are classified according to the three non-finite verb types:

to-infinitive, e.g.:

David plays chess *to please his father*.

-ing participle, e.g.:

Standing on a hill, they fought their last battle.

-ed participle, e.g.:

Whenever approached by him, David gave William money.

Verbless clauses do not include a verb, but can nonetheless be analyzed as a clause with a missing *be* and, often, a missing subject. Examples of verbless clauses used as adverbials are:

David plays chess <i>when on holiday</i> .	[when <i>he is</i> on holiday]
<i>Fearless</i> , they fought their last battle.	[<i>Being</i> fearless]
<i>Though indignant at his threats</i> , David gave William money.	[<i>Though he was</i> indignant ...]

Classification According to Position

Given the fairly fixed word order in English, adverbials are the most mobile of all sentence elements and may occur in any of the following positions:

At the beginning of the sentence (*pre-subject* or *initial position*):

Frankly, I don't care for caviar.
Standing on a hill, they fought their last battle.

Between the subject and verb (*pre-verb position*):

John *carefully* opened the door.
He *probably* didn't realize what he was doing.

Between the auxiliary and the main verb:

I should *never* have thought of that.
I should have *never* thought of that.

Between the verb and its direct or indirect object:

He spoke *kindly* to me.
She wrote *in feverish rage* long violent letters of complaint. [Quirk et al, 1985]

At the end of the sentence (*final position*):

The trip was quite enjoyable *after all*.
I work *in a factory*.

Not every adverbial can occur in every position. Furthermore, an adverbial in one position may have a different meaning or function than the same word or phrase in a different position. For example,

Clumsily, John stepped on the snail.

is interpreted as expressing the speaker's attitude that *it was clumsy of John to step on the snail*, while

John stepped on the snail *clumsily*.

is interpreted as expressing the way in which John snail-stepped. The sentence

John *clumsily* stepped on the snail.

is ambiguous between the above two meanings.

1 Adverbs and Adverbials

In this subsection, we are testing simple adverbs and prepositional phrases as adverbials in initial, pre-verb, and final positions.

1.1 Adverbials in Initial Position

In the following subsections, we will test adverbials in the initial position. Below are examples of adverbials in initial position. The adverbials are bracketed for ease of identification.

Eg, [In 1989] who was hired?

Eg, [Last year] what employee received a raise?

Eg, [Yesterday] terrorists bombed the Bank of Colombia.

Eg, [On December 15] assassins kidnapped the Prime Minister.

1.1.1 Simple Adverbs in Initial Position

In the following example, the word "yesterday" is a simple adverb in initial position. It is demonstrating understanding of the sentence:

Yesterday who had a birthday?

an employee database would be expected to calculate yesterday's date, relative to the system's current date, and compare the day to its databank of employees' birthdays.

A MUC system, given the sentence:

Today terrorists bombed the Bank of Columbia.

would be expected to create a template which reflects that a terrorist bombing of the Bank of Columbia occurred on the date that the system considers to be the current date.

Use any sentence pattern(s) from previous sections which the system has successfully processed. Add an [Adverbial] to the beginning of the sentence pattern(s). Some examples are shown below. Now replace the [Adverbial] in the sentence pattern with a simple adverb.

Pattern: [Adverbial] [WH-Word] ([NP]) [VP]?
Example: Yesterday who had a birthday?

Pattern: [Adverbial] [NP] [VP].
Examples: Yesterday terrorists bombed the Bank of Columbia.
Today assassins kidnapped the Prime Minister.
Today the guerrillas attacked the presidential farm.

Criteria: Demonstrated understanding of the meaning expressed by the simple adverb in initial position.

Score: _____

1.1.2 Prepositional Phrases as Adverbials in Initial Position

Use any sentence pattern(s) from previous sections which the system has successfully processed. Add an [Adverbial] to the beginning of the sentence pattern(s). Some examples are shown below. Now replace the [Adverbial] in the sentence pattern with a prepositional phrase ([PP]).

Pattern: [Adverbial] [WH-Word] ([NP]) [VP]?
Examples: In 1989 who sold CPUs?
In the New York office what employee received a raise?

Pattern:	[Adverbial]	[NP]	[VP].
Examples:	In December	terrorists	bombed the Bank of Colombia.
	On December 15	assassins	kidnapped the Prime Minister.
	In Guatemala City,	the guerrillas	bombed a bank.

Criteria: Demonstrated understanding of the meaning expressed by the prepositional phrase in initial position.

Score: _____

1.2 Adverbials in Pre-Verb Position

In the following subsections, we will test adverbials in the pre-verb position, that is, the position between the subject and the verb. Below are examples of adverbials in pre-verb position. The adverbials are bracketed:

Eg, List the branch which [in 1990] hired John Smith.
 Eg, Who [always] works overtime?
 Eg, What branch [only] has women?
 Eg, Terrorists [on December 15] bombed the Bank of Colombia.
 Eg, Assassins [yesterday] kidnapped the Prime Minister.

1.2.1 Simple Adverbs in Pre-Verb Position

Use any sentence pattern(s) from previous sections which the system has successfully processed. Insert an [Adverbial] in front of the [Verb] or [VP] in the sentence pattern. Some examples are shown below. Now replace the [Adverbial] in the sentence pattern with a simple adverb.

Pattern:	List	[NP]	[Rel Pronoun]	[Adverbial]	[VP] ?
Example:	List	the department	which	only	has 3 employees.

Pattern:	[WH-Word]	([NP])	[Adverbial]	[VP] ?
Example:	What	branch	only	has women?

Pattern:	[NP]	[Adverbial]	[VP].
Examples:	Terrorists	today	bombed the Bank of Colombia.
	Assassins	yesterday	kidnapped the Prime Minister.
	The guerrillas	possibly	attacked the farm.

Criteria: Demonstrated understanding of the meaning expressed by the simple adverb in pre-verb position.

Score: _____

1.2.2 Prepositional Phrases as Adverbials in Pre-Verb Position

Use any sentence pattern(s) from previous sections which the system has successfully processed. Insert an [Adverbial] in front of the [Verb] or [VP] in the sentence pattern. Some examples are shown below. Now replace the [Adverbial] in the sentence pattern with a simple prepositional phrase ([PP]).

Pattern: List [NP] [Rel Pronoun] [Adverbial] [VP] ?
Example: List the department which in 1990 hired women.

Pattern: [WH-Word] ([NP]) [Adverbial] [VP] ?
Example: What employees in 1990 sold CPUs?

Pattern: [NP] [Adverbial] [VP].
Examples: Terrorists on December 15 bombed the Bank of Colombia.
Assassins in Guatemala kidnapped the Prime Minister.

Criteria: Demonstrated understanding of the meaning expressed by the prepositional phrase as adverbial in pre-verb position.

Score: _____

1.3 Adverbials in Final Position

In the following subsections, we will test adverbials in the final position, that is, at the end of the sentence. Below are examples of adverbials in final position. The adverbials are bracketed:

Eg, List the department which hired women [in 1990].
Eg, List the employees who were hired [recently].
Eg, List the employees who received a raise [last year].
Eg, Who was hired [in 1989] ?
Eg, Who works [in New York]?
Eg, What employees sold CPUs [in 1990]?
Eg, Terrorists bombed the Bank of Columbia [yesterday].
Eg, Assassins kidnapped the Prime Minister [in Guatemala].

1.3.1 Simple Adverbs in Final Position

Use any sentence pattern(s) from previous sections which the system has successfully processed. Add an [Adverbial] to the end of the sentence pattern. Some examples are shown below. Now replace the [Adverbial] in the sentence pattern with a simple adverb.

Pattern: List [NP] [Rel Pronoun] [VP] [Adverbial].
Example: List the employees who were hired recently.

Pattern: [WH-Word] ([NP]) [VP] [Adverbial] ?
Example: Who is paid weekly?

Pattern: [NP] [VP] [Adverbial].
Examples: Terrorists bombed the Bank of Columbia yesterday.
The guerrillas bombed the embassy yesterday.

Criteria: Demonstrated understanding of the meaning expressed by the simple adverb in final position.

Score: _____

1.3.2 Prepositional Phrases as Adverbials in Final Position

Use any sentence pattern(s) from previous sections which the system has successfully processed. Add an [Adverbial] to the end of the sentence pattern. Some examples are shown below. Now replace the [Adverbial] in the sentence pattern with a prepositional phrase ([PP]).

Pattern: List [NP] [Rel Pronoun] [VP] [Adverbial].
Examples: List the department which hired women in 1990.
List the employees who were hired in 1990.

Pattern: [WH-Word] ([NP]) [VP] [Adverbial] ?
Examples: Who was hired in 1989?
What employees sold CPUs in 1990?

Pattern: [NP] [VP] [Adverbial].
Examples: Terrorists bombed the Bank of Colombia on December 15.
Assassins kidnapped the Prime Minister in Guatemala.
The guerrillas attacked the presidential farm near Guatemala City.
The guerrillas bombed the American Embassy last year.

Criteria: Demonstrated understanding of the meaning expressed by the prepositional phrase as adverbial in final position.

Score: _____

V. VERBS AND VERB PHRASES

1 Temporal Aspect of Verb Phrases

In this section, we will test a system's ability to understand the temporal nature of different categories of verbs, and the system's ability to understand the different tenses and aspectual meanings.

1.1 Stative Verbs

A stative verb is one which denotes a state, that is, one in which there is no inherent concept of change and one in which there is no inherent concept of a beginning or an end.

1.1.1 Quality (Inherent)

These verbs denote relatively permanent and inalienable properties of the subject being referred to, for example, "*to be born at (a certain time)*" or "*to be tall*". Inherent stative verbs may not be used with a progressive aspect:

**A dog is being a mammal.*

1.1.2 State (Non-Inherent)

The non-inherent statives include verbs which denote private states ("*know*", "*believe*", "*feel*", "*dislike*") and others which describe non-inherent configurations of the world, such as "*contain*", "*belong*", or "*resemble*". These verbs, in general, are not used with a progressive aspect:

**Sally is resembling her father.*

**I am believing the proposition X.*

**The box is containing several objects.*

but compare:

I am thinking that the Lakers won't win.

My tooth is aching today.

which express more of an evolving process.

1.1.2.1 Private States

1.1.2.1.1 Intellectual States

Verbs of intellectual states, such as "*know*", "*think*", "*believe*", "*wonder*", "*suppose*" and so on, are often followed by a nominal clause.

1.1.2.1.2 Emotional/Attitudinal States

There appear to be two classes of verbs denoting emotional or attitudinal states. One class, including verbs such as “*intend*”, “*wish*”, “*want*”, “*disagree*”, is followed by a nominal clause as object, while the other, which includes “*like*”, “*dislike*”, “*pity*”, “*disagree with*”, can take a simple object.

1.1.2.1.3 Perceptual States

Verbs of perception (such as “*see*”, “*hear*”, “*taste*”, ...) use the modals “*can*” or “*could*” to refer to a state of perception. The simple present or past expresses an act of perception which has a defined beginning and end. Compare:

I heard the bell ring. [Event seen as a whole]
with
I could hear the bell ring. [Perception continuing over a period]

1.1.2.1.4 Bodily Sensations

Verbs in this set, which includes “*hurt*”, “*ache*”, “*itch*”, “*feel cold*”, have approximately the same meaning in the simple present as in the present progressive.

1.2 Stance

These verbs, including “*live*”, “*sit*”, “*stand*”, “*lie*”, are like statives in that their use with the simple present and past denote a state (“*He lives in Massachusetts*”) but they are unlike statives in that they readily occur with a progressive aspect, denoting a temporary (and thus changing) state of affairs:

He is living in Massachusetts.

1.3 Dynamic Verbs

Dynamic verbs denote events. They may have an inherent durational quality or not, that is, they may take a longer or shorter extent of time. Events that are virtually instantaneous are called *punctual*. Events of a longer duration are called *durational*. Dynamic verbs may be conclusive or non-conclusive, that is, they may have an implicit ending or not.

You may use any successful sentence pattern from previous sections or one of the sentence patterns below. These sentence patterns will be used to test dynamic verbs in the following subsections.

Pattern:	List	[NP]	[Rel Pronoun]	[Verb]	([NP])	([PP]).
Examples:	List	the department	which	hires		in December.
	List	the women	who	work		in the New York branch.

Pattern: [WH-Word] ([NP]) [Verb] ([NP]) ([PP]) ?
 Examples: Who works in New York?
 Which department sold the most CPUs in 1990?

Pattern: [NP] [Verb] ([NP]) ([PP]).
 Examples: Terrorists bombed the Bank of Colombia.
 Assassins kidnapped the Prime Minister.

1.3.1 Non-Conclusive Durative (Activities and Goings-On)

Non-conclusive durative verbs have an associated time extent of an indefinite nature, that is, there is no implicit end to the activity expressed by the verb. If a non-conclusive durative verb takes an agent it is called an "activity". If it doesn't take an agent it is called a "going-on". A segment of an activity or going-on is an event of the same type. Examples of non-conclusive durative verbs are "rain", "shine", "play", "run", "work", "manage (a department)", "detain", "terrorize".

In the following example, in order to demonstrate understanding of the non-conclusive durative verb "work", a system would need to show that the event occurs at the time considered by the system to be the current time, with the temporal endpoint of the event unknown:

List the employees who work in Department 77.

In the next example, in order to demonstrate understanding of the non-conclusive durative verb "remain", a system would need to show that the event occurs at the time considered to be the system's current time, with the endpoint of the event unknown:

Terrorists remain in power in El Salvador.

Test a sentence with a non-conclusive durative verb. The following are examples of such sentences.

Eg, List the employees who work in Department 77.
 Eg, Who supervises the New York office?
 Eg, Terrorists hold the Mayor prisoner.
 Eg, Terrorists remain in power in El Salvador.

Criteria: Demonstrated understanding of the indefinite nature of the time extent of a non-conclusive durative verb, i.e., that there is no implicit end to the activity expressed by the verb.

Score: _____

1.3.2 Conclusive Durative (Accomplishments and Processes)

Conclusive durative verbs have an associated time extent, and they express an ongoing event which culminates in some completion. A conclusive durative verb which takes an agent is called an "accomplishment". One which doesn't take an agent is called a "process". Examples of conclusive durative verbs are "ripen", "improve", "earn (\$40,000)", "sabotage", "cleans (an area)".

With certain adjuncts or objects, activities or goings-on (covered in the previous subsection) may become conclusive, and thus fall into the categories accomplishments and processes. For instance, although "eat" and "run" are activities, "eat dinner" and "run a mile" are accomplishments.

Test an accomplishment or process.

Eg, Who distributes to the New York region?

Eg, List everyone who earned \$25,000 in 1989.

Eg, The Shining Path sabotaged an electric facility.

Eg, The guerrillas attacked the Government House.

Eg, The Armed men burned vehicles in the streets.

Criteria: Demonstrated understanding that a conclusive durative verb expresses a durational event which culminates in a state of completion.

Score: _____

1.3.3 Non-conclusive Punctual (Momentary Acts and Events)

Non-conclusive punctual verbs denote events which involve a change of state and an almost immediate return to the original state. These events are of a very short duration, or even instantaneous. For this reason, non-conclusive punctual verbs are called "momentary". If a momentary verb takes an agent it is called a "momentary act". If it takes no agent it is called a "momentary event". Examples of non-conclusive punctual verbs are "sneeze", "flash", "tap".

If non-conclusive punctual verbs are used in contexts where it is clear that there is a longer time duration over which the event occurs, they are understood to express a repetition of the momentary event. For example, in the sentence "the light flashed for about an hour", it is understood that the light flashed a number times, rather than just once.

Certain punctual verbs such as "kill", "hire", "fire" are non-conclusive when used with no object or with a non-specific object such as a class of things (specified by a plural count noun), and conclusive when used with a specific object (see Section X Reference for more information on specific and non-specific reference). Note that sentence (A), with a non-specific object, is non-conclusive since the event, a series of hiring occurrences, is ongoing, while sentence (B), with a specific object, expresses a conclusive event:

(A) Department 12 hires women

(B) Department 14 fired John Smith.

Test a momentary act or event using a context where there is a longer time duration over which the event occurs. The system should recognize that the momentary act or event repeats over the longer time duration.

- Eg, Who hires in department 12?
- Eg, List the manager in department 17 who fires.
- Eg, ARENA killed in December.
- Eg, ARENA killed civilians in December.

Criteria: Demonstrated understanding that a non-conclusive punctual verb expresses a continuing repetitive event when used in a context with a longer time duration.

_____ Score: _____

1.3.4 Conclusive Punctual (Achievements and Transitory Events)

Conclusive punctual verbs involve a change of state which happens more or less instantaneously. The verbs in this class are called "transitory". Transitory verbs which take an agent (transitory acts) are called "achievements". A "transitory event" is one which takes no agent. Examples of achievements and transitory events are "begin", "end", "die".

There is a set of punctual verbs including "kill", "hire", "fire" which are conclusive when used with a specific object. For example, "kill John Smith" is conclusive because the object *John Smith* has undergone a conclusive state change (in this case going from the state of being alive to that of being dead).

Test an achievement or a transitory event.

- Eg, Who was hired in 1990?
- Eg, List the employees who left in 1990.
- Eg, Armed terrorists kidnapped the Guatemalan Prime Minister.
- Eg, ARENA assassins killed the Prime Minister.
- Eg, The guerrillas bombed the American Embassy yesterday.

Criteria: Demonstrated understanding that a conclusive punctual involves a change of state which is thought of as happening more or less instantaneously.

_____ Score: _____

1.4 Tense / Aspect

In the following section, we test tense and aspect of verbs. Choosing a verb which the system successfully understood, you may choose from the following sentence patterns, or any successful sentence pattern from a previous section, to test verb tense and aspect. In this section, and later sections, we refer to a verb head with any auxiliaries as a "verb group",

which we will denote “[Verb Group]”. In each subsection we will test a different verb group. You will replace the [Verb Group] in the suggested sentence pattern with the specified verb group.

Pattern: List [NP] [Rel Pronoun] [Verb Group] ([NP]) ([PP]).
 Examples: List the department which hired women in 1990.
 List the women who are working in New York.

Pattern: [WH-Word] ([NP]) [Verb Group] ([NP]) ([PP]) ?
 Examples: What employees had sold CPUs in 1990?
 Who works in department 17?

Pattern: [NP] [Verb Group] ([NP]) ([PP]).
 Examples: Terrorists have been bombing downtown San Salvador since December 10.
 Assassins kidnapped the Prime Minister on December 15.

In the examples in the following subsections the verb group is enclosed in brackets for ease of identification. For a more detailed description of tense and aspect, see the *Glossary*.

1.4.1 Simple Tense

1.4.1.1 Simple Present

The **present** tense is indicated by the unmarked form of the verb, as in “*work*”, “*play*”, “*sing*”, “*stretch*”, with the exception of the third person singular form, marked by a final “-s” or “-es”, as in “*works*”, “*plays*”, “*sings*”, “*stretches*”.

The present tense indicates that the event occurs at the current time. Often the event is understood as habitual during a time period which includes the current time. In the following example the *work* is habitual:

Mr Smith works late on Tuesdays.

The present tense of achievements and transitory events cannot be construed as habitual, as these acts and events can only occur once. For example, given the standard reading of “*dying*”, the following sentence does not make sense:

**Mr Smith dies on Tuesdays.*

Replace the [Verb Group] in your chosen sentence pattern with a verb in present tense, denoted by:

[Verb +PRES]

Eg, List the employees who [work] in department 77.

Eg, Who [hires] in department 12?

Eg, Terrorists [assassinate] Prime Ministers.

Eg, Peasants [burn] the Government House every Spring.
Eg, The URNG [claim] responsibility for the attack on the presidential farm.

Criteria: Demonstrated understanding that the event expressed by the verb in the present tense occurs at the time which the system considers to be the current time.

Score: _____

1.4.1.2 Simple Past

The past tense is most often indicated by the addition of the “-ed” suffix to a verb, as in “worked”, “played”. Another common form of the past tense, with verbs with a short “i” vowel sound (“sing”, “sit”) is the replacement of the “i” with an “a”, as in “sang”, or “sat”. In verbs with a final “t”, there is often no difference between the present and the past tense forms, for example, “hit” or “put”.

The past tense indicates that an event occurred in the past. The event may be a specific event, for example:

Armed men attacked a police patrol.

The past tense may also be used with an event which was habitual during a time period in the past, for example, in:

Smith worked from 1981 to 1990.

Replace the [Verb Group] in your chosen sentence pattern with a verb in past tense, denoted by:

[Verb +PAST]

Eg, List the employees who [worked] in 1990.
Eg, Who [sold] vacuum cleaners in 1989?
Eg, The terrorists [kidnapped] the Prime Minister.
Eg, Armed men [attacked] the Government House in Peru.
Eg, The guerrillas [killed] a civilian on February 4.

Criteria: Demonstrated understanding that the event expressed by the verb in the past tense occurred at a time preceding the system’s current time.

Score: _____

1.4.1.3 Simple Future

The **future** tense is indicated by the use of the modal operator "*will*" followed by the unmarked verb. The future tense indicates an event (which may be of a habitual or an ongoing nature) which will take place in the future, as in:

The terrorists will kidnap the Prime Minister in February.

Replace the [Verb Group] in your chosen sentence pattern with a verb in future tense, fitting the pattern:

will [Verb]

Eg, List the women who [will supervise] in 1990.

Eg, Who [will work] in the New York office in 1991?

Eg, The terrorists [will kidnap] the Prime Minister in February.

Eg, Armed men [will attack] the Government House in Peru tomorrow.

Eg, The URNG [will claim] responsibility for the attack on the presidential farm.

Criteria: Demonstrated understanding that event expressed by the verb in the future tense will occur at a time that follows or succeeds the system's current time.

Score: _____

1.4.2 Perfect

The perfect aspect is marked by the use of the [HAVE-Verb] preceding a [Verb (-ed)]. The [HAVE-Verb] is tensed, and the [Verb (-ed)] is called the **-ed participle**, or the **perfect participle**. (It is also the form which is found in **passive** constructions, called the **passive participle**.) It is the verb with an "-ed" or "-en" ending, though English has many irregularities. Examples of the perfect aspect are:

present perfect

have worked

has arrested

have sold

past perfect

had hired

had kidnapped

had sung

future perfect

will have fired

will have attacked

will have eaten

The unmarked form of the [HAVE-Verb] is "*have*". The present tense form is "*have*" or "*has*", with "*has*" being used with a third person singular ("*he*", "*she*", "*it*") subject. The past tense form is "*had*".

When the perfect aspect is used with a stative verb or a non-conclusive durative verb, the event expressed by the verb group:

- begins at a time anterior to that signaled by tense
- the event occurs within a time frame leading up to the time indicated by tense and may continue through the time indicated by tense.

For example, compare the following two sentences:

simple past: *Smith worked here for 10 years.*
 present perfect: *Smith has worked here for 10 years.*

The event described using the simple past has already concluded, while the event described using the present perfect begins before the present but has not necessarily concluded at the present time.

With a conclusive verb, the perfect aspect does not impart the same open-endedness as with a non-conclusive verb, for example:

The cherries have ripened.
The project has begun.

A sentence expressed with the perfect aspect will have a different focus than the same sentence expressed with the simple aspect (by *simple aspect* we mean with no *overt* aspect marking, as in the simple tenses in the previous subsections). The sentence with the simple aspect will have as the focus the actual event, while the sentence with the perfect aspect will have as the focus the state resulting from the event. For example, compare:

simple aspect: *I met your sister.*
 perfect aspect: *I have met your sister.*

The first sentence, with no aspectual marking, focuses on the event mentioned (the actual meeting), while the second, the perfect, focuses on the state resulting from the event (that I already know your sister).

1.4.2.1 Present Perfect

Because of the differences between non-conclusive durative verbs and other verbs with respect to the perfect aspect, in this section we will test the perfect aspect first with a non-conclusive durative verb, and then with any other category verb.

1.4.2.1.1 With a Non-conclusive Durative Verb (Activities or Goings-On)

When the perfect aspect is used with a non-conclusive durative verb, there is an open-ended quality to the event expressed by the verb group. For example, in:

Smith has worked here for 10 years.

there is the understanding that the habitual event of Smith's working is not concluded at the present time.

Using an activity or a going-on, replace the [Verb Group] in your chosen sentence pattern with a verb expressed with the present perfect, which fits the pattern:

have/has [Verb (-ed)]

Eg, List the women who [have supervised] a department in 1991.

Eg, Which salespersons [have worked] in New York?

Eg, Terrorists [have held] the Mayor prisoner since September.

Eg, Terrorists [have remained] in power in El Salvador since March.

Criteria: Demonstrated understanding that the present perfect used with a non-conclusive durative verb indicates that the event:

- begins in the past
- continues to the present and perhaps into the future.

Score: _____

1.4.2.1.2 With a Conclusive or Punctual Verb

With a conclusive verb, the perfect aspect does not impart the same open-endedness as with a non-conclusive verb. For example, in

The cherries have ripened.

it is understood that the process is complete; the cherries are ripe.

Using any conclusive verb (accomplishments, processes, achievements, or transitory event) or a momentary act or event, replace the [Verb Group] in your chosen sentence pattern with a verb expressed with the present perfect, which fits the pattern:

have/has [Verb (-ed)]

Eg, List the salespersons who [have sold] more than five vacuum cleaners.

Eg, Which employees [have earned] \$45,000?

Eg, The terrorists [have kidnapped] the Prime Minister.

Eg, Armed men [have bombed] the Government House in Peru.

Eg, The guerrillas [have killed] a civilian.

Eg, The guerrillas [have attacked] the presidential farm.

Criteria: Demonstrated understanding that the present perfect used with a conclusive or punctual verb indicates that the event:

- begins in the past
- has come to a conclusion by the present moment.

_____ Score:_____

1.4.2.2 Pluperfect (Past Perfect)

An event expressed with the past perfect aspect begins before some temporal reference point in the past, possibly established by an expression within the current sentence or a previous sentence. In the sentence:

Laura Jones had worked in department 12 before John Smith was hired.

the temporal reference point in the past is the point at which *John Smith was hired*, and it is understood that Laura Jones' working starts before Smith's working begins, and may continue up until and even beyond Smith's hire date.

Using any verb, replace the [Verb Group] in your chosen sentence pattern with a verb expressed with the past perfect, which fits the pattern:

had [Verb (-ed)]

Eg, Who [had worked] in department 12 before John Smith was hired?

Eg, List the women who [had earned] \$40,000 by 1989.

Eg, The terrorists [had kidnapped] the Prime Minister.

Eg, Armed men [had attacked] the Government House in Peru.

Eg, The guerrillas [had attacked] the presidential farm before.

Eg, The guerrillas [had bombed] the bank earlier.

Criteria: Demonstrated understanding that the past perfect indicates that the event begins before some temporal reference point which is in the past relative to the system's current time.

_____ Score:_____

1.4.2.3 Future Perfect

An event expressed with the future perfect aspect begins before some temporal reference point in the future, possibly established by an expression within the current sentence or a previous sentence. In the sentence:

Laura Jones will have worked in department 12 before John Smith will be hired.

the temporal reference point in the future is the point at which *John Smith will be hired*, and it is understood that Laura Jones' working starts before Smith's hiring date, and may continue up until and even beyond that time.

Using any verb, replace the [Verb Group] in your chosen sentence pattern with a verb expressed with the future perfect, which fits the pattern:

will have [Verb (-ed)]

Eg, Which salespersons [will have sold] more than Smith in 1991?

Eg, List the women who [will have earned] \$40,000 by 1991.

Eg, Armed men [will have bombed] the telephone company building by May 1.

Eg, The terrorists [will have kidnapped] the Prime Minister.

Eg, By tomorrow, the terrorists [will have kidnapped] the Prime Minister.

Criteria: Demonstrated understanding that the future perfect indicates that the event begins before some temporal reference point which is in the future relative to the system's current time.

Score: _____

1.4.3 Progressive

The progressive aspect is marked by the use of the [BE-Verb] preceding a [Verb (-ing)]. The forms of the [BE-Verb] are as follows:

present tense: "am" (used with "I")
 "is" (used with "he")
 "are" (used with "we", "you", "they")

past tense: "was" (used with "I", "he")
 "were" (used with "we", "you", "they")

future tense: "will", followed by the unmarked "be"

Examples of the progressive aspect are:

present prog.
am working
is earning
are attacking

past prog.
was working
was earning
were attacking

future prog.
will be working
will be earning
will be attacking

When the progressive aspect is used in a verb group, it imparts the following meaning to the event expressed by the verb:

- not being bounded in time, that is, there is no implied beginning and no implied endpoint.
- the event's lack of completion.
- the event's occurrence at the time signaled by tense.

For example,

Mr. Smith is working (now).
The cherries are ripening.

The progressive aspect lends a durative quality to punctual events. For example, with momentary acts and events, which do not specify a lasting change in state, the progressive aspect indicates a continuing repetition of the act or event:

The light is flashing.
The company is hiring several employees.

With achievements or transitory events, which specify an almost instantaneous lasting change in state, the use of the progressive results in the non-conclusive part of the act or event being stretched over time:

Mr. Smith is hiring John Doe right now. [John Doe is not yet hired]

1.4.3.1 Present Progressive

Because of the differences found among the several categories of verbs with respect to the progressive aspect, in this section we will test the progressive aspect with a durative verb (one of either an activity, going-on, accomplishment, or process), a punctual non-conclusive verb (a momentary act or event), and a punctual conclusive verb (an achievement or a transitory event).

1.4.3.1.1 With a Durative Verb

The progressive aspect used with a durative verb indicates that the event expressed by the verb is ongoing at the current time, as in:

Mr. Smith is working.
The cherries are ripening.

Using a durative verb (either an activity, going-on, accomplishment, or process), replace the [Verb Group] in your chosen sentence pattern with a verb expressed with the present progressive, which fits the pattern:

[BE-Verb +PRES] [Verb (-ing)]

- Eg, Which salespersons [are working] in New York?
- Eg, List the women who [are supervising] a department.
- Eg, The arsonists [are burning] the Government House.
- Eg, Armed men [are holding] the Prime Minister prisoner.
- Eg, The guerrillas [are conducting] bombing activities in the city.
- Eg, The rebels [are burning] vehicles in the streets.

Criteria: Demonstrated understanding that the progressive aspect used with a durative verb indicates that the event has no implied beginning, and is ongoing at the present time with no implied endpoint.

Score: _____

1.4.3.1.2 With a Punctual Non-Conclusive Verb (Momentary Act or Momentary Event)

The progressive aspect lends a durative quality to punctual events. For example, with momentary acts and events, which do not specify a lasting change in state, the progressive aspect indicates a continuing repetition of the act or event.

The light is flashing.

The company is hiring several employees.

Using a momentary act or momentary event, replace the [Verb Group] in your chosen sentence pattern with a verb expressed with the present progressive, which fits the pattern:

[BE-Verb +PRES] [Verb (-ing)]

- Eg, List the department which [is hiring] women.
- Eg, Which salespersons [are selling] CPUs in New York?
- Eg, ARENA [is bombing] banks in El Salvador.
- Eg, Armed men [are killing] civilians in Peru.
- Eg, The guerrillas [are robbing] banks in Guatemala.

Criteria: Demonstrated understanding that the progressive aspect used with a punctual non-conclusive verb indicates a continuing repetition of the act or event expressed by the verb, with no implied beginning.

Score: _____

1.4.3.1.3 With a Punctual Conclusive Verb (Achievement or Transitory Event)

With achievements or transitory verbs, which express an almost instantaneous change in state, the progressive aspect signals that the preliminary events leading up to the change of state are ongoing. The state change is not concluded. Given the sentence

The Mayor is dying from gunshot wounds.

it is understand that the Mayor is not yet dead.

Using an achievement or transitory event, replace the [Verb Group] in your chosen sentence pattern with a verb expressed with the present progressive, which fits the pattern:

[BE-Verb +PRES] [Verb (-ing)]

Eg, List the department which [is finishing] a project.

Eg, List the employee who [is selling] the most.

Eg, The Mayor [is dying] from wounds from the terrorist attack in December.

Eg, Armed men [are assassinating] the Prime Minister.

Eg, The guerrillas [are stealing] food from the presidential farm.

Criteria: Demonstrated understanding that the progressive aspect used with a punctual conclusive verb indicates that the preliminary events leading up to a change of state, which has not yet occurred, are ongoing.

Score: _____

1.4.3.2 Past Progressive

The past progressive indicates that the event expressed by the verb is ongoing and not complete at some time in the past. In the following sentence, the attack is ongoing at the point in time of the shooting of the president:

The terrorists were attacking the Government House, when the President was shot.

Using any verb, replace the [Verb Group] in your chosen sentence pattern with a verb expressed with the past progressive, which fits the pattern:

[BE-Verb +PAST] [Verb (-ing)]

Eg, Which salespersons [were working] in New York in 1990?

Eg, List the woman who [was supervising] in 1989.

Eg, The terrorists [were attacking] the Government House.

- Eg, Armed men [were bombing] an electric facility.
Eg, The guerrillas [were attacking] the presidential farm in February.
Eg, The rebels [were stealing] food this morning.

Criteria: Demonstrated understanding that the past progressive aspect indicates that the event was ongoing and not concluded at some time in the past.

Score: _____

1.4.3.3 Future Progressive

The future progressive indicates that the event expressed by the verb is ongoing and not complete at some time in the future. In the following sentence, the meeting of the conference will be ongoing at the time of Mr Bush's flight:

The Latin American Peace Conference will be meeting when Mr Bush flies to Guatemala.

Using any verb, replace the [Verb Group] in your chosen sentence pattern with a verb expressed with the future progressive, which fits the pattern:

will be [Verb (-ing)]

- Eg, List the women who [will be supervising] a department.
Eg, Which salespersons [will be working] in New York in 1992?
Eg, The terrorists [will be attacking] the Government House.
Eg, Armed men [will be bombing] an electric facility.
Eg, The guerrillas [will be attacking] the presidential farm next week.
Eg, The guerrillas [will be bombing] the banks soon.

Criteria: Demonstrated understanding that the future progressive aspect indicates that the event is ongoing at some point in the future.

Score: _____

1.4.4 Perfect Progressive

The perfect progressive aspect is marked by the use of the [HAVE-Verb] followed by the -ed participle of the [BE-Verb], "been", followed by a [Verb (-ing)]. For example,

present perf. prog.
has been working
have been eating
has been arresting

past perf. prog.
have been hiring
had been kidnapping
had been kidnapping

future perf. prog.
had been firing
will have been attacking
will have been attacking

The unmarked form of the [HAVE-Verb] is "have". The present tense form is "have" or "has", with "has" being used with a third person singular ("he", "she", "it") subject. The past tense form is "had".

When the perfect progressive aspect is used in a verb group, it imparts the following meaning to the event expressed by the verb:

- an extent in time, or a duration, to the event described.
- the event begins before the reference point, the time indicated by tense.
- the event's lack of completion at the reference point.

Contrasting the present progressive with the present perfect progressive, we see that in both cases there is an unboundedness in time indicated by the progressive, and we can see that the perfect supplies the meaning of the event starting at an earlier point in the past:

present progressive: *I am writing a paper.*
present perfect progressive: *I have been writing a paper.*

The incompleteness of an event, which is inherent in events described using the progressive aspect, though not necessarily inherent in events described with the perfect aspect, is found with the perfect progressive. Compare the perfect progressive, above, with the perfect:

present perfect: *I have written a paper.*

As with the progressive, there is an durative quality given to punctual events which are described with the perfect progressive. With momentary acts and events, which specify a change in state and an almost immediate return to the original state, the perfect progressive aspect indicates a continued repetition of the act or event, beginning anterior to the time indicated by tense:

The light has been flashing.
Mr. Smith has been hiring for two years. [In charge of hiring]

With achievements or transitory events, which specify an almost instantaneous lasting change in state, the use of the perfect progressive results in the non-conclusive part of the act or event being stretched over time, beginning anterior to the time indicated by tense:

The terminally-ill patient has been dying for several days.

1.4.4.1 Present Perfect Progressive

The differences found among the several categories of verbs with respect to the perfect progressive aspect are also found with respect to the progressive aspect, and have been tested above, in that section. Therefore, we will not differentiate among the different classes of verbs here.

The present perfect progressive aspect indicates that the event has a time duration beginning in the past, and not completed at present.

Using any verb, replace the [Verb Group] in your chosen sentence pattern with a verb expressed with the present perfect progressive, which fits the pattern:

have/has been [Verb (-ing)]

Eg, Which salespersons [have been working] in New York?

Eg, List the PhD who [has been supervising] a department.

Eg, The terrorists [have been attacking] the Government House.

Eg, Armed men [have been sabotage] an electric facility.

Eg, The guerrillas [have been attacking] the farm since yesterday.

Eg, The rebels [have been burning] vehicles in the streets.

Criteria: Demonstrated understanding that the present perfect progressive aspect indicates:

- an extent in time, or a duration, to the event expressed by the verb
- the event begins in the past
- the event is not completed at present.

Score: _____

1.4.4.2 Past Perfect Progressive

The present perfect progressive aspect indicates that the event has a time duration beginning prior to a temporal reference point in the past and was not completed at that past temporal reference point.

Using any verb, replace the [Verb Group] in your chosen sentence pattern with a verb expressed with the past perfect progressive, which fits the pattern:

had been [Verb (-ing)]

Eg, List the women who [had been supervising] a department in 1989.

Eg, Which salespersons [had been working] in New York in 1989?

Eg, The terrorists [had been attacking] the Government House.

Eg, Armed men [had been sabotaging] an electric facility.

Eg, The guerrillas [had been attacking] the presidential farm in 1989.

Criteria: Demonstrated understanding that the past perfect progressive aspect indicates:

- an extent in time, or a duration, to the event expressed by the verb
- the event begins prior to a temporal reference point in the past
- the event is not completed by the past temporal reference point.

Score: _____

1.4.4.3 Future Perfect Progressive

The future perfect progressive aspect indicates that the event has a time duration beginning prior to a temporal reference point in the future and is not completed at that future temporal reference point.

Using any verb, replace the [Verb Group] in your chosen sentence pattern with a verb expressed with the future perfect progressive, which fits the pattern:

will have been [Verb (-ing)]

Eg, List the employees who [will have been working] 12 years in 1992.

Eg, The terrorists [will have been attacking] the Government House for three months in June.

Eg, Armed men [will have been sabotaging] an electric facility for three days.

Eg, The guerrillas [will have been holding] the mayor hostage for a week today.

Criteria: Demonstrated understanding that the future perfect progressive aspect indicates:

- an extent in time, or a duration, to the event expressed by the verb
- the event begins prior to a temporal reference point in the future
- the event is not completed by the future temporal reference point.

Score: _____

VI. QUANTIFIERS

Quantifiers are words such as “*all*”, “*some*”, “*many*”, “*none*”, and “*every*” which indicate how many or how much of some entity is being referred to. Quantifiers are found in a number of sentence positions, including predeterminer position, central determiner position, postdeterminer position, and noun phrase head position (functioning as pronouns). Remember that the determinative element of a noun phrase has up to three elements, with the *predeterminer* being first, the *central determiner* being next, and the *postdeterminer* being last. For more information on determinatives, see section III, *Noun Phrases*, subsection 3, *Determinatives in More Detail*. In the following examples of different quantifier position, the quantifier is enclosed in brackets for ease of identification:

Predeterminer position:

Here are [all] the employees in the New York Branch.

Central determiner position:

[Some] employees recently received a raise.

Postdeterminer position:

The [few] employees in sales also received promotions.

Noun phrase head position:

[Five] of the secretaries received mid-year bonuses.

In the first subsection we test quantifiers in certain functional positions. In the second subsection we test quantifiers with respect to meaning. In the third subsection we test quantifier pronouns. In the fourth subsection we test existential *there* sentences. In the fifth subsection we test universal adjectives.

1. Functional Position of Quantifiers

1.1 Quantifiers in Determinative Positions

Quantifiers which occur as part of the determinative of a noun phrase are referred to as **determiner quantifiers**. Quantifiers can occur in predeterminer, central determiner, and postdeterminer position.

Below are some suggested sentence patterns. In each subsection, you will replace the [NP +_{DET} QUANT] (denoting a noun phrase with a quantifier in a determiner position) with a noun phrase which incorporates the specified type of determiner quantifier.

In the following subsections we will use [NP -_{DET}] to denote a noun phrase without determinative. In the examples in each subsection we will bracket the complete noun phrase including the quantifier determinative element.

Note that a noun phrase includes optional postmodification.

MAIN DETERMINER QUANTIFIER PATTERNS:

Pattern: List [NP +_{DET} QUANT].

Example: List all employees in Department 77.

Pattern: List [NP] [Rel Pronoun] [Verb] [NP +_{DET} QUANT].

Example: List the salespersons who sold five vacuum cleaners.

Pattern: What ([NP]) [BE-Verb] [NP +_{DET} QUANT] [Verb (-ing)] ?

Example: What items are all the six salesmen in New York selling?

Pattern: What ([NP]) [BE-Verb] [NP +_{DET} QUANT] [Verb (-ed)] ?

Example: What are all the employees in payroll paid?

Pattern: Who [BE-Verb] [NP +_{DET} QUANT] ?

Example: Who are both the Vice Presidents of Shipping ?

Pattern: What ([NP]) [DO-Verb] [NP +_{DET} QUANT] [Verb] ?

Example: What benefits do some employees receive?

Pattern: What ([NP]) [Verb] [NP +_{DET} QUANT] ?

Example: What regions sell all the items in the catalog ?

Pattern: [NP +_{DET} QUANT] [VP].

Example: Six electric facilities in Bolivia were bombed by terrorists.

Pattern: [NP] [Verb] [NP +_{DET} QUANT].

Example: The terrorists shot the few Ambassadors at the Peruvian Embassy.

1.1.1 Quantifiers in Predeterminer Position

Predeterminer quantifiers include "all", "both", and the *fractions* and *multipliers*. These quantifiers are called "predeterminer quantifiers" because they are used to precede central determiners (e.g., "the", "a/an", "this", "that", "these", "those").

1.1.1.1 With Count Nouns

Test a predeterminer quantifier with a count noun. Use the article "the" as the central determiner. Use "both" only when quantifying over a noun phrase which expresses a group with exactly two elements in it.

Replace the [NP +_{DET} QUANT] in the MAIN DETERMINER QUANTIFIER PATTERNS with:

Pattern: [Predeterminer Quantifier] the [NP -_{DET}]

Example: all the employees in department 12.

The following full sentence examples incorporate this pattern:

Eg, List [all the employees in department 12].

- Eg, List [twice the salary of John Smith].
- Eg, What are [all the employees in the payroll department] paid?
- Eg, What products do [both the women in Chicago] sell?
- Eg, What is [half the salary of John Smith]?
- Eg, The terrorists shot [all the Ambassadors at the Peruvian Embassy].
- Eg, Terrorists bombed [both the Telephone Communications buildings in Nicaragua].
- Eg, Terrorists killed [half the border patrol at the Nicaraguan border].
- Eg, (Preliminary Sentence: Terrorists attacked twelve border guards at the Nicaraguan border.) The terrorists killed [half the guards].
- Eg, [All the electric facilities in Bolivia] were bombed by terrorists.
- Eg, Two Mayors were killed. [Twice the number] were kidnapped.
- Eg, [All the buildings] were burned in the guerrilla attack.

Criteria: Demonstrated understanding of the quantity indicated by the *predeterminer quantifier*.

Score: _____

1.1.1.2 With Mass Nouns

Use "all" to test a predeterminer quantifier with a mass noun. Use the article "the" as the central determiner.

Replace the [NP +DET QUANT] in the MAIN DETERMINER QUANTIFIER PATTERNS with:

Pattern: *all the* [NP -DET, +MASS]

Example: all the information about John Smith.

The following full sentence examples incorporate this pattern:

- Eg, List [all the information about John Smith].
- Eg, What department has [all the computer expertise]?
- Eg, [All the information about ARENA] was destroyed in an attack on the government house.
- Eg, [All the dynamite] was stolen by the URNG.

Criteria: Demonstrated understanding of the totality indicated by the predeterminer quantifier "all".

Score: _____

1.1.2 Quantifiers in Postdeterminer Position

Postdeterminer quantifiers include “*many*”, “*few*”, and the *cardinal numbers*. These quantifiers are called “postdeterminer quantifiers” because they are used to follow a central determiner (e.g., “*the*”, “*a/an*”, “*this*”, “*that*”, “*these*”, “*those*”).

When a quantifier follows the definite article “*the*”, the speaker *presupposes* the quantity mentioned is correct. For example, the sentence

List the one research assistant in department 17.

is an incorrect sentence if there is not exactly one research assistant in department 17 (that is, if there are zero, or two or more research assistants). The sentence

List the many managers of the company.

presupposes that there are many managers. If there are not many, but just a few, the sentence is incorrect.

Incorrect use of quantifiers as described above is a form of “*failed presupposition*”. Do not test sentences which include a failed presupposition unless you are specifically requested to do so.

1.1.2.1 Successful Presupposition

Test a sentence with a postdeterminer quantifier following the article “*the*”. Make sure there is no error in the presupposition.

Replace the [NP +_{DET} QUANT] in the MAIN DETERMINER QUANTIFIER PATTERNS with:

Pattern: *the* [Postdeterminer Quantifier] [NP -_{DET}]

Example: *the many* employees in department 7

The following full sentence examples incorporate this pattern:

Eg, List [the many employees in department 7].

Eg, List [the two women at the Chicago branch].

Eg, What do [the three salespersons in the New York office] earn?

Eg, ARENA kidnapped [the two men who guard the Government House].

Eg, [The few terrorists] attacked the Government House.

Eg, [The one terrorist who kidnapped the Prime Minister] died later in an explosion.

Eg, [The two presidential farms] were attacked by the URNG.

Criteria: Demonstrated understanding of the quantity indicated by the *postdeterminer quantifier*.

1.1.2.2 Failed Presupposition

Test a sentence with a postdeterminer quantifier following the article "the". Make sure there is an error in the presupposition. For example, if there are only five salespersons you could say "List the seven salespersons."

Replace the [NP +DET QUANT] in the MAIN DETERMINER QUANTIFIER PATTERNS with:

Pattern: the [Postdeterminer Quantifier] [NP -DET]
Example: the many employees in department 7

The following full sentence examples incorporate this pattern:

- Eg, List [the two women at the Chicago branch].
- Eg, List [the five employees who earned \$40,000 in 1990].
- Eg, What do [the three salespersons in the New York office] earn?
- Eg, (Preliminary Sentence: ARENA kidnapped two officials.) [The many officials] were later killed.
- Eg, (Preliminary Sentence: Seven terrorists attacked the Government House.) [The eight terrorists] were killed.
- Eg, (Preliminary Sentence: Two terrorists kidnapped the Prime Minister.) [The one terrorist who kidnapped the Prime Minister] died later in an explosion.

Criteria: Demonstrated understanding that an error occurred because the amount expressed by the *postdeterminer quantifier* following the definite article "the" differed from the known amount of the entity expressed by the noun phrase being quantified.

1.1.3 Quantifiers in Central Determiner Position

Central determiner quantifiers include "each", "every", "some", "either", "any", "neither", "no", and so on. They are called "central determiner quantifiers" because they neither follow nor precede a central determiner (e.g., "the", "a/an", "this", "that", "these", "those").

Replace the [NP +DET QUANT] in the MAIN DETERMINER QUANTIFIER PATTERNS with:

Pattern: [Central Determiner Quantifier] [NP -DET]
Example: every Manager who earns above \$45,000

The following full sentence examples incorporate this pattern:

- Eg, List [every Manager who earns above \$45,000].

- Eg, List [some employees in the Chicago branch].
- Eg, List the employees with [no degree].
- Eg, What does [each employee] earn?
- Eg, What products does [every salesperson] sell?
- Eg, What education does [either woman in New York] have?
- Eg, What department includes [no women]?
- Eg, Ten terrorists bombed electric facilities. [Every terrorist] bombed one electric facility.
- Eg, [Some information about ARENA] was destroyed in an attack on the government house.
- Eg, [Neither Marxist group] claimed they bombed the Government House.
- Eg, Terrorists killed [any government official whom they saw].
- Eg, Terrorists killed [every Senator] in the attack on the Government House.

Criteria: Demonstrated understanding of the quantity indicated by the *central determiner quantifier*.

Score: _____

1.1.4 Predeterminer and Postdeterminer Combinations

1.1.4.1 Without a Central Determiner

Replace the [NP +DET QUANT] in the MAIN DETERMINER QUANTIFIER PATTERNS with:

Pattern:	[Predeterminer Quantifier]	[Postdeterminer Quantifier]	[NP -DET]
Example:	all	five	employees in Chicago

The following full sentence examples incorporate this pattern:

- Eg, Who are [all five employees in Chicago]?
- Eg, What are [both two women in Chicago] paid?
- Eg, List [all few women in the New York branch].
- Eg, [All 100 men in ARENA] bombed the Government House.
- Eg, [All few Government Officials] were killed.
- Eg, ARENA bombed [all seven electric facilities].
- Eg, ARENA bombed [all few electric facilities].
- Eg, (Preliminary Sentence: Five Farms were attacked by the URNG.)
[All five farms] were destroyed.

Criteria: Demonstrated that it determined the correct amount expressed by the combination of *predeterminer* and *postdeterminer* quantifiers, and correctly interpreted the quantified noun phrase.

Score: _____

1.1.4.2 With an Article as Central Determiner

Use the article "*the*" as the central determiner. Replace the [NP +DET QUANT] in the MAIN DETERMINER QUANTIFIER PATTERNS with:

Pattern: [Predeterminer Quant.] *the* [Postdeterminer Quant.] [NP -DET]
Example: both the two women

The following full sentence examples incorporate this pattern:

- Eg, List [half the many employees in the company].
- Eg, What are [both the two women in Chicago] paid?
- Eg, Who are [all the five employees in Chicago]?
- Eg, List [all the few women in the New York branch].
- Eg, [All the 100 men in ARENA] bombed the Government House.
- Eg, [All the seven Government Officials] were killed.
- Eg, ARENA bombed [both the electric facilities].
- Eg, ARENA bombed [half the six electric facilities].
- Eg, [Both the two presidential farms] were attacked by the URNG.

Criteria: Demonstrated that it determined the correct amount expressed by the combination of *predeterminer* and *postdeterminer* quantifiers with a central determiner, and correctly interpreted the quantified noun phrase.

Score: _____

1.2 Quantifiers as Noun Phrase Head

In this section we test quantifiers as noun phrase head with a partitive *of*-phrase. A partitive *of*-phrase is structurally a prepositional phrase with the preposition *of*. A quantifier expresses an amount of some entity and the noun phrase which is the object of the partitive *of* prepositional phrase specifies the entity being quantified. In the sentence below, the entity is the *collection of employees in Chicago* and the amount being expressed is *all*:

All of the employees in Chicago are well-paid.

Quantifiers used as heads of noun phrases are called "*quantifier pronouns*". Quantifier pronouns include "*all*", "*both*", "*each*", "*some*", "*much*", "*many*", "*more*", "*most*", "*little*", "*few*", "*fewer*", "*fewest*", "*less*", "*least*", "*any*", "*either*", "*none*", "*neither*", and the *cardinal numbers*.

- Eg, List [all of the employees in Chicago].
- Eg, List [both of the women in the Chicago branch].

- Eg, List the positions with [many of the benefits].
- Eg, List the department with [the fewest of the employees].
- Eg, List [any of the branches].
- Eg, List [one of the women in the New York branch].
- Eg, What is [each of the employees] paid?
- Eg, What is [some of the information about Joe Smith]?
- Eg, What departments have [more of the PhDs] ?
- Eg, Are [most of the employees] paid over \$25,000?
- Eg, Who earns [the least of the employees]?
- Eg, [Few of the Cabinet Members] were killed in the explosion at the Government House.
- Eg, [Each of the three Cabinet Members] was killed by a carbomb.
- Eg, Terrorists burned [much of the information] in the attack on the Government House.
- Eg, [Neither of the Cabinet Members] were killed by the carbomb.
- Eg, Terrorists killed [six of the officials] in the bombing of the Government House.
- Eg, [All of the workers] were injured in the URNG attack on the Santo Tomas farm.

Criteria: Demonstrated understanding of the quantity indicated by the *quantifier pronoun*.

Score: _____

2. Semantics of Quantifiers

In the following subsections, we will test quantifiers with respect to their meanings. In the previous subsection, we tested quantifiers in a number of functional positions, including pre-determiner position, central determiner position, postdeterminer position, and noun phrase head position. In the following subsections, use each quantifier in a position which has been successfully tested. Do not use a sentence which has a failed presupposition unless you are specifically requested to do so.

In the examples in this subsection, the noun phrase in which the quantifier appears either as a determinative or a head is enclosed in brackets for ease of identification.

2.1 Universal Quantifiers

2.1.1 ALL

The universal quantifier "*all*" expresses *the entire quantity or amount; totality*.

- Eg, List [all employees in Department 77].
- Eg, What are [all employees in the payroll department] paid?
- Eg, What benefits do [all of the employees] receive?
- Eg, What branches have [all the women]?

- Eg, [All electric facilities in Bolivia] were bombed by terrorists.
 Eg, [All the information about ARENA] was destroyed in an attack on
 Eg, A carbomb killed [all of the Cabinet Members].
 Eg, [All the buildings at the presidential farm] were burned in a
 guerrilla attack.
 Eg, [All of the workers] were injured in an URNG attack on the Santo
 Tomas farm.

Criteria: Demonstrated understanding that the universal quantifier "all" expresses *the entire quantity or amount; totality*.

Score: _____

2.1.2 BOTH

The universal quantifier "both" expresses *each of two*.

In a sentence using "both" as a quantifier, it is *presupposed* that the quantified noun phrase expresses exactly two objects. For example, the sentence

List both research assistants in department 17.

is in error if there are not exactly two research assistants in department 17. This type of error is known as *failed presupposition*.

2.1.2.1 Successful Presupposition

Successful presupposition occurs in sentences where there is a presupposition which is not mistaken. For example, in the sentence

List both research assistants in department 17.

it is presupposed that there are exactly two research assistants. If the presupposition holds, it is called a "*successful presupposition*".

Test "both" as a quantifier in a noun phrase which refers to a set containing exactly two elements.

Replace the [NP +_{DET} QUANT] in the MAIN DETERMINER QUANTIFIER PATTERNS with:

both (the) [NP]: (where the noun phrase expresses two objects)

- Eg, List [both of the women] in department 12.
 Eg, What salaries do [both the Smiths] earn?
 Eg, [Both the Government houses] exploded.
 Eg, [Both of the Cabinet Members] were killed by a carbomb.

Eg, Terrorists bombed [both Telephone Communications buildings] in Nicaragua.

Eg, (Preliminary Sentence: Two men were kidnapped by URNG guerrillas.) [Both the kidnap victims] were murdered in Guatemala City.

Eg, [Both the two presidential farms] were attacked by the URNG.

Criteria: Demonstrated understanding that the universal quantifier "both" expresses *each of two*.

Score: _____

2.1.2.2 Failed Presupposition

Test "both" as a quantifier for a noun phrase which refers to a set that does *not* contain two elements. The system should give evidence that it recognizes that an error has been made.

Replace the [NP +_{DET} QUANT] in the MAIN DETERMINER QUANTIFIER PATTERNS with:

both (the) [NP]: (where the number of the [NP] is *not* two)

Eg, List [both the women in Chicago]. (where there is only one)

Eg, What are [both of the salespersons] paid? (where there are more than two)

Eg, Terrorists kidnapped the Prime Minister and killed [both of them].

Eg, (Preliminary Sentence: Three men were kidnapped by URNG guerrillas.) [Both the kidnap victims] were murdered in Guatemala City.

Criteria: Demonstrated recognition of the contradiction between the quantifier "both" and the number of objects contained in the set expressed by the noun phrase which it quantifies.

Score: _____

2.1.3 EACH

The universal quantifier "each" expresses *every one of the distinct individuals (of a set containing two or more elements) considered separately from the rest*.

"Each" has a distributive meaning. That is, it picks out the members of a set singly, rather than as a mass. Thus, the sentence:

What does each Manager earn?

is interpreted as:

Consider the managers one at a time. What does the manager presently being considered earn?

Eg, What does [each employee] earn?

Eg, What is [each of the women] paid?

Eg, (Preliminary Sentence: Ten terrorists bombed electric facilities.) [Each terrorist] bombed one electric facility.

Eg, Terrorists killed [each of the five union leaders in Cuilapa].

Eg, (Preliminary Sentence: Five farms were attacked by URNG guerrillas.) [Each farm] was destroyed in the attack.

Criteria: Demonstrated understanding that the universal quantifier "each" expresses *every one of the distinct individuals (of a set containing two or more elements) considered separately from the rest.*

Score: _____

2.1.4 EVERY

The universal quantifier "every" expresses *each individual or part of a group without exception.*

"Every" has both a distributive meaning and a non-distributive meaning. If its meaning is distributive, it picks out the members of the group expressed by the quantified noun phrase individually. If its meaning is non-distributive, it treats the group expressed by the quantified noun phrase as a unit.

Eg, What product does [every employee] sell?

Eg, List [every Manager who earns above \$45,000]?

Eg, (Preliminary Sentence: Ten terrorists bombed electric facilities.) [Every terrorist] bombed one electric facility.

Eg, (Preliminary Sentence: Ten electric facilities were bombed last week.) ARENA had bombed [every electric facility in San Salvador].

Eg, (Preliminary Sentence: Five farms were attacked by URNG guerrillas.) [Every farm] was destroyed in the attack.

Criteria: Demonstrated understanding that the universal quantifier "every" expresses *each individual or part of a group without exception.*

Score: _____

2.2 Existential Assertive Quantifiers

2.2.1 SOME

The existential quantifier "some" expresses *a part of an object or an unspecified number of objects.*

- Eg, List [some employees in the New York office].
- Eg, What products do [some of the salespersons] sell?
- Eg, [Some of the Cabinet Members] were killed by a carbomb.
- Eg, Terrorists killed [some peasants in Cuilapa].
- Eg, (Preliminary Sentence: Five farms were attacked by URNG guerrillas.) [Some farms] were destroyed in the attack.
- Eg, [Some dynamite] was stolen by URNG guerrillas on February 5.

Criteria: Demonstrated understanding that the existential quantifier "some" expresses *a part of an object or an unspecified number of objects.*

_____ Score: _____

2.2.2 SEVERAL

The existential quantifier "several" expresses *more than two but fewer than many.*

- Eg, List [several employees].
- Eg, What salary do [several of the salespersons] earn?
- Eg, [Several of the terrorists in ARENA] attacked the Government House.
- Eg, ARENA kidnapped [several Government Officials].

Criteria: Demonstrated understanding that the existential quantifier "several" expresses *more than two but fewer than many.*

_____ Score: _____

2.2.3 Multal

"Multal" means a large amount.

2.2.3.1 MANY

The existential quantifier "many" expresses *a large but indefinite number.*

- Eg, List [the many employees in department 7].

- Eg, What product do [many salespersons] sell?
- Eg, What degree do [many of the employees] have?
- Eg, [Many Cabinet Members] were killed by a carbomb.
- Eg, Terrorists killed [many of the peasants in Cuilapa].
- Eg, [Many peasants] were injured during an attack by URNG guerrillas.
- Eg, [Many of the dynamite sticks at the presidential farm] were stolen by guerrillas.

Criteria: Demonstrated understanding that the existential quantifier "many" expresses a large but indefinite number.

_____ Score: _____

2.2.3.2 MUCH

The existential quantifier "much" expresses a large quantity, amount, extent, or degree. "Much" quantifies over mass nouns, as opposed to count nouns.

- Eg, List the departments which have [much of the computer expertise].
- Eg, Terrorists burned [much information about their activities] in an attack on the Government House.
- Eg, [Much of the dynamite at the presidential farm] was stolen by guerrillas.

Criteria: Demonstrated understanding that the existential quantifier "much" expresses a large amount of the substance expressed by the mass noun which it quantifies.

_____ Score: _____

2.2.3.3 Comparative (Covered in Section VII, Comparatives)

The existential quantifier "more" is the comparative form (denoting a higher degree of quantity) of both "many" and "much". "More" expresses a greater number or amount; an additional amount.

2.2.3.4 Superlative

The existential quantifier "most" is the superlative form (denoting the highest degree of quantity) of both "many" and "much". "Most" expresses greatest number or amount.

- Eg, List the department with [the most doctorates].
- Eg, What are [most of the women paid]?
- Eg, Twenty Cabinet Members were killed yesterday. [Most Cabinet Members] were killed by a carbomb.

- Eg, Terrorists killed [most of the peasants in Cuilapa].
Eg, [Most of the dynamite sticks at the presidential farm] were stolen by guerrillas.

Criteria: Demonstrated understanding that the existential quantifier "most" expresses *highest number or greatest amount*.

Score: _____

2.2.4 Paucal

"*Paucal*" means a small amount.

2.2.4.1 FEW

The existential quantifier "few" expresses *at least some but a small amount in number*. "Few", as opposed to "a few", signals a sharp contrast between the group picked out by the quantifier and some other group not picked.

Since "a few" determines plural count nouns, which never occur alone with the indefinite article ("a"), we treat the article as belonging to the quantifier.

Test the quantifier "few", either with or without the article "a".

- Eg, What is the department with [few of the women]?
Eg, List [a few employees in department 7].
Eg, What high salary do [few employees] earn?
Eg, What product do [a few salespersons] sell?
Eg, [A few of the terrorists in ARENA] attacked the Government House.
Eg, Twenty Cabinet Members were killed yesterday. [Few of the Cabinet Members] were killed by a carbomb.
Eg, Terrorists killed [few peasants] in Cuilapa.
Eg, ARENA kidnapped [a few Government Officials].
Eg, [A few peasants] were injured during an attack by guerrillas.
Eg, [Few of the dynamite sticks at the presidential farm] were stolen by guerrillas.

Criteria: Demonstrated understanding that the existential quantifier "a few" expresses *at least some but a small amount in number*.

Score: _____

2.2.4.2 LITTLE

The existential quantifier "little" expresses *small in quantity or degree*. "Little" quantifies over mass nouns.

Eg, What is the department with [little of the management expertise]?

Eg, Terrorists burned [little information] in the attack on the Government House.

Eg, [Little of the dynamite at the presidential farm] was stolen by guerrillas.

Criteria: Demonstrated understanding that the existential quantifier "little" expresses *small in quantity or degree*.

Score: _____

2.2.4.3 Comparative (Covered in Section VII, Comparatives)

The existential quantifiers "fewer" and "less" are the comparative forms of "few" and "little", respectively. They both express *a smaller amount*.

2.2.4.4 Superlative

The existential quantifiers "fewest" and "least" are the superlative forms of "few" and "little". They express *the smallest number or amount*. *Fewest* is used to quantify count nouns while *least* is used to quantify mass nouns.

Test one of the paucal superlative quantifiers *fewest* or *least*.

Eg, List the department with [the fewest employees].

Eg, What department has [fewest of the PhDs]?

Eg, What is the department with [the least of the management expertise]?

Eg, ARENA killed [fewest of the Government Officials].

Criteria: Demonstrated understanding that the existential quantifiers "fewest" and "least" express *the smallest number or amount*.

Score: _____

2.3 Existential Non-Assertive Quantifiers

2.3.1 ANY

The existential quantifier "any" expresses *one or another taken at random from a totality; every*.

There are two senses to the word "any". An *exclusive* sense, meaning *one out of the total*, is exemplified in the sentence:

Pick any number from one to ten.

An *inclusive* sense of “any”, meaning *all*, is exemplified in the following sentence:

Any employee who has worked for 25 years is a senior employee.

Test the existential quantifier “any” with either the inclusive or exclusive sense.

Eg, List [any information about John Smith].

Eg, Do [any employees] earn \$20,000 ?

Eg, List [any of the employees in the New York branch].

Eg, Terrorists did not kill [any of the officials] in the bombing of the Government House.

Eg, [Any official at the Government House] was killed in the bombing.

Eg, Terrorists killed [any government official that they saw].

Eg, The URNG guerrillas burned [any farm along the road to Guatemala City] on February 5.

Eg, The URNG stole [any dynamite they found at the presidential farm] in a February 2 attack.

Eg, The URNG did not kidnap [any of the peasants at the Santo Tomas farm].

Criteria: Demonstrated understanding that the existential quantifier “any” expresses *one or another object taken at random from a totality or every one of the objects*.

Score: _____

2.3.2 EITHER

The existential quantifier “either” expresses *one or the other of two*.

There are two senses to the word “either”. An *exclusive* sense of either, meaning *one or the other, but not both*, is exemplified in the sentence:

Take either road.

An *inclusive* sense, meaning *one and the other of two*, is exemplified in the sentence:

There were flowers blooming on either side of the walk.

We will not differentiate between the inclusive and exclusive senses when testing *either*. In order to test that *either* expresses *two*, we will test with a successful presupposition and with a failed presupposition.

2.3.2.1 Successful Presupposition

Successful presupposition occurs in sentences where there is a presupposition which is not mistaken. For example, in the sentence

List either research assistant in department 17.

it is presupposed that there are exactly two research assistants. If the presupposition holds, it is called a "*successful presupposition*".

Test "*either*" as a quantifier for a noun phrase which expresses exactly two objects.

Eg, What is [either of the women in New York] paid?

Eg, What commission did [either Smith] earn in 1989?

Eg, Terrorists did not kill [either of the Cabinet Members] in the bombing of the Government House.

Eg, [Either Marxist group] bombed the Government House.

Eg, [Either of the URNG units] will claim responsibility for an attack on the presidential farm.

Criteria: Demonstrated understanding that "*either*" expresses *one or the other of two objects, exclusively or inclusively*.

Score: _____

2.3.2.2 Failed Presupposition

Test whether the system recognizes the error when "*either*" quantifies a noun phrase which refers to a set of objects whose cardinality is not *two*.

Eg, What is [either of the Chicago women] paid?

Eg, What commission did [either Jones] earn in 1989?

Eg, Terrorists did not kill [either of the Prime Minister] in the bombing of the Government House.

Eg, Arena kidnapped 3 men, but did not kill [either of the men].

Criteria: Demonstrated understanding of the discrepancy between the existential quantifier "*either*" and the cardinality of the set of objects expressed by the noun phrase which it quantifies (in this case *not* exactly two).

Score: _____

2.4 Negative Quantifiers

According to the MUC rules, templates are only generated for reports of terrorist activities. Since a sentence with a negative quantifier is often a report of the non-occurrence of such an incident, a MUC system might not create a template for such an input. In the case of such an event, it is unclear whether the system has successfully understood negative quantification.

2.4.1 NO

The negative quantifier "no" expresses *not any*.

Test the negative quantifier "no".

- Eg, List the employees with [no degree].
- Eg, What branch includes [no women]?
- Eg, Terrorists killed [no person] in the attack on the Government House.
- Eg, [No people] were killed in the attack on the Government House.
- Eg, The URNG attacked [no presidential farm] on February 5.

Criteria: Demonstrated understanding that the negative quantifier "no" expresses *not any* or a zero amount.

_____ Score: _____

2.4.2 NONE

The negative quantifier "none" expresses *not any*.

Test the negative quantifier "none".

- Eg, What department includes [none of the women]?
- Eg, Terrorists killed [none of the officials] in the bombing of the Government House.
- Eg, [None of the Cabinet Members] were killed by the carbomb.
- Eg, [None of the peasants at the Santo Tomas farm] were kidnapped by the guerrillas.

Criteria: Demonstrated understanding that the negative quantifier "none" expresses *not any* or a zero amount.

_____ Score: _____

2.4.3 NEITHER

The negative quantifier "neither" expresses *not the one or the other of two or more, chiefly limited to two*.

Test the negative quantifier "neither".

- Eg, What New York salary does [neither of the two women in New York] earn?
- Eg, What products does [neither Smith] sell?
- Eg, List the branch with [neither of the Smiths].
- Eg, [Neither of the Cabinet Members] was killed by the carbomb.
- Eg, Terrorists killed [neither Senator] in the attack on the Government House.
- Eg, The URNG attacked [neither presidential farm] on February 5.

Criteria: Demonstrated understanding that the negative quantifier “neither” expresses a zero amount of two or more.

Score: _____

2.5 Numerical Quantifiers

2.5.1 Cardinal Numbers

Cardinal numbers (“one”, “two”, “three”, ...) may act as quantifiers and either follow the definite article “the” or do not follow an article at all. When they are used with the definite article, as in:

List the one research assistant in department 17.

it is *presupposed* that there are exactly that number of objects. A *failed presupposition* occurs when there are less than or more than the number specified.

When testing cardinal numbers with an article, make sure that the presupposition holds.

- Eg, List [one women in the New York branch].
- Eg, What does [one of the women in Chicago] earn?
- Eg, What do [the three Chicago employees] earn?
- Eg, What amount do [the two Smiths] earn in commission?
- Eg, [One terrorist] attacked the Government House.
- Eg, [Five of the Cabinet Members] were killed by a carbomb.
- Eg, Terrorists killed [six Government Officials] in the bombing of the Government House.
- Eg, Terrorists killed [the five Cabinet Members] in the bombing of the Government House.
- Eg, [The two presidential farms] were attacked by the URNG.

Criteria: Demonstrated understanding of the quantification imposed on the noun phrase by the cardinal number.

Score: _____

2.5.2 Ordinal Numbers

Ordinal numbers express a position within an ordering of the elements of a group of objects. The ordinal numbers are "first", "second", "third", ...

In the sentence

Smith was the third employee to be hired.

the ordering is with respect to hiring times. It is presupposed that at least *three* employees have been hired.

In contrast to a cardinal number which specifies the number of elements in a set, an ordinal number specifies one individual from an ordered set. For example, "four people" refers to a set containing *four* elements while "fourth person" refers to the *fourth* in a sequence of four or more.

Eg, List the [first employee on the payroll].

Eg, Who was the [third employee to be hired] ?

Eg, The [second attack on the Government House] killed three people.

Eg, ARENA killed the [first man they saw].

Eg, ARENA kidnapped two men and killed the [second of them].

Eg, [The first of three guerrilla attacks] occurred on February 2.

Criteria: Demonstrated understanding of the ordering of the group of objects expressed by the noun phrase that the quantifier modifies and chose the correct individual from that group as specified by the ordinal number.

Score: _____

2.5.3 Fractions

The fractions include "(one-)half", "one-third", "one-fourth", "one quarter", "one-fifth", and so on. Fractions express a portion of the entity expressed by the quantified noun phrase.

Test a fraction.

Eg, What is [half the salary of John Smith]?

Eg, What is [one-fourth the number of employees] ?

Eg, Terrorists killed [half the border patrol at the Nicaraguan border].

Eg, (Preliminary Sentence: Terrorists attacked twelve border guards at the Nicaraguan border.) The terrorists killed [half of the guards].

Eg, (Preliminary Sentences: Ten farms were attacked by guerrillas.) [Half of the attacked farms] were burned to the ground.

Criteria: Demonstrated understanding of the quantification imposed on the noun phrase by the fraction quantifier.

Score: _____

2.5.4 Multipliers

The multipliers include *"twice"*, *"thrice"*, *"two times"*, *"three times"*, *"four times"*, and so on. Multipliers express a multiplication of the entity expressed by the quantified noun phrase.

Test a multiplier.

Eg, List [twice the salary of John Smith].

Eg, What is [three times the salary of John Smith] ?

Eg, Two Mayors were killed. [Twice that number] were kidnapped.

Eg, (Preliminary Sentence: Five farms were destroyed by guerrillas.)
[Twice that number] were attacked by the URNG.

Criteria: Demonstrated understanding of the quantification imposed on the noun phrase by the multiplier.

Score: _____

3. Indefinite Quantifier Pronouns

The indefinite quantifier pronouns (*"everybody"*, *"everyone"*, *"everything"*, *"somebody"*, *"someone"*, *"something"*, *"anybody"*, *"anyone"*, *"anything"*, *"nobody"*, *"no one"*, *"nothing"*) serve as the head of a NP.

We have already seen quantifiers (*"all"*, *"some"*, *"any"*, *"none"*, and so on) which can be used pronominally, as the head of a noun phrase. These are often followed by a prepositional phrase beginning with the preposition *"of"*, called the *"partitive of"*. Indefinite quantifier pronouns are never used with a partitive *of*. They can only be used as the head of a noun phrase and are never used in a determinative position.

In this subsection we will test each indefinite quantifier pronoun individually. Below are some suggested sentence patterns. In each test, you will replace the [Indef. Quant. Pronoun] with the specified determiner quantifier.

MAIN QUANTIFIER PRONOUN PATTERNS:

Pattern: List [Indef Quant Pronoun] [Postmodification] .

Example: List everyone who earns above \$45,000.

Pattern: List [NP] with [Indef Quant Pronoun] [Postmodification].

Example: List the departments with anyone who earns below \$25,000.

Pattern: Who [BE-Verb] [Indef Quant Pronoun] [Postmodification]?

Example: Who is everybody in department 12?

Pattern: What ([NP]) [BE-Verb] [Indef Quant Pronoun] [Postmodification] [Verb (-ed)]?

Example: What salary is everybody in department 12 paid?

Pattern: What ([NP]) [DO-Verb] [Indef Quant Pronoun] [Postmodification] [Verb]?

Example: What product does everyone in department 17 sell?

Pattern: [NP] [Verb] [Indef Quant Pronoun] [Postmodification].

Example: Terrorists killed anyone at the Government House.

Pattern: [Indef Quant Pronoun] [Postmodification] [VP] .

Example: Nobody in the FMLN killed a government official.

In the examples in the following subsections the *indefinite quantifier pronoun* is enclosed in brackets for ease of identification.

3.1 Universal

3.1.1 Personal

The universal personal indefinite quantifier pronouns are “*everyone*” and “*everybody*”, meaning *every person*.

Replace [Indef Quant Pronoun] in the MAIN QUANTIFIER PRONOUN PATTERNS with:

everyone or *everybody*

Eg, List [everybody] who earns above \$45,000.

Eg, Who is [everyone] in the New York branch?

Eg, What salary is [everybody] in Chicago paid?

Eg, What manager supervises [everyone]?

Eg, What salaries does [everybody] in department 17 earn?

Eg, Terrorists killed [everyone] in the Government House.

Eg, [Everybody] at the Government House was killed in a terrorist attack.

Eg, [Everyone] was killed in the URNG attack on the Santo Tomas farm.

Criteria: Demonstrated understanding that the universal personal indefinite quantifier pronoun “*everyone*” or “*everybody*” means *every person*.

Score: _____

3.1.2 Nonpersonal

The universal nonpersonal indefinite quantifier pronoun is “*everything*”, meaning *all that exists*.

Replace [Indef Quant Pronoun] in the MAIN QUANTIFIER PRONOUN PATTERNS with:

everything

Eg, List [everything] that employees sell.

Eg, What is [everything] that department 12 produces?

Eg, Terrorists bombed [everything] at the Government House.

Eg, [Everything] at the Government House was destroyed in a terrorist attack.

Eg, [Everything] was destroyed in the URNG attack on the Santo Tomas farm.

Criteria: Demonstrated understanding that the universal nonpersonal indefinite quantifier pronoun "*everything*" means *all that exists*.

Score: _____

3.2 Existential Assertive

3.2.1 Personal

The existential assertive personal indefinite quantifier pronouns are "*someone*" and "*somebody*", meaning *one or some person of unspecified or indefinite identity*.

Replace [Indef Quant Pronoun] in the MAIN QUANTIFIER PRONOUN PATTERNS with:

someone or somebody

Eg, List [somebody] who earns above \$45,000.

Eg, What salary is [someone] in the New York branch paid?

Eg, What items does [somebody] in the New York branch sell?

Eg, Terrorists killed [someone] in the Government House.

Eg, [Somebody] at the Government House was killed in a terrorist attack.

Eg, [Someone] was killed in the URNG attack on the Santo Tomas farm.

Criteria: Demonstrated understanding that the existential assertive personal indefinite quantifier pronoun "*someone*" or "*somebody*" means *one or some person of unspecified or indefinite identity*.

Score: _____

3.2.2 Nonpersonal

The existential assertive nonpersonal indefinite quantifier pronoun is "*something*", meaning *some indeterminate or unspecified thing*.

Replace [Indef Quant Pronoun] in the MAIN QUANTIFIER PRONOUN PATTERNS with:

something

- Eg, List [something] that the New York branch sells.
Eg, What is [something] that the New York branch sells?
Eg, What price does [something] cost?
Eg, Terrorists bombed [something] at the Government House.
Eg, [Something] at the Government House was destroyed in a terrorist attack.
Eg, [Something] was destroyed in the URNG attack on the Santo Tomas farm.

Criteria: Demonstrated understanding that the existential assertive nonpersonal indefinite quantifier pronoun "something" means *some indeterminate or unspecified thing*.

Score: _____

3.3 Existential Nonassertive

3.3.1 Personal

The existential nonassertive personal indefinite quantifier pronouns are "anyone" and "anybody", meaning *any person*.

Replace [Indef Quant Pronoun] in the MAIN QUANTIFIER PRONOUN PATTERNS with:

anyone or anybody

- Eg, List [anyone] who is paid \$35,000.
Eg, What items does [anybody] in the New York branch sell?
Eg, What benefits does [anyone] who is salaried receive?
Eg, Terrorists killed [anybody] at the Government House.
Eg, [Anyone] who was at the Government House was killed by terrorists.

Criteria: Demonstrated understanding that the existential nonassertive personal indefinite quantifier pronoun "anyone" or "anybody" means *any person*.

Score: _____

3.3.2 Nonpersonal

The existential nonassertive nonpersonal indefinite quantifier pronoun is "anything", meaning *any thing whatever*.

Replace [Indef Quant Pronoun] in the MAIN QUANTIFIER PRONOUN PATTERNS with:

anything

- Eg, List [anything] that is produced by Department 17.
Eg, [Anything] that was at the Government House was destroyed by terrorists.

Criteria: Demonstrated understanding that the existential nonassertive nonpersonal indefinite quantifier pronoun *"anything"* means *any thing whatever*.

Score: _____

3.4 Negative

According to the MUC rules, templates are only generated for reports of terrorist activities. Since a sentence with a negative indefinite quantifier pronoun is often a report of the non-occurrence of such an incident, a MUC system might not create a template for such an input. In the case of such an event, it is unclear whether the system has successfully understood the negative indefinite quantifier pronoun.

3.4.1 Personal

The negative personal indefinite quantifier pronouns are *"no one"* and *"nobody"*, meaning *no person; not anybody*.

Replace [Indef Quant Pronoun] in the MAIN QUANTIFIER PRONOUN PATTERNS with:

no one or nobody

- Eg, What salary does [nobody] in the New York branch earn?
- Eg, What product did [no one] in Chicago sell in 1990?
- Eg, [No one] was killed in the bombing at the Government House.
- Eg, [Nobody] in the FMLN killed a government official.
- Eg, [Nobody] was injured in the URNG attack on the Santo Tomas farm.

Criteria: Demonstrated understanding that the negative personal indefinite quantifier pronoun *"no one"* or *"nobody"* means *no person; not anybody*.

Score: _____

3.4.2 Nonpersonal

The negative nonpersonal indefinite quantifier pronoun is *"nothing"*, meaning *not any thing; no thing*.

Replace [Indef Quant Pronoun] in the MAIN QUANTIFIER PRONOUN PATTERNS with:

nothing

- Eg, What employees earn [nothing] from commissions?
- Eg, [Nothing] was destroyed in the bombing at the Government House.
- Eg, Terrorists destroyed [nothing] in the bombing at the Government House.
- Eg, [Nothing] was damaged in the URNG attack on the Santo Tomas farm.

Criteria: Demonstrated understanding that the negative nonpersonal indefinite quantifier pronoun "nothing" means *not any thing; no thing*.

Score: _____

4. Existential *There*

Existential *there* sentences express the existence of some object specified by the noun phrase which serves as the subject complement of the sentence. The word "*there*" in existential *there* sentences is not used in a locative sense.

The basic structure of an existential *there* sentence is shown below, with [BE-Verb] being a form of the copular verb "*to be*", possibly with an auxiliary verb or verbs.

Pattern: There [BE-Verb] [NP].

Example: There is a director.

There are five new employees in Department 77.

In this section, several sentence types are described which employ an existential *there*. Make sure that a singular existential sentence is tested as well as a plural existential sentence.

Note that a noun phrase includes optional postmodification.

4.1 Declaratives

Pattern: *There* [BE-Verb] [NP].

Examples: There are salespersons in the New York office.

There are electric facilities that the terrorists attacked.

There have been two URNG attacks on presidential farms outside of Guatemala City today.

Criteria: Demonstrated understanding that the existential *there* declarative sentence specifies the existence of the object expressed by the noun phrase which serves as the subject complement of the sentence.

Score: _____

4.2 In Relative Clauses

Pattern: [NP] [VP] (*that*) *there* [BE-Verb].

Example: The terrorists attacked the electric facilities that there are.

Pattern: List [NP] (*that*) *there* [BE-Verb].

Examples: List the financial goal for 1991 that there is.

List the departments that there are.

Pattern: [NP] (that) there [BE-Verb] [VP] .
 Example: All the presidential farms that there are were attacked by
 on the road to Guatemala City URNG guerrillas.

Criteria: Demonstrated understanding that the existential *there* relative clause specifies the existence of the object expressed by the noun phrase which it postmodifies.

_____ Score: _____

4.3 What Questions

Pattern: What [NP] ([Postmodification]) [BE-Verb] *there* ?
 Examples: What job with the least training is there?
 What positions in department 17 are there?

Pattern: What [NP] [BE-Verb] *there* ([Postmodification]) ?
 Examples: What employees are there in department 17?
 What presidential farms are there on the road to Guatemala City?

Criteria: Demonstrated understanding that the existential *there* clause in the *what* question refers to the existence of the object expressed by the noun phrase which it follows.

_____ Score: _____

4.4 Yes-No Questions

Pattern: [BE-Verb] *there* [NP] ?
 Examples: Is there a Boston branch ?
 Are there any sales departments?
 Are there any guerrilla groups that have claimed responsibility
 for the attacks earlier today on presidential farms?

Criteria: Demonstrated understanding that the existential *there* clause in the yes-no question refers to the existence of the object expressed by the noun phrase which follows it.

_____ Score: _____

4.5 Tag Questions

A Tag Question is a type of *yes-no question* conveying positive or negative orientation relative to the statement to which it is appended.

The tag is formed in three steps. First, the statement's auxiliary verb, if there is one, is repeated. If there is no auxiliary, the dummy auxiliary *DO* is used. Second, if the question or statement is positive, a negation is added. If the question or statement is negative, no negation is use in the tag. Third, the statement's subject is repeated. To form a tag for the

sentence

The employees are paid well.

we take the auxiliary verb ("are"), append the negation ("aren't"), and repeat the subject ("aren't they"). The tag is then appended to the original sentence, resulting in the following:

The employees are paid well, aren't they?

In the case of a tag question using an existential *there* construction, the auxiliary verb, usually a form of the [BE-Verb], is negated and the word "*there*" is repeated as the subject. To form a tag for the sentence

There are five employees.

we take the auxiliary verb ("are"), append the negation ("aren't"), and repeat the subject ("aren't there"). The tag is then appended to the original sentence, resulting in the following:

There are five employees, aren't there?

Test an existential *there* sentence.

Pattern:	<i>There</i>	[BE-Verb]	[NP],	[Tag Question] ?
Examples:	There	is	a sales department,	isn't there?
	There	are	female salespersons,	aren't there?
	There	have been	guerrilla attacks on the presidential farms outside of Guatemala City today,	haven't there?

Criteria: Demonstrated understanding that the tag questions the existence of the object expressed by the noun phrase which serves as the subject complement of the declarative existential *there* sentence.

Score: _____

5. Universal Adjectives

Universal Adjectives are a set of open class quantifiers such as *whole*, *entire*, or *full*. They occur in the position of premodification of a noun phrase. In the following example sentences, the noun phrase which is premodified with a universal adjective will be bracketed for greater readability.

Eg, List [the entire staff of department 17].

Eg, Terrorists bombed [the entire Government House].

Eg, [The complete electric facility] was destroyed by terrorists.

Eg, [The entire store of dynamite] was stolen by the URNG guerrillas.

Eg, [A great deal of dynamite] was stolen by the URNG guerrillas.

Criteria: Demonstrated understanding that the *universal adjective* indicates the quantity or amount for the noun phrase which it modifies.

Score: _____

6. Open-Class Determiner Quantifiers (t.b.d)

Open-class determiner quantifiers are phrases which act like determiners in that they must precede nouns, and they can also precede other determiners. This group includes phrases such as:

A great deal of
lots of
a small amount of
a great number of

VII. COMPARATIVES

A comparative expresses a comparison or contrast between two events, entities or attributes with respect to some measure on a scale, which may be numerical (age, height) or non-numerical (friendliness, perseverance). In the sentence:

Jill has more experience than Ted.

the comparison is between *Bill* and *Ted* with respect to *years of experience*, a numerical quantity. In the sentence:

Tom is less friendly than his brother.

the comparison is between *Tom* and *his brother* with respect to *friendliness*, which is not measured numerically.

A comparative sentence has two clauses connected by a comparative conjunct such as the word “*than*”, or the phrase “*as ... as*”. The two clauses have roughly the same structure, with the corresponding elements in the clauses, labeled [*<element>*]₁ and [*<element>*]₂, either matching or differing. There must be at least one pair which differs, however, in order to make a comparison. In this next sentence:

Pattern: What [NP]₁ [BE-Verb] [Adj + COMPARE]₁ *than* [NP]₂ [BE-Verb] [Adj]₂?
Example: What employee is older than Smith is old?

the differing items are *John Smith* and some yet unnamed *employee*. The other elements do not differ and so are not in contrast.

We may also have *gapping* or *ellipsis*. This means a grammatical element that occurs in the first clause is omitted from the second. The element in the first clause which no longer has a corresponding element in the second clause is understood to be present in the second clause and is not the item being contrasted.

For example, we may omit the [BE-Verb] and the adjective in the sentence above, so that it reads:

Pattern: What [NP]₁ [BE-Verb] [Adj + COMPARE]₁ *than* [NP]₂?
Example: What employee is older than Smith?

Here, the sentence is understood to be an abbreviated version of “*What employee is older than John Smith is old?*”. The contrast is still between John Smith and a different employee.

In the following sections we test comparatives with no gapping, and with various patterns of gapping.

1. Comparative Adjectives

The *standard comparative adjective pattern* is:

[NP]₁ [BE-Verb] [Adj +_{COMPARE}]₁ *than* [NP]₂ [BE-Verb] [Adj]₂

1.1 Comparison to a Higher Degree

A comparative expresses a comparison or contrast between two entities or attributes with respect to some measure on a scale, which may be numerical or non-numerical. In comparatives to a higher degree, the measurement of the first entity or attribute is greater than that of the second. Note that in *WH*-questions, a *WH*-word often functions as a noun phrase and expresses an unknown entity. In comparing two entities, one of the entities may be expressed by a *WH*-word.

A comparative to a higher degree is formed with “[Adj +_{COMPARE}] *than*”, where [Adj +_{COMPARE}] denotes an adjective comparative to a higher degree. An adjective comparative to a higher degree is formed as follows: (“→” means “becomes”)

- by adding an *-er*, with associated spelling changes if needed:

big → *bigger*

- by using the word *more*, before the adjective:

beautiful → *more beautiful*

“*More*” can be used as a quantifier as well as being used as part of a comparative adjective phrase. As a quantifier, “*more*” may be replaced by “*a greater number of*” or “*a greater amount of*”. Make sure that “*more*” is not used as a quantifier in this section on comparative adjectives.

In the next four subsections try to use the *more* inflection (marking) at least once and the *-er* inflection at least once, so that both are tested. The following patterns (which may be longer than one line) capture the structure which we are testing. Use these patterns in the following subsections along with the additional instructions in each subsection.

MAIN COMPARATIVE ADJECTIVE PATTERNS:

Pattern 1: List [NP]₁ [WH-Word] [BE-Verb] [Adj +_{COMPARE}]₁ *than*

Example: List an employee who is more experienced than

[NP]₂ [BE-Verb] [Adj]₂.
the Supervisor of Department 77 is experienced.

Pattern 2: [WH-Word] ([NP]₁) [BE-Verb] [Adj +_{COMPARE}]₁ *than* [NP]₂

Example a: What employee is more experienced than Jane Doe

Example b: Who is older than John Smith

[BE-Verb] [Adj]₂ ?
is experienced ?
is old ?

Pattern 3: [NP]₁ [Rel. Pronoun] [BE-Verb] [Adj + COMPARE]₁ *than*
 Example: The terrorists who are more anticommunist than
 [NP]₂ [BE-Verb] [Adj]₂ [VP].
 ARENA is anticommunist killed the Prime Minister.

Pattern 4: [NP]₁ [VP] [Rel. Pronoun] [BE-Verb]
 Example: The terrorists killed the Prime Minister who is
 [Adj + COMPARE]₁ *than* [NP]₂ [BE-Verb] [Adj]₂.
 more pro-Cuban than he is pro-US.

Pattern 5: [NP]₁ [BE-Verb] [Adj + COMPARE]₁ *than* [NP]₂
 Example: (Preliminary Sentence: Guerrillas attacked the presidential farm.)
 The attack was deadlier than the previous attack
 [BE-Verb] [Adj]₂.
 was deadly.

1.1.1 No Gapping

Test a comparative adjective to a higher degree with no gapping, using the MAIN COMPARATIVE ADJECTIVE PATTERNS.

Eg, List an employee who is more experienced than the Supervisor of Department 77 is experienced.

Eg, Who is older than John Smith is old?

Eg, The terrorists who are more anticommunist than ARENA is anti-communist killed the Prime Minister.

Eg, The terrorists killed the Prime Minister who is more Marxist than he is Maoist.

Eg, (Preliminary Sentence: Guerrillas attacked the presidential farm.)
 The attack was deadlier than the previous attack was deadly.

Criteria: Demonstrated understanding of either

- the contrast between the two entities expressed by [NP]₁ and [NP]₂ with respect to the attribute or attributes expressed by [Adj + COMPARE]₁ and [Adj]₂.

or

- the contrast between the two attributes, expressed by [Adj + COMPARE]₁ and [Adj]₂, of one entity expressed by both [NP]₁ and [NP]₂.

Score: _____

1.1.2 Adjective Gapping

Test a comparative adjective to a higher degree with adjective gapping by omitting the [Adj]₂ from the MAIN COMPARATIVE ADJECTIVE PATTERNS as shown below:

Pattern 1: List [NP]₁ [WH-Word] [BE-Verb] [Adj + COMPARE] *than*
 Example: List an employee who is more experienced than
 [NP]₂ [BE-Verb].
 the Supervisor of Department 77 is.

Pattern 2: [WH-Word] ([NP]₁) [BE-Verb] [Adj + COMPARE] *than* [NP]₂
 Example a: What employee is more experienced than Jane Doe
 Example b: Who is older than John Smith
 [BE-Verb]?
 is?
 is?

Pattern 3: [NP]₁ [Rel. Pronoun] [BE-Verb] [Adj + COMPARE] *than*
 Example: The terrorists who are more anticommunist than
 [NP]₂ [BE-Verb] [VP].
 ARENA is killed the Prime Minister.

Pattern 4: [NP]₁ [VP] [Rel. Pronoun] [BE-Verb]
 Example: The terrorists killed the Prime Minister who is
 [Adj + COMPARE] *than* [NP]₂ [BE-Verb].
 more pro-Cuban than they are.

Pattern 5: [NP]₁ [BE-Verb] [Adj + COMPARE]₁ *than* [NP]₂
 Example: (Preliminary Sentence: Guerrillas attacked the presidential farm.)
 The attack was deadlier than the previous attack
 [BE-Verb].
 was.

Criteria: Demonstrated understanding of the contrast between the two entities expressed by [NP]₁ and [NP]₂ with respect to the attribute expressed by [Adj + COMPARE].

Score: _____

1.1.3 Copular and Adjective Gapping

Test a comparative adjective to a higher degree with copular and adjective gapping by omitting the [BE-Verb] and the [Adj]₂ from the MAIN COMPARATIVE ADJECTIVE PATTERNS as shown below:

Pattern 1: List [NP]₁ [WH-Word] [BE-Verb] [Adj + COMPARE] *than*
 Example: List an employee who is more experienced than
 [NP]₂.
 the Supervisor of Department 77.

Pattern 2: [WH-Word] ([NP]₁) [BE-Verb] [Adj + COMPARE] *than* [NP]₂ ?
 Example a: What employee is more experienced than Jane Doe?
 Example b: Who is older than John Smith?

Pattern 3: [NP]₁ [Rel. Pronoun] [BE-Verb] [Adj + COMPARE] *than*
 Example: The terrorists who are more anticommunist than
 [NP]₂ [VP].
 ARENA killed the Prime Minister.

Pattern 4: [NP]₁ [VP] [Rel. Pronoun] [BE-Verb]
 Example: The terrorists killed the Prime Minister who is
 [Adj + COMPARE] *than* [NP]₂.
 more pro-Cuban than they.

Pattern 5: [NP]₁ [BE-Verb] [Adj + COMPARE]₁ *than* [NP]₂ .
 Example: (Preliminary Sentence: Guerrillas attacked the presidential farm.)
 The attack was deadlier than the previous attack.

Criteria: Demonstrated understanding of the contrast between the two entities expressed by [NP]₁ and [NP]₂ with respect to the attribute expressed by [Adj + COMPARE].

Score: _____

1.1.4 Noun Phrase and Copular Gapping (Pseudo-Comparatives)

Test a comparative adjective to a higher degree with noun phrase and copular gapping by omitting the [NP]₂ and the [BE-Verb] from the MAIN COMPARATIVE ADJECTIVE PATTERNS as shown below. The adjectives must be different.

Pattern 1: List [NP]₁ [WH-Word] [BE-Verb] [Adj + COMPARE]₁ *than*
 Example: List an employee who is more experienced than
 [Adj]₂.
 educated.

Pattern 2: [WH-Word] ([NP]₁) [BE-Verb] [Adj +_{COMPARE}]₁ *than* [Adj]₂ ?
 Example a: What employee is more experienced than educated ?
 Example b: Who is older than young ?

Pattern 3: [NP]₁ [Rel. Pronoun] [BE-Verb] [Adj +_{COMPARE}]₁ *than*
 Example: The terrorists who are more pro-Cuban than
 [Adj]₂ [VP].
 pro-US killed the Prime Minister.

Pattern 4: [NP]₁ [VP] [Rel. Pronoun] [BE-Verb]
 Example: The terrorists killed the Prime Minister who is
 [Adj +_{COMPARE}]₁ *than* [Adj]₂.
 more pro-Cuban than pro-US.

Criteria: Demonstrated understanding of the contrast between the attributes expressed by [Adj +_{COMPARE}]₁ and [Adj]₂ for the entity expressed by [NP]₁.

Score: _____

1.2 Comparison to a Lower Degree

A comparative expresses a comparison or contrast between two entities or attributes with respect to some measure on a scale, which may be numerical or non-numerical. In comparatives to a lower degree, the measurement of the first entity or attribute is less than that of the second.

A comparison to a lower degree is formed by replacing “[Adj +_{COMPARE}] *than*” in the *standard comparative adjective pattern* in the beginning of the section titled “Comparative Adjectives”, with “*less* [Adj] *than*”.

Perform the following tests with comparison to a lower degree. The following four subsections test comparison to a lower degree with no gapping, with adjective gapping, with copular and adjective gapping, and with noun phrase and copular gapping, respectively. This section is parallel to Section 1.1.

In contrast to section 1.1, the patterns are not repeated in each subsection. As the sections are parallel, we rely on the evaluators to follow the instructions in a manner similar to that done in 1.1.

LOWER COMPARATIVE ADJECTIVE PATTERNS:

Pattern 1: List [NP]₁ [WH-Word] [BE-Verb] *less* [Adj]₁ *than*
 Example: List an employee who is less experienced than

[NP]₂ [BE-Verb] [Adj]₂.
 the Supervisor of Department 77 is experienced.

Pattern 2: [WH-Word] ([NP]₁) [BE-Verb] *less* [Adj]₁ *than* [NP]₂
 Example a: What employee is less experienced than Jane Doe
 Example b: Who is less educated than John Smith

[BE-Verb] [Adj]₂ ?
 is experienced ?
 is educated ?

Pattern 3: [NP]₁ [Rel. Pronoun] [BE-Verb] *less* [Adj]₁ *than*
 Example: The terrorists who are less anticommunist than

[NP]₂ [BE-Verb] [Adj]₂ [VP].
 ARENA is anticommunist killed the Prime Minister.

Pattern 4: [NP]₁ [VP] [Rel. Pronoun] [BE-Verb]
 Example: The terrorists killed the Prime Minister who is

less [Adj]₁ *than* [NP]₂ [BE-Verb] [Adj]₂.
 less pro-Cuban than he is pro-US.

Pattern 5: [NP]₁ [BE-Verb] *less* [Adj]₁ *than* [NP]₂
 Example: (Preliminary Sentence: Guerrillas attacked the presidential farm.)
 The attack was less deadly than the previous attack

[BE-Verb] [Adj]₂.
 was deadly.

1.2.1 No Gapping

Test a comparative adjective to a lower degree with no gapping, using the LOWER COMPARATIVE ADJECTIVE PATTERNS.

Eg, List a manager who is less experienced than the Supervisor of Department 77 is experienced.

Eg, Who is less educated than John Smith is educated?

Eg, The terrorists who are less anticommunist than ARENA is anti-communist killed the Prime Minister.

Eg, The terrorists killed the Prime Minister who is less Marxist than he is Maoist.

Eg, (Preliminary Sentence: Guerrillas attacked the presidential farm.)
 The attack was less deadly than the previous attack was deadly.

Criteria: Demonstrated understanding of either

- the contrast between the two entities expressed by [NP]₁ and [NP]₂ with respect to the attribute or attributes expressed by [Adj +COMPARE]₁ and [Adj]₂.

or

- the contrast between the two attributes, expressed by [Adj +COMPARE]₁ and [Adj]₂, of one entity expressed by both [NP]₁ and [NP]₂.

Score: _____

1.2.2 Adjective Gapping

Test a comparative adjective to a lower degree with adjective gapping by omitting the [Adj]₂ from the LOWER COMPARATIVE ADJECTIVE PATTERNS.

Eg, List a manager who is less experienced than the Supervisor of Department 77 is.

Eg, Who is less educated than John Smith is?

Eg, The terrorists who are less anticommunist than ARENA is, killed the Prime Minister.

Eg, The terrorists killed the Prime Minister who is less Marxist than they are.

Eg, (Preliminary Sentence: Guerrillas attacked the presidential farm.)
The attack was less deadly than the previous attack was.

Criteria: Demonstrated understanding of the contrast between the two entities expressed by [NP]₁ and [NP]₂ with respect to the attribute expressed by [Adj +COMPARE].

Score: _____

1.2.3 Copular and Adjective Gapping

Test a comparative adjective to a lower degree with copular and adjective gapping by omitting the [BE-Verb] and the [Adj]₂ from the LOWER COMPARATIVE ADJECTIVE PATTERNS.

Eg, List a manager who is less experienced than the Supervisor of Department 77.

Eg, Who is less educated than John Smith?

Eg, The terrorists who are less anticommunist than ARENA, killed the Prime Minister.

Eg, The terrorists killed the Prime Minister who is less Marxist than they.

Eg, (Preliminary Sentence: Guerrillas attacked the presidential farm.)
The attack was less deadly than the previous attack.

Criteria: Demonstrated understanding of the contrast between the two entities expressed by [NP]₁ and [NP]₂ with respect to the attribute expressed by [Adj + COMPARE].

Score: _____

1.2.4 Noun Phrase and Copular Gapping (Pseudo-Comparatives)

Test a comparative adjective to a lower degree with noun phrase and copular gapping by omitting the [NP]₂ and [BE-Verb] from the LOWER COMPARATIVE ADJECTIVE PATTERNS. The adjectives must be different.

Eg, List a manager who is less experienced than educated.

Eg, The terrorists who are less anticommunist than antifascist, killed the Prime Minister.

Eg, The terrorists killed the Prime Minister who is less Marxist than Maoist.

Criteria: Demonstrated understanding of the contrast between the attributes expressed by [Adj + COMPARE]₁ and [Adj]₂ for the entity expressed by [NP]₁.

Score: _____

1.3 Comparisons To the Same Degree

1.3.1 In Assertive Contexts

A comparative expresses a comparison or contrast between two entities or attributes with respect to some measure on a scale, which may be numerical or non-numerical. In a comparison to the same degree in an assertive context, the measurement of the first entity or attribute is the same as that of the second.

A comparison to the same degree in an assertive context is formed by replacing “[Adj + COMPARE] *than*” in the *standard comparative adjective pattern* in the beginning of the section titled “Comparative Adjectives”, with “*as [Adj] as*”.

Perform the following tests with comparison to the same degree in an assertive context. The following four subsections test comparison to the same degree with no gapping, with adjective gapping, with copular and adjective gapping, and with noun phrase and copular gapping, respectively. This section is parallel to Section 1.1.

SAME DEGREE COMPARATIVE ADJECTIVE PATTERNS.

Pattern 1: List [NP]₁ [WH-Word] [BE-Verb] *as [Adj]₁ as*

Example: List an employee who is as experienced as

[NP]₂ [BE-Verb] [Adj]₂.
 the Supervisor of Department 77 is experienced.

Pattern 2: [WH-Word] ([NP]₁) [BE-Verb] *as* [Adj]₁ *as* [NP]₂
 Example a: What employee is as experienced as Jane Doe
 Example b: Who is as old as John Smith

[BE-Verb] [Adj]₂ ?
 is experienced ?
 is old ?

Pattern 3: [NP]₁ [Rel. Pronoun] [BE-Verb] *as* [Adj]₁ *as*
 Example: The terrorists who are as anticommunist as

[NP]₂ [BE-Verb] [Adj]₂ [VP].
 ARENA is anticommunist killed the Prime Minister.

Pattern 4: [NP]₁ [VP] [Rel. Pronoun] [BE-Verb]
 Example: The terrorists killed the Prime Minister who is

as [Adj]₁ *as* [NP]₂ [BE-Verb] [Adj]₂.
 as pro-Cuban as he is pro-US

Pattern 5: [NP]₁ [BE-Verb] *as* [Adj]₁ *as* [NP]₂
 Example: (Preliminary Sentence: Guerrillas attacked the presidential farm.)
 The attack was as deadly as the previous attack

[BE-Verb] [Adj]₂.
 was deadly.

1.3.1.1 No Gapping

Test a comparative adjective to the same degree with no gapping, using the SAME DEGREE COMPARATIVE ADJECTIVE PATTERNS.

Eg, What employee is as old as the supervisor of department 17 is old?

Eg, The terrorists who are as anticommunist as ARENA is anti-communist killed the Prime Minister.

Eg, The terrorists killed the Prime Minister who is as Marxist as he is Maoist.

Eg, (Preliminary Sentence: Guerrillas attacked the presidential farm.)
 The attack was as deadly as the previous attack was deadly.

Criteria: Demonstrated understanding of either

- the contrast between the two entities expressed by [NP]₁ and [NP]₂ with respect to the attribute or attributes expressed by [Adj +COMPARE]₁ and [Adj]₂.

or

- the contrast between the two attributes, expressed by [Adj +COMPARE]₁ and [Adj]₂, of one entity expressed by both [NP]₁ and [NP]₂.

_____ Score:_____

1.3.1.2 Adjective Gapping

Test a comparative adjective to the same degree with adjective gapping by omitting the [Adj]₂ from the SAME DEGREE COMPARATIVE ADJECTIVE PATTERNS.

Eg, What employee is as old as the supervisor of department 17 is?

Eg, The terrorists who are as anticommunist as ARENA is, killed the Prime Minister.

Eg, The terrorists killed the Prime Minister who is as Marxist as they are.

Eg, (Preliminary Sentence: Guerrillas attacked the presidential farm.)
The attack was as deadly as the previous attack was.

Criteria: Demonstrated understanding of the contrast between the two entities expressed by [NP]₁ and [NP]₂ with respect to the attribute expressed by [Adj +COMPARE].

_____ Score:_____

1.3.1.3 Copular and Adjective Gapping

Test a comparative adjective to the same degree with copular and adjective gapping by omitting the [BE-Verb] and the [Adj]₂ from the SAME DEGREE COMPARATIVE ADJECTIVE PATTERNS.

Eg, What employee is as old as the supervisor of department 17?

Eg, The terrorists who are as anticommunist as ARENA, killed the Prime Minister.

Eg, The terrorists killed the Prime Minister who is as Marxist as they.

Eg, (Preliminary Sentence: Guerrillas attacked the presidential farm.)
The attack was as deadly as the previous attack.

Criteria: Demonstrated understanding of the contrast between the two entities expressed by [NP]₁ and [NP]₂ with respect to the attribute expressed by [Adj +COMPARE].

1.3.1.4 Noun Phrase and Copular Gapping (Pseudo-Comparatives)

Test a comparative adjective to the same degree with noun phrase and copular gapping by omitting the [NP]₂ and the [BE-Verb] from the SAME DEGREE COMPARATIVE ADJECTIVE PATTERNS. The adjectives must be different.

Eg, What employee is as experienced as educated?

Eg, The terrorists who are as anticommunist as antifascist, killed the Prime Minister.

Eg, The terrorists killed the Prime Minister who is as Marxist as Maoist.

Criteria: Demonstrated understanding of the contrast between the attributes expressed by [Adj +COMPARE]₁ and [Adj]₂ for the entity expressed by [NP]₁.

1.3.2 In Non-Assertive Contexts

A comparative expresses a comparison or contrast between two entities or attributes with respect to some measure on a scale, which may be numerical or non-numerical. In comparatives to the same degree in non-assertive contexts, the measurement of the first entity or attribute is not the same as that of the second.

An adjective comparison to the same degree in non-assertive contexts, i.e., in negative statements or questions, is formed by replacing “[Adj +COMPARE] *than*” in the *standard comparative adjective pattern* in the beginning of the section titled “Comparative Adjectives”, with “*not so [Adj] as*” or “*not as [Adj] as*”. For example,

Richard *is not so rich as* he'd like.

Who *is not as nice as* Jenny?

Determine which of the two forms (with either “*as*” or “*so*”), if either, is accepted by the system being tested, and use that form for the test questions.

The following four subsections test comparison to the same degree with no gapping, with adjective gapping, with copular and adjective gapping, and with noun phrase and copular gapping, respectively. This section is parallel to Section 1.1.

NON-ASSERTIVE COMPARATIVE ADJECTIVE PATTERNS.

Pattern 1: List [NP]₁ [WH-Word] [BE-Verb] *not so/as* [Adj]₁ *as*
 Example: List an employee who is not as experienced as
 [NP]₂ [BE-Verb] [Adj]₂.
 the Supervisor of Department 77 is experienced.

Pattern 2: [WH-Word] ([NP]₁) [BE-Verb] *not so/as* [Adj]₁ *as* [NP]₂
 Example a: What employee is not so experienced as Jane Doe
 Example b: Who is not as old as John Smith
 [BE-Verb] [Adj]₂ ?
 is experienced ?
 is old ?

Pattern 3: [NP]₁ [Rel. Pronoun] [BE-Verb] *not so/as* [Adj]₁ *as*
 Example: The terrorists who are not so anticommunist as
 [NP]₂ [BE-Verb] [Adj]₂ [VP].
 ARENA is anticommunist killed the Prime Minister.

Pattern 4: [NP]₁ [VP] [Rel. Pronoun] [BE-Verb]
 Example: The terrorists killed the Prime Minister who is
not so/as [Adj]₁ *as* [NP]₂ [BE-Verb] [Adj]₂.
 not as pro-Cuban as he is pro-US.

Pattern 5: [NP]₁ [BE-Verb] *not so/as* [Adj]₁ *as* [NP]₂
 Example: (Preliminary Sentence: Guerrillas attacked the presidential farm.)
 The attack was not so deadly as the previous attack
 [BE-Verb] [Adj]₂.
 was deadly.

1.3.2.1 No Gapping

Test a comparative adjective to the same degree with no gapping, using the NON-ASSERTIVE COMPARATIVE ADJECTIVE PATTERNS.

Eg, List an employee who is not as experienced as the Supervisor of Department 77 is experienced.

Eg, The terrorists who are not so anticommunist as ARENA is anti-communist killed the Prime Minister.

Eg, The terrorists killed the Prime Minister who is not as Marxist as he is Maoist.

Eg, (Preliminary Sentence: Guerrillas attacked the presidential farm.)
 The attack was not as deadly as the previous attack was deadly.

Criteria: Demonstrated understanding of either

- the contrast between the two entities expressed by [NP]₁ and [NP]₂ with respect to the attribute or attributes expressed by [Adj +COMPARE]₁ and [Adj]₂.

or

- the contrast between the two attributes, expressed by [Adj +COMPARE]₁ and [Adj]₂, of one entity expressed by both [NP]₁ and [NP]₂.

Score: _____

1.3.2.2 Adjective Gapping

Test a comparative adjective to the same degree with adjective gapping by omitting the [Adj]₂ from the NON-ASSERTIVE COMPARATIVE ADJECTIVE PATTERNS.

Eg, List an employee who is not so experienced as the Supervisor of Department 77 is.

Eg, The terrorists who are not so anticommunist as ARENA is, killed the Prime Minister.

Eg, The terrorists killed the Prime Minister who is not as Marxist as they are.

Eg, (Preliminary Sentence: Guerrillas attacked the presidential farm.)
The attack was not as deadly as the previous attack was.

Criteria: Demonstrated understanding of the contrast between the two entities expressed by [NP]₁ and [NP]₂ with respect to the attribute expressed by [Adj +COMPARE].

Score: _____

1.3.2.3 Copular and Adjective Gapping

Test a comparative adjective to the same degree with copular and adjective gapping by omitting the [BE-Verb] and the [Adj]₂ from the NON-ASSERTIVE COMPARATIVE ADJECTIVE PATTERNS.

Eg, List an employee who is not as experienced as the Supervisor of Department 77.

Eg, The terrorists who are not so anticommunist as ARENA, killed the Prime Minister.

Eg, The terrorists killed the Prime Minister who is not as Marxist as they.

Eg, (Preliminary Sentence: Guerrillas attacked the presidential farm.)
The attack was not as deadly as the previous attack.

Criteria: Demonstrated understanding of the contrast between the two entities expressed by [NP]₁ and [NP]₂ with respect to the attribute expressed by [Adj +COMPARE].

Score: _____

1.3.2.4 Noun Phrase and Copular Gapping (Pseudo-Comparatives)

Test a comparative adjective to the same degree with noun phrase and copular gapping by omitting the [NP]₂ and the [BE-Verb] from the NON-ASSERTIVE COMPARATIVE ADJECTIVE PATTERNS. The adjectives must be different.

Eg, List an employee who is not so experienced as educated.

Eg, The terrorists who are not so anticommunist as antifascist, killed the Prime Minister.

Eg, The terrorists killed the Prime Minister who is not as Marxist as Maoist.

Criteria: Demonstrated understanding of the contrast between the two attributes expressed by [Adj +COMPARE]₁ and [Adj]₂.

Score: _____

1.4 Comparison to a Constant

A constant is an individual value from the scale used to measure an attribute. For example: *3.5 years* is a constant from the scale used to measure time in years; *6.75 in* is a constant from the scale used to measure a linear dimension in inches; *excellent* is a constant from the scale used to measure quality (*excellent, good, fair, poor*).

A comparison to a constant defines the measure of an attribute by comparing it to a constant measure. For example, the phrase *taller than 6 feet* expresses an attribute defined by a comparison to the constant *6 feet*.

Comparisons to a constant can be done to a higher, lower, or equal degree. The examples given here are to a higher degree.

We use [NP +CONSTANT] to denote a noun phrase with a constant functioning either as the head or as a determinative.

Pattern 1: List [NP]₁ [WH-Word] [BE-Verb] [Adj +COMPARE]₁ *than*

Example: List an employee who is more experienced than

[NP +CONSTANT].
five years.

Pattern 2: [WH-Word] ([NP]₁) [BE-Verb] [Adj + COMPARE]₁ *than* [NP + CONSTANT]?
Example: Who is older than 50?

Pattern 3: [NP]₁ [Rel. Pronoun] [BE-Verb] [Adj + COMPARE]₁ *than*
Example: The Prime Minister who is older than
[NP + CONSTANT] [VP].
70 was killed.

Pattern 4: [NP]₁ [VP] [Rel. Pronoun] [BE-Verb]
Example: The terrorists killed the Prime Minister who is
[Adj + COMPARE] *than* [NP + CONSTANT].
older than 60 years.

Pattern 5: [NP]₁ [BE-Verb]
Example: (Preliminary Sentence: Guerrillas attacked government officials.)
The number of government officials who were attacked is
[Adj + COMPARE] *than* [NP + CONSTANT].
greater than 5.

Criteria: Demonstrated understanding of the measure of the attribute expressed by the comparison to a constant.

Score: _____

1.5 Comparative Phrases Used as Pre-Modifiers Within a Noun Phrase

A [Comparative Phrase] may compare:

- two adjectives:

more experienced than educated

- an adjective with a constant:

older than 50.

- an adjective with a noun phrase:

as loud as a siren

Comparative phrases may be to a higher, a lower, or the same degree.

The following sentences use a *comparative phrase* as a pre-modifier in a noun phrase. Recall that the pre-modifier appears before the *head* in a NP.

Pattern: List ([DET]) [Comparative Phrase] [NP].

Pattern: [WH-Word] [Comparative Phrase] [NP] [VP] ?
Example: What older than 65 years employee earns \$25,000?

Pattern: [NP] [Verb] ([DET]) [Comparative Phrase] [NP].
Example: The terrorists killed the more Marxist than Maoist Prime Minister.

Pattern: ([DET]) [Comparative Phrase] [NP] [VP].
Example 1: The more Marxist than Maoist Prime Minister was killed by terrorists.
Example 2: (Preliminary Sentence: Guerrillas attacked a farm on January 2.)
The more damaged than destroyed farm was attacked again on February 10.

Criteria: Demonstrated understanding of

- the comparison expressed by the comparative phrase
- the attribute or quality imposed on the entity expressed by the noun phrase which the comparative phrase premodifies.

Score: _____

2. Superlatives

A superlative (“*youngest*”, “*most educated*”, “*least qualified*”) indicates that the entity being modified is at one of the extreme ends of the scale with respect to the property being attributed to it. For example, “*the youngest employee*” refers to the employee that is at the lowest end of the age scale.

2.1 Superlatives to a High Degree

A superlative to a high degree indicates that the entity to whom the superlative applies has the greatest amount of an attribute or comes the closest to the “high” endpoint on the scale associated with an attribute about which the comparison is made (e.g., “*the most educated scholar*”).

Superlatives to a high degree are formed:

- by adding an *-est*, with an associated spelling change if needed:

big → *biggest*

- by using the word *most* before the adjective:

beautiful → *most beautiful*

In forming superlatives to a high degree, test both the *most* and the *-est* inflection. The following suggested patterns capture the structure which we are testing.

Pattern: List ([DET]) [Adj +^{SUPER}] [NP].

Example: List the oldest salesperson.

Pattern: What [NP] [BE-Verb] ([DET]) [Adj +^{SUPER}] ?

Pattern: [WH-Word] [BE-Verb] ([DET]) [Adj +^{SUPER}] [NP] ?

Example: Who is the most educated employee in the NY branch?

Pattern: [NP] [Verb] ([DET]) [Adj +^{SUPER}] [NP].

Example: Terrorists killed the most fascist Government official.

Pattern: ([DET]) [Adj +^{SUPER}] [NP] [VP].

Example 1: The most fascist Government official was killed by terrorists.

Example 2: (Preliminary Sentence: Guerrillas attacked farms.)

The most damaged farm is the Santo Tomas farm.

With "*most*":

Criteria: Demonstrated understanding that the superlative to a high degree formed with an "*-est*" suffix expresses an attribute at the "high" endpoint of the scale associated with that attribute.

Score: _____

With "*-est*":

Criteria: Demonstrated understanding that the superlative to a high degree formed with the word "*most*" expresses an attribute at the "high" endpoint of the scale associated with that attribute.

Score: _____

2.2 Superlatives to a Low Degree

A superlative to a low degree indicates that the entity to whom the superlative applies has the least amount of an attribute or comes the closest to the "low" endpoint on the scale associated with an attribute about which the comparison is made (e.g., "*the least qualified employee*").

Superlatives to a low degree are formed:

- with the word *least*:

qualified → *least qualified*

The following are suggested sentence patterns:

Pattern: List ([DET]) *least* [Adj] [NP].

Example: List the least educated salesperson.

Pattern: What [NP] [BE-Verb] ([DET]) *least* [Adj] ?

Pattern: [WH-Word] [BE-Verb] ([DET]) *least* [Adj] [NP] ?

Example: Who is the least educated employee in the NY branch?

Pattern: [NP] [Verb] ([DET]) *least* [Adj] [NP].

Example: Terrorists killed the least fascist Government official.

Pattern: ([DET]) *least* [Adj] [NP] [VP].

Example 1: The least fascist Government official was killed by terrorists.

Example 2: (Preliminary Sentence: Guerrillas attacked farms.)
The least damaged farm is the Santo Tomas farm.

Criteria: Demonstrated understanding that the superlative to a low degree expresses an attribute at the "low" endpoint of the scale associated with that attribute.

Score: _____

3. Comparative Adverbial Phrase

A comparative expresses a comparison or contrast between two events, entities, or attributes with respect to some measure on a scale, which may be numerical (age, height, speed) or non-numerical (friendliness, perseverance). In the sentence:

Jones sold printers more often than Smith.

the comparison is between the actions (*selling printers*) of two entities *Jones* and *Smith* with respect to time, a numerical measure.

Typically, in interrogatives, the comparison is between a known and an unknown entity. For example, in the question:

Who is older than John?

the comparison is between *John* and an unknown someone (expressed by the *WH*-word "*who*").

The *standard comparative adverb pattern* is:

[NP]₁ [Verb] [Adverb +_{COMPARE}]₁ *than* [NP]₂ [Verb]₂

3.1 Comparison to a Higher Degree

In comparatives to a higher degree, the measurement of the first event, entity or attribute is greater than that of the second.

Adverb comparatives to a higher degree are formed:

- by adding an *-er*:

fast → *faster*

- by dropping the *-ly* and adding *-er*:

quickly → *quicker*

- by using the word *more* before the adverb:

beautifully → *more beautifully*

Caution: "*More*" can be used as a quantifier in a noun phrase as well as part of a comparative adverb group. "*Much*" can also be used as a quantifier in a noun phrase, as well as a comparative adverb. In this section, avoid the use of "*more*" or "*much*" as *quantifiers*.

MAIN COMPARATIVE ADVERB PATTERNS:

Pattern: List [NP]₁ [Rel Pronoun] [VP]₁ [Adverb +_{COMPARE}] *than* [NP]₂ [VP]₂.

Pattern:	[Wh-Word]	([NP] ₁)	[VP] ₁	[Adverb + _{COMPARE}]	<i>than</i>
Example 1:	Which	salesperson	sells printers	more often	than
Example 2:	Who		advanced	more quickly	than

[NP] ₂	[VP] ₂ ?
Smith	sells CPUs?
John Smith	advanced?

Pattern:	[NP] ₁	[VP] ₁	[Adverb + _{COMPARE}]
Example 1:	Shining Path	murdered civilians	more ruthlessly
Example 2:	Government officials in Honduras	are kidnapped	more often
	<i>than</i> [NP] ₂	[VP] ₂ .	
	<i>than</i> ARENA	assassinated government officials.	
	<i>than</i> government officials in Guatemala	are killed.	

3.1.1 No Gapping

Test a comparative adverb to a higher degree with no gapping, using the MAIN COMPARATIVE ADVERB PATTERNS.

- Eg, Which employee was hired earlier than Smith was hired?
- Eg, Which salesperson sells printers more often than Smith sells CPUs?
- Eg, Who advanced more quickly than John Smith advanced?
- Eg, Shining Path murdered civilians more ruthlessly than ARENA assassinated government officials.
- Eg, Government officials in Honduras are kidnapped more often than government officials in Guatemala are killed.

Criteria: Demonstrated understanding of the contrast between the two events expressed by the subject-verb phrase pairs, [NP]₁ [VP]₁ and [NP]₂ [VP]₂, with respect to the attribute expressed by [Adverb +COMPARE].

Score: _____

3.1.2 Verb phrase gapping

Test a comparative adverb to a higher degree with verb phrase gapping by omitting the [VP]₂ from the MAIN COMPARATIVE ADVERB PATTERNS.

Pattern: List [NP]₁ [Rel Pronoun] [VP]₁ [Adverb +COMPARE] *than* [NP]₂

Pattern:	[Wh-Word]	([NP] ₁)	[VP] ₁	[Adverb +COMPARE]	<i>than</i>
Example 1:	Which	salesperson	sells printers	more often	than
Example 2:	Who		advanced	more quickly	than
		[NP] ₂ ?			
		Smith?			
		John Smith?			

Pattern:	[NP] ₁	[VP] ₁	[Adverb +COMPARE]
Example 1:	Shining Path	murdered civilians	more ruthlessly
Example 2:	Government officials in Honduras	are kidnapped	more often
	<i>than</i>	[NP] ₂ .	
	<i>than</i>	ARENA.	
	<i>than</i>	government officials in Guatemala.	

Criteria: Demonstrated understanding of the contrast between the event expressed by the subject-verb phrase pair [NP]₁ [VP]₁ and the event expressed by the subject [NP]₂ with an omitted (but implied) verb phrase, with respect to the attribute expressed by [Adverb +COMPARE].

3.1.3 Noun phrase gapping

Test a comparative adverb to a higher degree with noun phrase gapping by omitting the [NP]₂, the subject of the second clause, from the MAIN COMPARATIVE ADVERB PATTERNS.

Pattern: List [NP] [Rel Pronoun] [VP]₁ [Adverb + COMPARE] *than* [VP]₂.

Pattern: [Wh-Word] ([NP]) [VP]₁ [Adverb + COMPARE] *than*

Example Which salesperson sells printers more often *than*

[VP]₂ ?
sells CPUs?

Pattern: [NP] [VP]₁ [Adverb + COMPARE]

Example 1: Shining Path murdered civilians more ruthlessly

Example 2: Government officials in Honduras are kidnapped more often

than [VP]₂.
than assassinated government officials.
than are killed.

Criteria: Demonstrated understanding of the contrast between the event expressed by the subject-verb phrase pair [NP]₁ [VP]₁ and that expressed by [VP]₂ with an omitted (but implied) subject, with respect to the attribute expressed by [Adverb + COMPARE].

3.2 Comparison to a Lower Degree

In comparatives to a lower degree, the measurement of the first event, entity or attribute is less than that of the second.

Adverb comparatives to a lower degree are formed:

- with the word *less* before the adverb.

quickly → *less quickly*

Perform the following tests with comparison to a lower degree. Replace the “[Adverb + COMPARE] *than*” in the *standard comparative adverb pattern* in the beginning of the section titled “Comparative Adverbs”, with “*less* [Adverb] *than*”. The following three subsections test

comparison to a lower degree with no gapping, with verb phrase gapping, and with noun phrase gapping, respectively. This section is parallel to Section 3.1

LOWER COMPARATIVE ADVERB PATTERNS:

Pattern: List [NP]₁ [Rel Pronoun] [VP]₁ *less* [Adverb] *than* [NP]₂ [VP]₂.

Pattern:	[Wh-Word]	([NP] ₁)	[VP] ₁	<i>less</i> [Adverb]	<i>than</i>	[NP] ₂
Example 1:	Which	salesperson	sells printers	less often	than	Smith
Example 2:	Who		advanced	less quickly	than	John Smith
		[VP] ₂ ?				
		sells CPUs?				
		advanced?				

Pattern:	[NP] ₁	[VP] ₁	<i>less</i> [Adverb]	<i>than</i>
Example 1:	Shining Path	murdered civilians	less ruthlessly	than
Example 2:	Government officials in Honduras	are kidnapped	less often	than
	[NP] ₂	[VP] ₂ .		
	ARENA	assassinated government officials.		
	government officials in Guatemala	are killed.		

3.2.1 No Gapping

Test a comparative adverb to a lower degree with no gapping, using the LOWER COMPARATIVE ADVERB PATTERNS.

Eg, Which salesperson sells printers less often than Smith sells CPUs?

Eg, Who advanced less quickly than John Smith advanced?

Eg, Shining Path murdered civilians less ruthlessly than ARENA assassinated government officials.

Eg, Government officials in Honduras are kidnapped less often than government officials in Guatemala are killed.

Criteria: Demonstrated understanding of the contrast between the two events expressed by the subject-verb phrase pairs, [NP]₁ [VP]₁ and [NP]₂ [VP]₂, with respect to the attribute expressed by [Adverb + COMPARE].

Score: _____

3.2.2 Verb Phrase Gapping

Test a comparative adverb to a lower degree with verb phrase gapping by omitting the [VP]₂ from the LOWER COMPARATIVE ADVERB PATTERNS.

- Eg, Which salesperson sells printers less often than Smith?
 Eg, Who advanced less quickly than John Smith?
 Eg, Shining Path murdered civilians less ruthlessly than ARENA.
 Eg, Government officials in Honduras are kidnapped less often than government officials in Guatemala.

Criteria: Demonstrated understanding of the contrast between the event expressed by the subject-verb phrase pair [NP]₁ [VP]₁ and that expressed by the subject [NP]₂ with an omitted (but implied) verb phrase, with respect to the attribute expressed by [Adverb + COMPARE].

Score: _____

3.2.3 Noun Phrase Gapping

Test a comparative adverb to a lower degree with noun phrase gapping by omitting the [NP]₂, the subject of the second clause, from the LOWER COMPARATIVE ADVERB PATTERNS.

- Eg, Which salesperson sells printers less often than sells CPUs?
 Eg, Shining Path murdered civilians less ruthlessly than assassinated government officials.
 Eg, Government officials in Honduras are kidnapped less often than are killed.

Criteria: Demonstrated understanding of the contrast between the event expressed by the subject-verb phrase pair [NP]₁ [VP]₁ and that expressed by [VP]₂ with an omitted (but implied) subject, with respect to the attribute expressed by [Adverb + COMPARE].

Score: _____

3.3 Comparisons to the Same Degree

In comparatives to the same degree, the measurement of the first event, entity or attribute is the same as that of the second.

3.3.1 In Assertive Contexts

An adverb comparison to the same degree in an assertive context, is formed by replacing "[Adverb + COMPARE] *than*" in the *standard comparative adverb pattern* in the beginning of the section titled "Comparative Adverbs", with "*as* [Adverb] *as*".

Perform the following tests with comparison to the same degree. The following three subsections test comparison to the same degree with no gapping, with verb phrase gapping, and with noun phrase gapping, respectively. This section is parallel to Section 3.1.

SAME DEGREE COMPARATIVE ADVERB PATTERNS:

Pattern: List [NP]₁ [Rel Pronoun] [VP]₁ as [Adverb] as [NP]₂ [VP]₂.

Pattern: [Wh-Word] ([NP]₁) [VP]₁ as [Adverb] as [NP]₂
Example 1: Which salesperson sells printers as often as Smith
Example 2: Who advanced as quickly as John Smith
[VP]₂ ?
sells CPUs?
advanced?

Pattern: [NP]₁ [VP]₁ as [Adverb] as
Example 1: Shining Path murdered civilians as ruthlessly as
Example 2: Government officials in Honduras are kidnapped as often as
[NP]₂ [VP]₂.
ARENA assassinated government officials.
government officials in Guatemala are killed.

3.3.1.1 No Gapping

Test a comparative adverb to the same degree with no gapping, using the SAME DEGREE COMPARATIVE ADVERB PATTERNS.

- Eg, Which salesperson sells printers as often as Smith sells CPUs?
- Eg, Who advanced as quickly as John Smith advanced?
- Eg, Shining Path murdered civilians as ruthlessly as ARENA assassinated government officials.
- Eg, Government officials in Honduras are kidnapped as often as government officials in Guatemala are killed.

Criteria: Demonstrated understanding of the contrast between the two events expressed by the subject-verb phrase pairs, [NP]₁ [VP]₁ and [NP]₂ [VP]₂, with respect to the attribute expressed by [Adverb +COMPARE].

Score: _____

3.3.1.2 Verb Phrase Gapping

Test a comparative adverb to the same degree with verb phrase gapping by omitting the [VP]₂ from the SAME DEGREE COMPARATIVE ADVERB PATTERNS.

- Eg, Which salesperson sells printers as often as Smith?
- Eg, Who advanced as quickly as John Smith?

- Eg, Shining Path murdered civilians as ruthlessly as ARENA.
Eg, Government officials in Honduras are kidnapped as often as government officials in Guatemala.

Criteria: Demonstrated understanding of the contrast between the event expressed by the subject-verb phrase pair [NP]₁ [VP]₁ and that expressed by the subject [NP]₂ with an omitted (but implied) verb phrase, with respect to the attribute expressed by [Adverb +COMPARE].

Score: _____

3.3.1.3 Noun Phrase Gapping

Test a comparative adverb to the same degree with noun phrase gapping by omitting the [NP]₂, the subject of the second clause, from the SAME DEGREE COMPARATIVE AD-VERB PATTERNS.

- Eg, Which salesperson sells printers as often as sells CPUs?
Eg, Shining Path murdered civilians as ruthlessly as assassinated government officials.
Eg, Government officials in Honduras are kidnapped as often as are killed.

Criteria: Demonstrated understanding of the contrast between the event expressed by the subject-verb phrase pair [NP]₁ [VP]₁ and that expressed by [VP]₂ with an omitted (but implied) subject, with respect to the attribute expressed by [Adverb +COMPARE].

Score: _____

3.3.2 In Non-Assertive Contexts

An adverb comparison to the same degree in non-assertive contexts, i.e., in questions or negative statements, is formed by replacing "[Adverb +COMPARE] *than*" in the *standard comparative adverb pattern* in the beginning of the section titled "Comparative Adverbs", with "*not so* [Adverb] *as*" or "*not as* [Adverb] *as*". Examples are:

- Who advanced *not so quickly as* John Smith advanced?
Smith works *not as often as* Jones.

Determine which of the forms, if either, is accepted by the system being tested, and use that form for the test questions.

The following three subsections test comparison to the same degree with no gapping, with verb phrase gapping, and with noun phrase gapping, respectively. This section is parallel to Section 3.1

NON-ASSERTIVE COMPARATIVE ADVERB PATTERNS:

Pattern: List [NP]₁ [Rel Pronoun] [VP]₁ *not so/as* [Adverb] *as* [NP]₂ [VP]₂.

Pattern: [Wh-Word] ([NP]₁) [VP]₁ *not so/as* [Adverb] *as* [NP]₂
 Example 1: Which salesperson sells printers not so often as Smith
 Example 2: Who advanced not as quickly as John Smith
 [VP]₂ ?
 sells CPUs?
 advanced?

Pattern: [NP]₁ [VP]₁ *not so/as* [Adverb] *as*
 Example 1: Shining Path murdered civilians not so ruthlessly as
 Example 2: Government officials in Honduras are kidnapped not as often as
 [NP]₂ [VP]₂.
 ARENA assassinated government officials.
 government officials in Guatemala are killed.

3.3.2.1 No Gapping

Test a comparative adverb to the same degree with no gapping, using the NON-ASSERTIVE COMPARATIVE ADVERB PATTERNS.

- Eg, Which salesperson sells printers not as often as Smith sells CPUs?
- Eg, Who advanced not so quickly as John Smith advanced?
- Eg, Shining Path murdered civilians not so ruthlessly as ARENA assassinated government officials.
- Eg, Government officials in Honduras are kidnapped not as often as government officials in Guatemala are killed.

Criteria: Demonstrated understanding of the contrast between the two events expressed by the subject-verb phrase pairs, [NP]₁ [VP]₁ and [NP]₂ [VP]₂, with respect to the attribute expressed by [Adverb +COMPARE].

_____ Score: _____

3.3.2.2 Verb Phrase Gapping

Test a comparative adverb to the same degree with verb phrase gapping by omitting the [VP]₂ from the NON-ASSERTIVE COMPARATIVE ADVERB PATTERNS.

- Eg, Which salesperson sells printers not as often as Smith?

Eg, Who advanced not so quickly as John Smith?

Eg, Shining Path murdered civilians not so ruthlessly as ARENA.

Eg, Government officials in Honduras are kidnapped not as often as government officials in Guatemala.

Criteria: Demonstrated understanding of the contrast between the event expressed by the subject-verb phrase pair [NP]₁ [VP]₁ and that expressed by the subject [NP]₂ with an omitted (but implied) verb phrase, with respect to the attribute expressed by [Adverb + COMPARE].

Score: _____

3.3.2.3 Noun Phrase Gapping

Test a comparative adverb to the same degree with noun phrase gapping by omitting the [NP]₂, the subject of the second clause, from the NON-ASSERTIVE COMPARATIVE AD-VERB PATTERNS.

Eg, Which salesperson sells printers not as often as sells CPUs?

Eg, Shining Path murdered civilians not so ruthlessly as assassinated government officials.

Eg, Government officials in Honduras are kidnapped not as often as are killed.

Criteria: Demonstrated understanding of the contrast between the event expressed by the subject-verb phrase pair [NP]₁ [VP]₁ and that expressed by [VP]₂ with an omitted (but implied) subject, with respect to the attribute expressed by [Adverb + COMPARE].

Score: _____

3.4 Comparisons to a Constant

A **constant** is an individual value from the scale used to measure an attribute. For example: *3.5 years* is a constant from the scale used to measure time in years; *6.75 in* is a constant from the scale used to measure a linear dimension in inches; *excellent* is a constant from the scale used to measure quality (*excellent, good, fair, poor*).

A comparison to a constant defines the measure of an attribute by comparing it to a constant measure. For example, the phrase *more often than once daily* expresses an attribute defined by a comparison to the constant *once daily*.

Comparisons to a constant can be done to a higher, lower, or equal degree. The examples given here are to a higher degree.

We use [NP + CONSTANT] to denote a noun phrase with a constant functioning either as the head or as a determinative.

Pattern: List [NP] [Rel Pronoun] [VP] [Adverb +COMPARE] *than* [Constant]
([Adverbial]).

Pattern: [Wh-Word] ([NP]) [VP] [Adverb +COMPARE] *than* [Constant] ([Adverbial])?
Example Who moved more often than three times in 1989 ?

Pattern: [NP] [VP] [Adverb +COMPARE] *than* [Constant]
Example Shining Path murdered civilians more often than three times
([Adverbial]).
last year.

Criteria: Demonstrated understanding of the comparison between the event expressed by the [NP] [VP] pair and the constant, with respect to the attribute expressed by [Adverb +COMPARE].

Score: _____

4. Superlative Adverbs

A superlative (“*most often*”, “*most carefully*”) indicates that the entity being modified is at one of the extreme ends of the scale with respect to the property being attributed to it. For example, in the sentence

Of all the salespersons, Smith sold printers most easily.

Smith is at the highest end of the scale associated with *easiness* with respect to the action of *selling printers*.

4.1 Superlative Adverbs to a High Degree

A superlative to a high degree indicates that the event or entity to whom the superlative applies has the greatest amount of an attribute or comes the closest to the “high” endpoint on the scale associated with an attribute about which the comparison is made (e.g., “*most easily sold*”).

Superlative adverbs to a high degree are formed:

- by adding an *-est*:

fast → *fastest*

- by dropping the *-ly* and adding *-est*:

quickly → *quickest*

- by using the word *most* before the adverb:

beautifully → *most beautifully*

Pattern: List [NP] [Rel Pronoun] [VP] [Adverb +*SUPER*].

Pattern: [Wh-Word] ([NP]) [VP] [Adverb +*SUPER*]?

Example Who was hired most recently ?

Pattern: [NP] [VP] [Adverb +*SUPER*].

Example 1: The Government Officials in Honduras are kidnapped most often.

Example 2: (Preliminary Sentence: Guerrillas attacked several farms.)
The Santo Tomas farm was burned most completely.

Criteria: Demonstrated understanding that the superlative to a high degree expresses an attribute at the "high" endpoint of the scale associated with that attribute.

Score: _____

4.2 Superlative Adverbs to a Low Degree

A superlative to a low degree indicates that the event or entity to whom the superlative applies has the least amount of an attribute or comes the closest to the "low" endpoint on the scale associated with an attribute about which the comparison is made (e.g., "*least easily sold*").

Superlatives to a low degree are formed:

- with the word *least* before the adverb:

often → *least often*

Pattern: List [NP] [Rel Pronoun] [VP] *least* [Adverb].

Pattern: [Wh-Word] ([NP]) [VP] *least* [Adverb]?

Example Who was hired least recently ?

Pattern: [NP] [VP] *least* [Adverb].

Example 1: The Government Officials in Honduras are kidnapped least often.

Example 2: (Preliminary Sentence: Guerrillas attacked several farms.)
The Santo Tomas farm was burned least completely.

Criteria: Demonstrated understanding that the superlative to a low degree expresses an attribute at the "low" endpoint of the scale associated with that attribute.

Score: _____

5. *THAN* as a Connective Between Mixed Clauses

In this section, test sentences with “*than*” as a connective between a copular clause ([NP] [BE-Verb] [Adj]) and a non-copular clause ([NP] [VP]). The comparison you use may be to a higher, lower or equal degree. The examples given here are to a higher degree.

Pattern: List [NP]₁ [Rel Pronoun] [BE-Verb] [Adj + COMPARE]₁
Example: List an employee who is more experienced
than [NP]₂ [VP].
than his job description requires.

Pattern: [WH-Word] ([NP]₁) [BE-Verb] [Adj + COMPARE]₁ *than* [NP]₂ [VP] ?

Pattern: [NP] [Relative Pronoun] [BE-Verb] [Adj + COMPARE]₁ *than* [NP]₂ [VP].

Pattern: [NP] [Verb] [NP] [Relative Pronoun] [BE-Verb]
Example: Terrorists killed the Government official who is
[Adj + COMPARE]₁ *than* [NP]₂ [VP].
more Marxist than they desired.

Criteria: Demonstrated understanding of the contrast between the attribute ([Adj + COMPARE]) for the entity expressed by the noun phrase in the copular clause ([NP] [BE-Verb] [Adj]), and the attribute expressed by the non-copular clause ([NP] [VP]).

Score: _____

6. Comparative Noun Phrases in Object Position

The *standard comparative noun phrase pattern* is

[NP]₁ [Verb]₁ [Object]₁ *than* [NP]₂ [Verb]₂ [Object]₂

where [Object]₁ and [Object]₂ are noun phrases which function as the objects of [Verb]₁ and [Verb]₂, respectively. The comparative element will either be a comparative quantifier within the noun phrase functioning as [Object]₁ (e.g., “*more printers*”) or will be a comparative adjective as a premodifier within the noun phrase functioning as [Object]₁ (e.g., “*older employee*”).

In the standard comparative noun phrase pattern, “[NP]₁ [Verb]₁ [Object]₁” forms a clause and “[NP]₂ [Verb]₂ [Object]₂” forms another clause. In this section, we will contrast the noun phrases which function as the objects of the two clauses. In order to keep the tests as simple as possible, use simple nouns phrases for the [Object]. Remember that when a grammatical element is omitted, it is understood.

6.1 Comparative Noun Phrases Using Comparative Quantifiers

Comparative noun phrases using comparative quantifiers use the grammatical structures:

Higher quantity: *more* [Object]₁ *than* ... [Object]₂

Lower quantity: *less* [Object]₁ *than* ... [Object]₂

Equal quantity: *as much* [Object]₁ *as* ... [Object]₂

The following four subsections test comparative noun phrases using comparative quantifiers without gapping, gapping the [Object]₂, gapping the [Verb]₂ and the [Object]₂, and gapping the [NP]₂ and the [Verb]₂.

COMPARATIVE QUANTIFIER NOUN PHRASE PATTERN:

Pattern: List [NP]₁ [Rel Pronoun] [Verb]₁ *more/less/as much* [Object]₁
Example: List the salesperson who sold more printers
than/as [NP]₂ [Verb]₂ [Object]₂.
than Smith sold CPUs.

Pattern: [WH-Word] ([NP]₁) [Verb]₁ *more/less/as much* [Object]₁ *than/as* [NP]₂
[Verb]₂ [Object]₂ ?

Pattern: [NP]₁ [Verb]₁ *more/less/as much* [Object]₁ *than/as*
Example 1: Shining Path killed more civilians than
Example 2: (Preliminary Sentence: URNG Guerrillas attacked six farms.)
The guerrillas attacked more farms than
[NP]₂ [Verb]₂ [Object]₂.
ARENA kidnapped Union leaders.
the rebels bombed banks.

6.1.1 No Gapping

Test comparative noun phrases which have comparative quantifiers with no gapping, using the COMPARATIVE QUANTIFIER NOUN PHRASE PATTERN.

Eg, List the salesperson who sold more printers than Smith
sold CPUs.

Eg, Shining Path killed more civilians than ARENA kidnapped Union
leaders.

Eg, (Preliminary Sentence: URNG guerrillas attacked six farms.)
The guerrillas attacked more farms than the rebels bombed banks.

Criteria: Demonstrated understanding within the context of the sentence of the contrast between the quantities of the objects of the two clauses.

6.1.2 Object Gapping

Test comparative noun phrases which have comparative quantifiers with object gapping by omitting the [Object]₂ from the COMPARATIVE QUANTIFIER NOUN PHRASE PATTERN.

Eg, List the salesperson who sold more printers than Smith sold.

Eg, Shining Path killed more civilians than ARENA kidnapped.

Eg, (Preliminary Sentence: URNG guerrillas attacked six farms.)
The guerrillas attacked more farms than the rebels attacked.

Criteria: Demonstrated understanding within the context of the sentence of the contrast between the quantity of the object of the first clause, and the quantity of the omitted (but implied) object of the second clause.

Score: _____

6.1.3 Verb and Object Gapping

Test comparative noun phrases which have comparative quantifiers with verb and object gapping by omitting the [Verb]₂ and the [Object]₂ from the COMPARATIVE QUANTIFIER NOUN PHRASE PATTERN.

Eg, List the salesperson who sold more printers than Smith.

Eg, Shining Path killed more civilians than ARENA.

Eg, (Preliminary Sentence: URNG guerrillas attacked six farms.)
The guerrillas attacked more farms than the rebels.

Criteria: Demonstrated understanding within the context of the sentence of the contrast between the quantity of the object of the first clause, and the quantity of the omitted (but implied) object of the second clause, with respect to the action expressed by the verb.

Score: _____

6.1.4 Noun Phrase and Verb Gapping

Test comparative noun phrases which have comparative quantifiers with noun phrase and verb gapping by omitting the [NP]₂ and the [Verb]₂ from the COMPARATIVE QUANTIFIER NOUN PHRASE PATTERN.

Eg, List the salesperson who sold more printers than CPUs.
 Eg, Shining Path killed more civilians than union leaders.
 Eg, (Preliminary Sentence: URNG guerrillas attacked six farms.)
 The guerrillas attacked more farms than banks.

Criteria: Demonstrated understanding within the context of the sentence of the contrast between the quantity of the objects of the two clauses, with respect to the action expressed by the verb.

Score: _____

6.2 Comparative Noun Phrases Using Comparative Adjectives

[Adj +*COMPARE*] represents a comparative adjective to a higher, lower, or same degree. The following four subsections test comparative noun phrases using comparative adjectives without gapping, gapping [Object]₂, gapping [Verb]₂ and [Object]₂, and gapping [NP]₂ and [Verb]₂, respectively.

Use the *-er* form of the comparative, to avoid confusion between the *more* form of the comparative and *more* used as a quantifier.

COMPARATIVE ADJECTIVE NOUN PHRASE PATTERN:

Pattern: List [NP]₁ [Rel Pronoun] [Verb]₁ [Adj +*COMPARE*] [Object]₁ *than*
 [NP]₂ [Verb]₂ [Object]₂.

Pattern: [WH-Word] ([NP]₁) [Verb]₁ [Adj +*COMPARE*] [Object]₁
 Example: Which department pays a higher commission
than [NP]₂ [Verb]₂ [Object]₂ ?
than Smith receives a salary ?

Pattern: [NP]₁ [Verb]₁ [Adj +*COMPARE*] [Object]₁ *than*
 Example 1: The FMLN killed a higher-ranking government official *than*
 Example 2: (Preliminary Sentence: A rebel bombing killed two civilians.)
 The rebels exploded a deadlier grenade *than*
 [NP]₂ [Verb]₂ [Object]₂.
 the ELN killed a union leader.
 guerrillas exploded a bomb.

6.2.1 No Gapping

Test comparative noun phrases which have comparative adjectives with no gapping, using

the COMPARATIVE ADJECTIVE NOUN PHRASE PATTERN.

Eg, Which department pays a higher commission than Smith receives a salary?

Eg, The FMLN killed a higher-ranking government official than ELN killed a Union leader.

Eg, (Preliminary Sentence: A rebel bombing killed two civilians.)
The rebels exploded a deadlier grenade than the guerrillas exploded a bomb.

Criteria: Demonstrated understanding within the context of the sentence of the contrast between the objects of the two clauses with respect to the attribute expressed by the comparative adjectives.

_____ Score: _____

6.2.2 Object Gapping

Test comparative noun phrases which have comparative adjectives with object gapping by omitting the [Object]₂ from the COMPARATIVE ADJECTIVE NOUN PHRASE PATTERN.

Eg, Which department pays a higher commission than Smith receives?

Eg, The FMLN killed a higher-ranking government official than ELN killed.

Eg, (Preliminary Sentence: A rebel bombing killed two civilians.)
The rebels exploded a deadlier grenade than the guerrillas exploded.

Criteria: Demonstrated understanding within the context of the sentence of the contrast between the object of the first clause and the omitted (but implied) object of the second clause with respect to the attribute expressed by the comparative adjectives.

_____ Score: _____

6.2.3 Verb and Object Gapping

Test comparative noun phrases which have comparative adjectives with verb and object gapping by omitting the [Verb]₂ and the [Object]₂ from the COMPARATIVE ADJECTIVE NOUN PHRASE PATTERN.

Eg, Which department pays a higher commission than the New York

branch?

Eg, The FMLN killed a higher-ranking government official than ELN.

Eg, (Preliminary Sentence: A rebel bombing killed two civilians.)

The rebels exploded a deadlier grenade than the guerrillas.

Criteria: Demonstrated understanding within the context of the sentence of the contrast between the object of the first clause and the omitted (but implied) object of the second clause with respect to the attribute expressed by the comparative adjectives.

Score: _____

6.2.4 Noun Phrase and Verb Gapping

Test comparative noun phrases which have comparative adjectives with noun phrase and verb gapping by omitting the [NP]₂ and the [Verb]₂ from the COMPARATIVE ADJECTIVE NOUN PHRASE PATTERN.

Eg, Which department pays a higher commission than a salary?

Eg, The FMLN killed a higher-ranking government official than a union leader.

Eg, (Preliminary Sentence: A rebel bombing killed two civilians.)

The rebels exploded a deadlier grenade than the bomb.

Criteria: Demonstrated understanding within the context of the sentence of the contrast between the objects of the two clauses with respect to the attribute expressed by the comparative adjectives.

Score: _____

7. Comparing Objects of VPs with Extra Adjuncts

In this section, we will contrast the noun phrases which function as the objects in the two comparative clauses. Thus, section 7 is similar to section 6, with the exception of an extra adjunct appearing in both clauses of the comparative sentence. What is being tested is the additional adjunct. It is therefore unnecessary to test both the comparative quantifier and the comparative adjective versions of the noun phrase in object position test. For testing purposes, use sentences from either the MAIN COMPARATIVE QUANTIFIER PATTERNS or the MAIN COMPARATIVE ADJECTIVE PATTERNS.

MAIN COMPARATIVE QUANTIFIER PATTERNS:

Pattern:	List	[NP] ₁	[Rel Pronoun]	[Verb] ₁	<i>more</i>	[Object] ₁	[Adjunct] ₁
Example:	List	the salesperson	who	sold	more	printers	in 1990

than [NP]₂ [Verb]₂ [Object]₂ [Adjunct]₂.
 than Smith sold CPUs in 1989.

Pattern: [WH-Word] ([NP]₁) [Verb]₁ *more* [Object]₁ [Adjunct]₁ *than*
 Example: Which salesperson sold more printers in 1989 than
 [NP]₂ [Verb]₂ [Object]₂ [Adjunct]₂?
 John Smith sold CPUs in 1990?

Pattern: [NP]₁ [Verb]₁ *more* [Object]₁ [Adjunct]₁ *than*
 Example 1: Shining Path killed more civilians in Honduras than
 Example 2: (Preliminary Sentence: URNG Guerrillas attacked six farms.)
 The guerrillas attacked more buildings on the presidential farm than
 [NP]₂ [Verb]₂ [Object]₂ [Adjunct]₂.
 ARENA kidnapped union leaders in El Salvador.
 the rebels bombed buildings on the Santo Tomas farm.

MAIN COMPARATIVE ADJECTIVE PATTERNS:

Pattern: List [NP]₁ [Rel Pronoun] [Verb]₁ [Adj + COMPARE] [Object]₁ [Adjunct]₁
 Example: List the branch which paid a higher commission in 1989
 than [NP]₂ [Verb]₂ [Object]₂ [Adjunct]₂.
 than Jones received salary in 1990.

Pattern: [WH-Word] [NP]₁ [Verb]₁ [Adj + COMPARE] [Object]₁ [Adjunct]₁
 Example: Which department paid a higher commission in February
 than [NP]₂ [Verb]₂ [Object]₂ [Adjunct]₂ ?
 than Jones received a salary in March ?

Pattern: [NP]₁ [Verb]₁ [Adj + COMPARE] [Object]₁ [Adjunct]₁ *than*
 Example 1: The FMLN killed a higher-ranking official in December than
 Example 2: (Preliminary Sentence: A rebel bombing killed two civilians.)
 The rebels exploded a deadlier grenade on January 2 than
 [NP]₂ [Verb]₂ [Object]₂ [Adjunct]₂.
 the ELN killed a union leader in November.
 guerrillas exploded a bomb on February 10.

7.1 No Gapping

Test comparative noun phrases with an extra adjunct with no gapping. Use either the MAIN COMPARATIVE QUANTIFIER PATTERNS or the MAIN COMPARATIVE ADJECTIVE

PATTERNS.

- Eg, List the salesperson who sold more printers in 1990 than Smith sold CPUs in 1989.
- Eg, Which salesperson sold more printers in 1989 than John Smith sold CPUs in 1990.
- Eg, Shining Path killed more civilians in Honduras than ARENA kidnapped union leaders in El Salvador.
- Eg, List the department which paid a higher commission in 1990 than Jones received a salary in 1989.
- Eg, Which department paid a higher commission in February than Jones received a salary in March.
- Eg, The FMLN killed a higher-ranking government official in December than ELN killed a union leader in November.
- Eg, (Preliminary Sentence: URNG Guerrillas attacked six farms.) The guerrillas attacked more buildings on the presidential farm than the rebels bombed buildings on the Santo Tomas farm.
- Eg, (Preliminary Sentence: A rebel bombing killed two civilians.) The rebels exploded a deadlier grenade on January 2 than guerrillas exploded a bomb on February 10.

Criteria: Demonstrated understanding within the context of the sentence of either

- the contrast between the quantities of the objects of the two clauses.

or

- the contrast between the objects of the two clauses with respect to the attribute expressed by the comparative adjectives.

Score: _____

7.2 Single Gapping

In these sentences with a subject, verb, object, and adjunct, there are four possible single gappings, each one formed by omitting one of these four sentence parts. The subject and the object are noun phrases. Using one of the above pattern sets, test for the four possible single gappings by omitting each of the four phrases in the *than clause* in turn, generating the following alternatives, where "∅" represents an omitted item:

<i>than</i>	∅	[Verb]	[Object]	[Adjunct]
<i>than</i>	[Subject]	∅	[Object]	[Adjunct]
<i>than</i>	[Subject]	[Verb]	∅	[Adjunct]
<i>than</i>	[Subject]	[Verb]	[Object]	∅

For example, the following sentences illustrate the first case, above, where the subject is omitted from the second clause:

- Eg, List the salesperson who sold more printers in 1990

than sold CPUs in 1989.

Eg, Shining Path killed more civilians in Honduras than kidnapped union leaders in El Salvador.

Eg, Which department paid a higher commission in February than paid a salary in March.

Eg, The FMLN killed a higher-ranking government official in December than killed a union leader in November.

Eg, (Preliminary Sentence: URNG Guerrillas attacked six farms.) The guerrillas attacked more buildings on the presidential farm than bombed buildings on the Santo Tomas farm.

Eg, (Preliminary Sentence: A rebel bombing killed two civilians.) The rebels exploded a deadlier grenade on January 2 than exploded a bomb on February 10.

Criteria: Demonstrated understanding within the context of the sentence of either

- the contrast between the quantities of the objects of the two clauses.

or

- the contrast between the objects of the two clauses with respect to the attribute expressed by the comparative adjectives.

_____ Score: _____

Criteria: Demonstrated understanding within the context of the sentence of either

- the contrast between the quantities of the objects of the two clauses.

or

- the contrast between the objects of the two clauses with respect to the attribute expressed by the comparative adjectives.

_____ Score: _____

Criteria: Demonstrated understanding within the context of the sentence of either

- the contrast between the quantity of the object of the first clause and the quantity of the omitted (but implied) object of the second clause.

or

- the contrast between the object of the first clause and the omitted (but implied) object of the second clause with respect to the attribute expressed by the comparative adjectives.

_____ Score: _____

Criteria: Demonstrated understanding within the context of the sentence of either

- the contrast between the quantities of the objects of the two clauses.

or

- the contrast between the objects of the two clauses with respect to the attribute expressed by the comparative adjectives.

Score: _____

7.3 Double Gapping

In these sentences with a subject, verb, object, and adjunct, there are six possible double gappings, each one formed by omitting two of these four sentence parts. Using one of the above pattern sets, test for the six possible double gappings by omitting a pair of the four phrases in the *than* clause in turn, generating these alternatives:

<i>than</i>	∅	∅	[Object]	[Adjunct]
<i>than</i>	∅	[Verb]	∅	[Adjunct]
<i>than</i>	∅	[Verb]	[Object]	∅
<i>than</i>	[Subject]	∅	∅	[Adjunct]
<i>than</i>	[Subject]	∅	[Object]	∅
<i>than</i>	[Subject]	[Verb]	∅	∅

For example, the following sentences illustrate the first case, above, where the subject and verb are omitted from the second clause:

Eg, List the salesperson who sold more printers in 1990
than CPUs in 1989.

Eg, Shining Path killed more civilians in Honduras than union
leaders in El Salvador.

Eg, Which department paid a higher commission in February than
salary in March.

Eg, The FMLN killed a higher-ranking government official in December
a union leader in November.

Eg, (Preliminary Sentence: URNG Guerrillas attacked six farms.) The
guerrillas attacked more buildings on the presidential farm than
buildings on the Santo Tomas farm.

Eg, (Preliminary Sentence: A rebel bombing killed two civilians.)
The rebels exploded a deadlier grenade on January 2 than
a bomb on February 10.

Criteria: Demonstrated understanding within the context of the sentence of either

- the contrast between the quantities of the objects of the two clauses.

or

- the contrast between the objects of the two clauses with respect to the attribute expressed by the comparative adjectives.

Score: _____

Criteria: Demonstrated understanding within the context of the sentence of either

- the contrast between the quantity of the object of the first clause and the quantity of the omitted (but implied) object of the second clause.

or

- the contrast between the object of the first clause and the omitted (but implied) object of the second clause with respect to the attribute expressed by the comparative adjectives.

_____ Score: _____

Criteria: Demonstrated understanding within the context of the sentence of either

- the contrast between the quantities of the objects of the two clauses.

or

- the contrast between the objects of the two clauses with respect to the attribute expressed by the comparative adjectives.

_____ Score: _____

Criteria: Demonstrated understanding within the context of the sentence of either

- the contrast between the quantity of the object of the first clause and the quantity of the omitted (but implied) object of the second clause.

or

- the contrast between the object of the first clause and the omitted (but implied) object of the second clause with respect to the attribute expressed by the comparative adjectives.

_____ Score: _____

Criteria: Demonstrated understanding within the context of the sentence of either

- the contrast between the quantities of the objects of the two clauses.

or

- the contrast between the objects of the two clauses with respect to the attribute expressed by the comparative adjectives.

_____ Score: _____

Criteria: Demonstrated understanding within the context of the sentence of either

- the contrast between the quantity of the object of the first clause and the quantity of the omitted (but implied) object of the second clause.

or

- the contrast between the object of the first clause and the omitted (but implied) object of the second clause with respect to the attribute expressed by the comparative adjectives.

Score: _____

7.4 Triple Gapping

In these sentences with a subject, verb, object, and adjunct, there are four possible triple gappings, each formed by omitting three of these four sentence parts. Using one of the above pattern sets, test for the four possible triple gappings by omitting three of the four phrases in the *than clause* in turn, generating these alternatives:

<i>than</i>	[Subject]	∅	∅	∅
<i>than</i>	∅	[Verb]	∅	∅
<i>than</i>	∅	∅	[Object]	∅
<i>than</i>	∅	∅	∅	[Adjunct]

For example, the following sentences illustrate the first case, above, where the verb, the object, and the adjunct are omitted from the second clause:

Eg, List the salesperson who sold more printers in 1990
than Smith.

Eg, Shining Path killed more civilians in Honduras than ARENA.

Eg, Which department paid a higher commission in February than
department 12.

Eg, The FMLN killed a higher-ranking government official in December
than ELN.

Eg, (Preliminary Sentence: URNG Guerrillas attacked six farms.) The
guerrillas attacked more buildings on the presidential farm than
workers.

Eg, (Preliminary Sentence: A rebel bombing killed two civilians.)
The rebels exploded a deadlier grenade on January 2 than a bomb.

Criteria: Demonstrated understanding within the context of the sentence of either

- the contrast between the quantity of the object of the first clause and the quantity of the omitted (but implied) object of the second clause.

or

- the contrast between the object of the first clause and the omitted (but implied) object of the second clause with respect to the attribute expressed by the comparative adjectives.

Score: _____

Criteria: Demonstrated understanding within the context of the sentence of either

- the contrast between the quantity of the object of the first clause and the quantity of the omitted (but implied) object of the second clause.

or

- the contrast between the object of the first clause and the omitted (but implied) object of the second clause with respect to the attribute expressed by the comparative adjectives.

_____ Score: _____

Criteria: Demonstrated understanding within the context of the sentence of either

- the contrast between the quantities of the objects of the two clauses.

or

- the contrast between the objects of the two clauses with respect to the attribute expressed by the comparative adjectives.

_____ Score: _____

Criteria: Demonstrated understanding within the context of the sentence of either

- the contrast between the quantity of the object of the first clause and the quantity of the omitted (but implied) object of the second clause.

or

- the contrast between the object of the first clause and the omitted (but implied) object of the second clause with respect to the attribute expressed by the comparative adjectives.

_____ Score: _____

8. Implicit Comparatives

Implicit comparatives are certain adjectives such as the words *senior*, *junior*, *inferior*, *superior*, *prior*, *anterior*, and *posterior*.

Test an implicit comparative. You may use any sentence pattern which has been successfully tested. Below are some suggested sentence patterns.

Pattern: List [NP]₁ [Rel Pronoun] [BE-Verb] [Implicit Comparative]

Example: List an employee who is senior

to [NP]₂.

to John Doe.

Pattern: [WH-Word] ([NP]₁) [BE-Verb] [Implicit Comparative] to [NP]₂ ?

Pattern: [NP] [Verb] [NP]₁ ([Relative Pronoun])

Example 1: The terrorists assassinated the government official who

Example 2: URNG guerrillas conducted an attack

 ((BE-Verb)) [Implicit Comparative] to [NP]₂.
 is superior to the Attorney General.
 prior to the February 2 attack.

Criteria: Demonstrated understanding of the contrast between the two entities expressed by [NP]₁ and [NP]₂ with respect to the attribute expressed by the implicit comparative.

Score: _____

9. Multipliers and Fractions in Comparisons

In the following subsections, we compare two actions, entities, or attributes using a multiplier or a fraction to further define a numerical measure.

Choose from the following types of comparative elements, denoted [Comparative Element]:

- The quantifier "*many*",
- The quantifier "*many*" followed by a noun phrase, as in:

many employees

- An adjective.

9.1 Multipliers

Test a comparative which uses a multiplier. You may use any sentence pattern which has been successfully tested. Below are some suggested sentence patterns.

Pattern: List [NP]₁ [Rel Pronouns] [Verb] [Multiplier] as

Example: List the employees that are twice as

[Comparative Element] as [NP]₂ ((VP)).
old as John Doe.

Pattern: [WH-Word] ([NP]₁) [Verb] [Multiplier] as [Comparative Element]

Example: Who earns twice as much salary

as [NP]₂ ((VP)) ?
as John Smith ?

Pattern: [NP] [Verb] [Multiplier] as [Comparative Element]

Example: Shining Path killed three times as many civilians

as [NP]₂ ([VP]).
as ARENA.

Criteria: Demonstrated understanding of the numerical measure expressed by the multiplication applied to the comparative element.

Score: _____

9.2 Fractions

Test a comparative which uses a fraction. You may use any sentence pattern which has been successfully tested. Below are some suggested sentence patterns.

Pattern: List [NP]₁ [Rel Pronouns] [Verb] [Fraction] *as*
Example: List the employees that are two-thirds *as*
[Comparative Element] *as* [NP]₂ ([VP]).
old as John Doe.

Pattern: [WH-Word] ([NP]₁) [Verb] [Fraction] *as* [Comparative Element]
Example: Who earns half *as* much salary
as [NP]₂ ([VP]) ?
as John Smith ?

Pattern: [NP] [Verb] [Fraction] *as* [Comparative Element]
Example: Shining Path killed one third *as* many civilians
as [NP]₂ ([VP]).
as ARENA.

Criteria: Demonstrated understanding of the numerical measure expressed by the fraction applied to the comparative element.

Score: _____

10. Comparisons Using *TOO* (t.b.d.)

VIII. CONNECTIVES

1 Coördinators (Single Pair Coördination)

By “*single pair coördination*” we refer to coördination with just two elements. Coördination with greater than two elements is covered in a later section.

“*Scope*” is the semantic range of influence which certain words have over other parts of a sentence [Quirk et al 1985, p. 85]. In the sentence:

What employees hire and supervise assistants?

the object “*assistants*” is contained within the scope of the verb “*hire*”, so that the noun “*assistants*” functions as the object of the verb “*hire*”. That is, *assistants* are hired as well as supervised.

Note the use of an extra square bracket pair, “[]”, in many of the test patterns. We use brackets to aid in the determination of which sentence elements are being conjoined. The elements inside the brackets are to be treated as one object. Thus, the phrase:

young [men and women]

has the interpretation that the *men and women* are young. The nouns “*men*” and “*women*” are both within the scope of the adjective “*young*”. In the phrase:

[young men] and women

the brackets show that the noun “*men*” is within the scope of the adjective “*young*” while the noun “*women*” is not. The interpretation is that the men are young and the women’s ages are unspecified.

1.1 AND

1.1.1 Sentential Connectives

1.1.1.1 Declaratives Conjoined by AND

Test two declarative sentences connected by the word “*and*”. Use any two that have been processed successfully. Be sure that the two sentences are full sentences without any omissions.

Pattern:	[Declarative] ₁	<i>and</i>	[Declarative] ₂ .
Example:	Jane Smith is a manager	<i>and</i>	John Doe is a salesperson.
Example:	Jane Smith earned \$21,000 in 1989	<i>and</i>	John Doe earned \$20,000 in 1989.
Example:	Terrorists attacked the Government Building	<i>and</i>	20 men were killed.
Example:	Guerrillas attacked a farm	<i>and</i>	a peasant was killed.
Example:	Guerrillas bombed the Central Bank	<i>and</i>	two civilians were injured.

Criteria: Demonstrated understanding of the declarative sentences conjoined with "and".

Score: _____

1.1.1.2 Imperatives Conjoined by AND

Test two imperative sentences connected by the word "and". Use any two that have been processed successfully. Be sure that the two sentences are full sentences without any omissions.

Pattern: [Imperative]₁ and [Imperative]₂.

Example: List the men in Chicago and list the women in New York.

Example: List the employees and tell me the salaries.

Criteria: Demonstrated understanding of the imperative sentences conjoined with "and".

Score: _____

1.1.1.3 Interrogatives Conjoined by AND

Test two interrogative clauses connected by the word "and". Use any two that have already been processed successfully. Make sure the two interrogatives are complete sentences.

Pattern: [Interrogative]₁ and [Interrogative]₂ ?

Example: Who is the oldest employee and what do the Chicago employees earn?

Example: What employees are women and who works in the New York branch?

Criteria: Demonstrated understanding of the interrogative sentences conjoined with "and".

Score: _____

1.1.2 Relative Clauses Conjoined by AND

Test conjoined relative clauses. Remember that relative clauses function as postmodifiers in a noun phrase. You may choose from the following sentence patterns or choose any successful sentence pattern from a previous section. Note in the examples which follow that both relative clauses modify the noun phrase, as indicated by the brackets enclosing the conjoined relative clauses.

Remember that [Verb (-ed)] refers to the passive form of the verb, the verb with the -ed participle. For more information on the *passive verb*, see Section I, Subsection 4.4 *Voice*.

Pattern: List [NP] [[Relative Clause] and [Relative Clause]].

Example: List the employees who earn \$25,000 and who work in New York.

Pattern: Who [BE-Verb] [NP] [[Relative Clause] and [Relative Clause] ?
Example: Who are the employees who earn \$25,000 and who work in New York ?

Pattern: What [BE-Verb] [NP] [[Relative Clause] and [Relative Clause]
Example: What are the employees who are women and who are educated
[Verb (-ed)]?
paid?

Pattern: What ([NP]) [DO-Verb] [NP] [[Relative Clause] and
Example: What salaries do the employees who live in New York and
[Relative Clause] [Verb]?
who have a degree earn?

Pattern: [NP] [[Relative Clause] and
Example: The terrorists who attacked the Government House and
Example: The guerrillas who burned the presidential farm and
[Relative Clause] [VP].
who killed 20 people bombed the Central Bank.
who stole food killed a peasant.

Pattern: [NP] [Verb] [NP] [[Relative Clause] and
Example: Peasants shot the men who bombed the Bank and
Example: The police arrested the rebels who burned vehicles and
[Relative Clause].
who killed 20 people.
who robbed shops.

Criteria: Demonstrated understanding of the qualification of the postmodified noun phrase by the conjoined relative clauses.

Score: _____

1.1.3 Noun Phrase Constructions with the Conjunction *AND*

Choose one of the sentence patterns from the group listed below which has been tested successfully for use in the following subsections. In each of the subsections, a noun phrase construction with the conjunction "and" is specified. You will replace the [NP + CONJUNCTION] in the chosen pattern with the specified noun phrase.

Pattern: List [NP +CONJUNCTION].

Example: List the men and women in New York.

Example: List the married men and the single women.

Pattern: Who [BE-Verb] [NP +CONJUNCTION]?

Example: Who are the men in NY and the women in Chicago?

Pattern: What (([NP]) [BE-Verb] [NP +CONJUNCTION] [Verb (-ed)]?)

Example: What are the men and women paid?
in the New York branch

Pattern: What (([NP]) [DO-Verb] [NP +CONJUNCTION] [Verb]?)

Example: What salaries do the oldest employee and
the youngest employee earn?

Pattern: [NP +CONJUNCTION] [Verb] [NP].

Example: The terrorists and guerrillas in Bolivia attacked the Government House.

Example: Guerrillas and rebels in Guatemala City attacked the Central Bank.

Pattern: [NP] [Verb] [NP +CONJUNCTION].

Example: Terrorists in Bolivia bombed the residences and brothels.

Example: Guerrillas killed women and children at the presidential farm.

Brackets are used in the specified noun phrases in the following subsections to aid in the determination of which elements are being conjoined. Also, brackets are used in the examples to identify the phrases which follow the specified noun phrase pattern.

1.1.3.1 Conjunction of Simple Noun within the Scope of an Article

Replace the [NP +CONJUNCTION] in your chosen sentence pattern with the noun phrase:

[Article] [[Noun] and [Noun]] ([Postmodification])

Eg, List [the men and women in the New York branch].

Eg, What are [the men and women in the New York branch] paid?

Eg, Terrorists in Bolivia bombed [the residences and brothels].

Eg, [The terrorists and guerrillas in Bolivia] attacked the
Government House.

Eg, Guerrillas killed [the women and children at the presidential
farm].

Eg, [The guerrillas and rebels in Guatemala City] attacked the
Central Bank.

Criteria: Demonstrated understanding of the noun phrase formed with the conjunction of two nouns.

1.1.3.2 Conjunction of Nouns with Adjective Premodifiers

Replace the [NP +CONJUNCTION] in your chosen sentence pattern with the noun phrase:

[Article] [[Adjective] [Noun] *and* [Adjective] [Noun]] ([Postmodifier])

Eg, Who are [the married men and single women in the New York branch].

Eg, Terrorists in Bolivia bombed [the countryside residences and downtown brothels].

Eg, [The Maoist terrorists and Marxist guerrillas in Bolivia] attacked the Government House.

Eg, The guerrillas bombed [the presidential farm and Government House.]

Eg, [The armed guerrillas and militant rebels] burned the shops.

Criteria: Demonstrated understanding of the noun phrase formed with the conjunction of two phrases consisting of "[Adjective] [Noun]".

1.1.3.3 Conjunction of Nouns with Articles and Adjective Premodifiers

Replace the [NP +CONJUNCTION] in your chosen sentence pattern with the noun phrase:

[[Article] [Adjective] [Noun] *and* [Article] [Adjective] [Noun]] ([Postmodifier])

Eg, What are [the married men and the single women in New York] paid?

Eg, Terrorists in Guatemala bombed [the countryside residences and the downtown brothels].

Eg, [The Maoist terrorists and the Marxist guerrillas in Escuintla] attacked the Government House.

Eg, Guerrillas attacked [the presidential farm and the Government House].

Eg, [The armed guerrillas and the militant rebels] burned shops.

Criteria: Demonstrated understanding of the noun phrase formed with the conjunction of two phrases consisting of "[Article] [Adjective] [Noun]".

1.1.3.4 Conjunction of Noun Phrases with Premodifiers and Postmodifiers

Replace the [NP +CONJUNCTION] in your chosen sentence pattern with the noun phrase:

[[Article] [Adjective] [Noun] [Postmodification]
and [Article] [Adjective] [Noun] [Postmodification]].

Eg, What do [the oldest employee in department 17 and the youngest worker in the payroll department] earn?

Eg, Terrorists bombed [the countryside residences in Cuilapa and the downtown brothels in Escuintla].

Eg, [The Maoist terrorists in Escuintla and the Marxist guerrillas in Cuilapa] attacked the electric facilities.

Eg, The guerrillas bombed [the presidential farm outside the capital city and the Government House in the city].

Eg, [The armed guerrillas in Guatemala City and the militant rebels in Flores] burned shops.

Criteria: Demonstrated understanding of the noun phrase formed with the conjunction of two phrases consisting of "[Article] [Adjective] [Noun] [Postmodification]".

1.1.4 The Conjunction AND in a Premodification of a Noun Phrase

This section tests the use of conjunctions within the premodification of a noun phrase. In the following subsections, a noun phrase with a conjunction in its premodifier is specified. You will replace the [NP +PREMOD] in the chosen pattern with the specified noun phrase.

Pattern: List [NP +PREMOD].

Example: List the young and single men in the New York branch.

Example: List the single and the married men who sell printers.

Pattern: Who [BE-Verb] [NP +PREMOD] ?

Example: Who are the young and single men in the New York branch ?

Example: Who are the educated and experienced men in New York?

Pattern: What ([NP]) [BE-Verb] [NP +PREMOD] [Verb (-ed)] ?

Example: What salaries are the young and single men paid?

Pattern: [NP +PREMOD] [Verb] [NP].

Example: The young and militant rebels attacked the presidential farm.

Example: The FMLN and ELN terrorists attacked the Government House.

Pattern: [NP] [Verb] [NP +PREMOD].
Example: Terrorists attacked the Prime Minister's and the Secretary General's residences.

Brackets are used in the specified noun phrases in the following subsections to aid in the determination of which elements are being conjoined. Also, brackets are used in the examples to identify the phrases which follow the specified noun phrase pattern.

1.1.4.1 Conjunctions of Adjectives

Choose two adjectives which together will describe one object or group expressed by the noun which they premodify. For example, in

young and single men

both "young" and "single" describe the same group of men.

Replace the [NP +PREMOD] in your chosen sentence pattern with the noun phrase:

[Article] [[Adjective] and [Adjective]] [Noun] ([Postmodification])

Eg, List [the young and single men in the New York branch].

Eg, Who are [the educated and experienced women]?

Eg, [The young and militant rebels] attacked the presidential farm.

Criteria: Demonstrated understanding of the qualification of the premodified noun phrase by the conjoined adjectives.

Score: _____

1.1.4.2 Conjunctions of Article with Adjective

Choose two adjectives which define different objects or groups expressed by the noun which they premodify. For example, in

single and married men

"single" describes one group of men, "married" describes another.

Replace the [NP +PREMOD] in your chosen sentence pattern with the noun phrase:

[[Article] [Adjective] and [Article] [Adjective]] [Noun] ([Postmodification])

Eg, List [the single and the married men in the New York branch].

Eg, [The Guatemalan and the Honduran terrorists] bombed the

Government Houses.

Eg, [The armed and the unarmed guerrilla units] attacked the Government House.

Eg, [The American and the British Embassies] were attacked by guerrillas.

Criteria: Demonstrated understanding of the qualification of the premodified noun phrase by the conjoined "[Article] [Adjective]" phrases.

Score: _____

1.1.4.3 Conjunction of Genitive Noun Phrases

Replace the [NP +PREMOD] in your chosen sentence pattern with the noun phrase:

[[NP +GENITIVE] and [NP +GENITIVE]] [NOUN]

Eg, List [John Smith's and Jane Jones' salaries].

Eg, What were [the printer's and the CPU's sales in 1990]?

Eg, Terrorists attacked [the Prime Minister's and the Secretary General's residences].

Eg, Guerrillas burned [the President's and the Prime Minister's offices].

Criteria: Demonstrated understanding of the qualification of the premodified noun phrase by the conjoined genitive noun phrases.

Score: _____

1.1.4.4 Scope of Adjectives over Nouns

A noun phrase which follows the pattern:

[Adjective] [Noun] and [Noun]

is ambiguous, with the possibilities being that either the first noun only is within the scope of the adjective, or that both nouns are within the scope of the adjective. The ambiguity must be resolved using situational or world knowledge. Generally, if the two nouns refer to subcategories of the same type of thing, they will both be modified by the adjective. For example, in the phrase

single men and women

the typical interpretation would be that the phrase refers both to men and women who are single, since *men* and *women* are subcategories of the type *human*.

In examples where the two nouns refer to different types of things, it may not make sense for the adjective to modify both. For example, in the phrase

single men and machinery

"single" does not modify "machinery".

In these tests we see whether the system can distinguish the scope of the adjective over the nouns in the conjunction.

1.1.4.4.1 Scope of Adjective Includes First Noun Only

Replace the [NP +PREMOD] in your chosen sentence pattern with the noun phrase:

[[Article] [[Adjective] [Noun]] and [Noun]] ([Postmodification])

Choose an adjective and two nouns such that the second noun is not contained within the scope of the adjective.

Eg, List [the single men and salaries in the New York branch].

Eg, A carbomb killed [the Marxist terrorists and President].

Eg, Guerrillas burned [the government buildings and banks].

Criteria: Demonstrated understanding of the noun phrase formed with an adjective followed by the conjunction of two nouns, where the first noun is inside the scope of the adjective and the second noun is outside the scope of the adjective.

_____ Score: _____

1.1.4.4.2 Scope of Adjective Includes Both Nouns

Replace the [NP +PREMOD] in your chosen sentence pattern with the noun phrase:

[Article] [Adjective] [[Noun] and [Noun]] ([Postmodification])

Choose an adjective and two nouns such that both conjoined nouns are contained within the scope of the adjective.

Eg, List [the single men and women in the New York branch].

Eg, [The Marxist terrorists and guerrillas] attacked the Government House.

Eg, Guerrillas burned [the government buildings and vehicles].

Criteria: Demonstrated understanding of the noun phrase formed with an adjective followed by the conjunction of two nouns, where both nouns are inside the scope of the adjective.

Score: _____

1.1.5 Pronouns Conjoined by *AND* (t.b.d.)

1.1.6 Verb Phrases with the Conjunction *AND*

Choose one of the sentence patterns below to use in the following subsections. In each of the subsections, a verb phrase construction with the conjunction "and" is specified. You will replace the [VP + CONJUNCTION] in the chosen pattern with the specified verb phrase.

Pattern: List [NP] [Rel Pronoun] [VP + CONJUNCTION]
Example: List the women who are young and single.
Example: List the employees who live in New York and sell.
Example: List the employees who earn \$45,000 and sell printers.

Pattern: What ([NP]) [VP + CONJUNCTION] ?
Example: What employees does John Smith train and supervise?
Example: What employees buy and sell printers?

Pattern: [NP] [VP + CONJUNCTION].
Example: The terrorists shot and killed the Prime Minister.
Example: The electric facility exploded and burned.

Pattern: [NP] [Relative Pronoun] [VP + CONJUNCTION]
Example: The terrorists who were armed and unidentified
Example: The rebels who were young and militant
[VP].
bombed the Government House.
burned the vehicles.

Pattern: [NP] [Verb] [Noun] [Relative Pronoun]
Example: The terrorists attacked the Prime Minister who
Example: The guerillas attacked the train which
Example: Guerrillas kidnapped a civilian who

[VP +CONJUNCTION].
was alive and unharmed.
was derailed and damaged.
was an American and a diplomat.

Brackets are used in the specified verb phrases in the following subsections to aid in the determination of which elements are being conjoined. Also, brackets are used in the examples to identify the phrases which follow the specified verb phrase pattern.

1.1.6.1 BE-Verb Conjoined by *AND*

1.1.6.1.1 BE-Verb With Complement Conjoined by *AND*

1.1.6.1.1.1 Adjectival Complements:

Replace the [VP +CONJUNCTION] in your chosen sentence pattern with the verb phrase:

[BE-Verb] [(Adjective) *and* (Adjective)]

Eg, List the women who [are young and single].

Eg, What employees [are educated and experienced]?

Eg, The terrorists who [were armed and unidentified] bombed the Government House.

Eg, The terrorists attacked the Prime Minister who [is alive and unharmed].

Eg, The rebels who [were young and militant] burned the vehicles.

Eg, Guerrillas attacked the train which [was derailed and damaged].

Criteria: Demonstrated understanding of the copular verb phrase formed with a *BE*-verb followed by conjoined adjectival complements.

Score: _____

1.1.6.1.1.2 Noun Phrase Complements:

Replace the [VP +CONJUNCTION] in your chosen sentence pattern with the verb phrase:

[BE-Verb] [(NP) *and* (NP)]

Eg, List the employees who [are women and salespersons].

Eg, The terrorists who [were Indians and Whites] bombed the Government House.

Eg, The terrorists attacked a man who [is a Guatemalan and a Banker].

Eg, Guerrillas kidnapped a civilian who [is an American and a diplomat].

Criteria: Demonstrated understanding of the copular verb phrase formed with a *BE*-verb followed by conjoined noun phrase complements.

Score: _____

1.1.6.1.1.3 Mixed Complements

In this test, use one adjectival complement and one noun phrase complement. Replace the [VP +CONJUNCTION] in your chosen sentence pattern with the verb phrase:

[BE-Verb] [Complement] *and* [BE-Verb] [Complement]

Eg, List the women who [are managers and are single].

Eg, The terrorists who [were Whites and were armed] attacked the Government House.

Eg, The rebels who [are young and are URNG members] attacked the Government House.

Eg, The guerrillas kidnapped a man who [is an American and was wounded].

Criteria: Demonstrated understanding of the copular verb phrase formed with a *BE*-verb followed by a noun phrase complement conjoined with an adjectival complement.

Score: _____

1.1.6.1.2 Passive Constructions with the Conjunction *AND*

1.1.6.1.2.1 Conjunction of the Verb in a Passive Verb Phrase

Replace the [VP +CONJUNCTION] in your chosen sentence pattern with the verb phrase:

[BE-Verb] [[Verb (-ed)] ([NP]) *and* [Verb (-ed)] ([NP])] (*by* [NP])

Eg, List the employees who [are paid \$35,000 and given benefits].

Eg, What employees [are paid \$35,000 and given benefits]?

Eg, The Prime Minister [was kidnapped and shot by terrorists].

Eg, The men who [were captured and killed] had bombed the Government House.

Eg, The presidential farm [was attacked and burned by the guerrillas].

Eg, The buildings which [were bombed and destroyed] were government buildings.

Criteria: Demonstrated understanding of the passive verb phrase formed with the auxiliary *BE*-verb followed by two conjoined passive verbs (with optional objects).

Score: _____

1.1.6.1.2.2 Conjunction of a Passive Verb Phrase

Replace the [VP +CONJUNCTION] in your chosen sentence pattern with the verb phrase:

[BE-Verb] [Verb (-ed)] ([NP]) *and* [BE-Verb] [Verb (-ed)] ([NP]) (*by* [NP])

Eg, List the employees who [are paid \$35,000 and are given benefits].

Eg, What employees [are paid \$35,000 and are given benefits]?

Eg, The Prime Minister [was kidnapped and was shot by terrorists].

Eg, The men who [were captured and were killed] had bombed the Government House.

Eg, The Santo Tomas farm [was burned and was destroyed by guerrillas].

Eg, An American diplomat [was kidnapped and was killed by guerrillas].

Criteria: Demonstrated understanding of the passive verb phrase formed by the conjunction of two passive verb phrases.

Score: _____

1.1.6.2 DO-Verb Constructions with the Conjunction *AND*

Test a *DO*-verb as an auxiliary to a verb phrase formed by conjoining two verbs with "*and*". Replace the [VP +CONJUNCTION] in your chosen sentence pattern with either the verb phrase:

[DO-Verb] [[Verb] *and* [Verb]] ([NP])

in an declarative sentence, or

[DO-Verb] [NP] [[Verb] *and* [Verb]] ([NP])

in an interrogative.

Eg, What employees [does John Smith train and supervise]?

Eg, The terrorists [did shoot and kill the Prime Minister].

Eg, The guerrillas [did kidnap and kill the American diplomat].

Criteria: Demonstrated understanding of the verb phrase formed with the auxiliary *DO*-verb followed (not necessarily immediately) by two conjoined verbs.

1.1.6.3 Full Verb Constructions with the Conjunction *AND*

1.1.6.3.1 Conjunction of Intransitive Verbs

Replace the [VP +CONJUNCTION] in your chosen sentence pattern with the verb phrase:

[Verb +INTRANS] *and* [Verb +INTRANS]

Eg, What employees [live and work] in New York?

Eg, The electric facility [exploded and burned].

Eg, (Preliminary Sentence: The guerrillas shot a civilian.)
The civilian [suffered and died].

Criteria: Demonstrated understanding of the verb phrase formed with the conjunction of two intransitive verbs.

1.1.6.3.2 Conjunction of Transitive Verbs

1.1.6.3.2.1 Conjunction of Transitive Verb Phrases

Replace the [VP +CONJUNCTION] in your chosen sentence pattern with the verb phrase:

[Verb +TRANS] [NP] *and* [Verb +TRANS] [NP]

Eg, List the employees who [earn \$45,000 and sell printers].

Eg, Terrorists [bombed the Government House and killed the Prime Minister].

Eg, Guerrillas [attacked the presidential farm and killed a civilian].

Eg, The rebels [burned vehicles and robbed shops].

Criteria: Demonstrated understanding of the verb phrase formed with the conjunction of two transitive verbs, each with an object.

1.1.6.3.2.2 Conjunction of Two Transitive Verbs with Single Object NP

Replace the [VP +CONJUNCTION] in your chosen sentence pattern with the verb phrase:

[[Verb +TRANS] and [Verb +TRANS]] [NP]

Eg, What company [manufactures and sells printers]?

Eg, Terrorists [shot and killed the Prime Minister].

Eg, The guerrillas [attacked and burned the presidential farm].

Eg, The guerrillas [bombed and destroyed the Central Bank].

Criteria: Demonstrated understanding of the verb phrase formed with the conjunction of two transitive verbs which share the object following the second verb.

Score: _____

1.1.6.4 Mixed Verb Phrases in Constructions with AND

1.1.6.4.1 Conjunction of Transitive and Intransitive Verbs

There is some difficulty in interpreting the conjunction of intransitive and transitive verbs. When the transitive, followed by its object, precedes the intransitive, it is clear that the latter verb is intransitive, since there is no following noun phrase to function as the object of the second verb. For example, in the sentence:

Smith sells printers and purchases.

it is clear that *selling printers* is one of Smith's tasks, and *purchases* is the other. When the intransitive precedes the transitive it is often possible to erroneously interpret the first verb as being transitive and thereby sharing the final noun phrase. A likely interpretation of the sentence:

Smith purchases and sells printers.

is that one of Smith's two tasks is *purchasing printers*.

1.1.6.4.1.1 Conjunction of Transitive with Intransitive

Replace the [VP +CONJUNCTION] in your chosen sentence pattern with the verb phrase:

[Verb +TRANS] [NP] and [Verb +INTRANS]

Eg, List the employees who [sell printers and live in New York].

Eg, Terrorists [bombed the Government House and died].

Eg, Two ARENA members [shot the American Ambassador and died during the ambush].

Criteria: Demonstrated understanding of the verb phrase formed with a transitive verb and its object conjoined with an intransitive verb.

Score: _____

1.1.6.4.1.2 Conjunction of Intransitive with Transitive

Replace the [VP +CONJUNCTION] in your chosen sentence pattern with the verb phrase:

[Verb +INTRANS] *and* [Verb +TRANS] [NP]

Eg, What salesperson [works and sells printers]?

Eg, A car bomb [exploded and killed twenty peasants].

Criteria: Demonstrated understanding of the verb phrase formed with an intransitive verb conjoined with a transitive verb followed by its object.

Score: _____

1.1.6.4.2 Conjunction of Copular with Non-Copular Active Verb Phrase

1.1.6.4.2.1 With Copular First

Replace the [VP +CONJUNCTION] in your chosen sentence pattern with the following verb phrase, where [VP] is any non-copular verb phrase:

[BE-Verb] [Complement] *and* [VP]

Eg, What employees [are women and earn \$45,000]?

Eg, The terrorists [are assassins and killed the Prime Minister].

Eg, The terrorists [are Marxists and killed the Prime Minister].

Eg, The rebels [were armed and killed two American citizens].

Criteria: Demonstrated understanding of the verb phrase formed by the conjunction of a copular verb phrase with a non-copular verb phrase.

Score: _____

1.1.6.4.2.2 With Non-Copular First

Replace the [VP +CONJUNCTION] in your chosen sentence pattern with the following verb phrase, where [VP] is any non-copular verb phrase:

[VP] *and* [BE-Verb] [Complement]

Eg, What employees [earn \$45,000 and are women]?

Eg, The terrorists [killed the Prime Minister and are assassins].

Eg, The terrorists [killed the Prime Minister and are Marxists].

Eg, A guerrilla [bombed the Central Bank and was wounded].

Criteria: Demonstrated understanding of the verb phrase formed by the conjunction of a non-copular verb phrase with a copular verb phrase.

Score: _____

1.1.6.4.3 Conjunction of Passive with Non-Copular Active Verb Phrase

1.1.6.4.3.1 With Passive First

Replace the [VP +CONJUNCTION] in your chosen sentence pattern with the following verb phrase, where [VP] is a verb phrase in active voice:

[[BE-Verb] [Verb (-ed)] ([NP]) (*by* [NP])] *and* [VP]

Eg, List the employees who [are supervised and earn \$25,000].

Eg, List the employees who [are paid \$50,000 and manage a department].

Eg, The Prime Minister [was shot by terrorists and died].

Eg, An American diplomat [was kidnapped by guerrillas and died].

Eg, A tanker [was bombed by terrorists and exploded].

Criteria: Demonstrated understanding of the verb phrase formed by the conjunction of a passive verb phrase with a (non-copular) active verb phrase.

Score: _____

1.1.6.4.3.2 With Non-Copular Active Verb Phrase First

Replace the [VP +CONJUNCTION] in your chosen sentence pattern with the following verb phrase, where [VP] is a verb phrase in active voice:

[VP] *and* [[BE-Verb] [Verb (-ed)] ([NP]) (*by* [NP])]

Eg, List the employees who [earn \$25,000 and are supervised].

Eg, List the employees who [manage a department and are paid \$50,000].

Eg, The terrorists [attacked the Government House and were killed].

Eg, A tanker [anchored and was attacked by the guerrillas].

Criteria: Demonstrated understanding of the verb phrase formed by the conjunction of a (non-copular) active verb phrase with a passive verb phrase.

Score: _____

1.1.6.4.4 Conjunction of Copular with Passive

1.1.6.4.4.1 With Copular First

Replace the [VP +CONJUNCTION] in your chosen sentence pattern with the verb phrase:

[BE-Verb] [Complement] *and* [BE-Verb] [Verb (-ed)] ([NP]) (*by* [NP])

Eg, List the employees who [are women and are paid \$50,000].

Eg, The Prime Minister who [is a Guatemalan and was shot], died.

Eg, The man who [is the Prime Minister and was shot], died.

Criteria: Demonstrated understanding of the verb phrase formed by the conjunction of a copular verb phrase with a passive verb phrase.

Score: _____

1.1.6.4.4.2 With Passive First

Replace the [VP +CONJUNCTION] in your chosen sentence pattern with the verb phrase:

[BE-Verb] [Verb (-ed)] ([NP]) (*by* [NP]) *and* [BE-Verb] [Complement]

Eg, List the employees who [are paid \$50,000 and are women].

Eg, The Prime Minister who [was shot and was a Union leader], died.

Eg, Guerrillas killed an American who [was a diplomat and was kidnapped].

Criteria: Demonstrated understanding of the verb phrase formed by the conjunction of a passive verb phrase with a copular verb phrase.

Score: _____

1.1.7 Conjunction of Adverbials

Test two adverbials conjoined with "and".

Pattern:	List	[NP]	[Rel Pronoun]	[VP]	[[Adverbial]	<i>and</i>
Example:	List	the salespersons	who	earned \$35,000	in 1989	<i>and</i>

[Adverbial]?
in 1990.

Pattern: What [NP] [VP] [[Adverbial] and [Adverbial]]?
Example: What salespersons earned \$35,000 in 1989 and in 1990?

Pattern: [NP] [VP] [[Adverbial] and [Adverbial]].
Example: Terrorists attacked the Government House yesterday and on January 10.
Example: Guerrillas bombed the presidential farm yesterday and today.

Criteria: Demonstrated understanding of the conjunction of the two adverbials.

Score: _____

1.1.8 Conjunction within Prepositional Phrases

Remember that a prepositional phrase consists of a preposition followed by a complement, which is typically a noun phrase, for example: "*in the department*", "*for Joe Smith*", "*on December 12*".

In order to keep the following tests as simple as possible, use simple noun phrases within the prepositional phrases. That is, avoid noun phrases which contain postmodifiers.

1.1.8.1 Conjunction of Prepositional Phrases

Test two prepositional phrases conjoined with "*and*".

Pattern: List [NP] [[PP] and [PP]].
Example: List the employees in the New York branch and in the Chicago branch.

Pattern: What (([NP]) [BE-Verb] [NP] [[PP] and [PP]] [Verb (-ed)] ?

Pattern: What (([NP]) [DO-Verb] [NP] [[PP] and [PP]] [Verb] ?

Pattern: [NP] [[PP] and [PP]]
Example: Terrorists from Guatemala and from Honduras
Example: The guerrillas in Guatemala City and in Quezaltenango

[VP].
shot the Prime Ministers.
bombed electric power stations.

Pattern: [NP] [Verb] [NP] [[PP] and [PP]].
Example: Terrorists bombed the Government Houses in Honduras and in Guatemala.

Criteria: Demonstrated understanding of the conjunction of the two prepositional phrases.

Score: _____

1.1.8.2 Conjunction of Noun Phrases within a Prepositional Phrase

Test two noun phrases conjoined with "and" within a prepositional phrase.

Pattern: List [NP] [Preposition] [[NP] and [NP]].

Example: List the employees in the New York and Chicago branches.

Pattern: What (([NP]) [BE-Verb] [NP] [Preposition] [[NP] and [NP]] [Verb (-ed)] ?

Pattern: What (([NP]) [DO-Verb] [NP] [Preposition] [[NP] and [NP]] [Verb] ?

Pattern: [NP] [Preposition] [[NP] and [NP]]

Example: Terrorists from Guatemala and Honduras

Example: Guerrillas in Guatemala City and Quezaltenango

[VP].

shot the Prime Ministers.

bombed electric power stations.

Pattern: [NP] [Verb] [NP] [Preposition] [[NP] and

Example: Terrorists bombed the Government House in November and

Example: Guerrillas attacked the presidential farm on January 16 and

[NP]].

December.

February 3.

Criteria: Demonstrated understanding of the prepositional phrase formed with a preposition followed by two conjoined noun phrases.

Score: _____

1.1.8.3 Conjunction of Prepositions within a Prepositional Phrase

Test two prepositions conjoined with "and" within a prepositional phrase.

Pattern: List [NP] [[Preposition] and [Preposition]] [NP].

Example: List the personnel above and below the manager in the New York branch.

Pattern: What ([NP]) [BE-Verb] [NP] [[Preposition] *and* [Preposition]] [NP]
[Verb (-ed)] ?

Pattern: What ([NP]) [DO-Verb] [NP] [[Preposition] *and* [Preposition]] [NP]
[Verb] ?

Pattern: [NP] [[Preposition] *and* [Preposition]]
Example: Power transmission towers to *and* from
Example: The houses in *and* around

[NP] [VP].
the electric facility were bombed.
Guatemala City were burned by the URNG on February 1.

Pattern: [NP] [Verb] [NP] [[Preposition] *and* [Preposition]]
Example: Terrorists bombed the electric facilities in *and* around
Example: The guerrillas killed civilians in *and* around
[NP].
Honduras.
Guatemala City.

Criteria: Demonstrated understanding of the prepositional phrase formed with the conjunction of two prepositions followed by a noun phrase.

Score: _____

1.2 BUT as a Conjunction (t.b.d.)

1.3 OR as a Conjunction (t.b.d.)

1.4 Multiple Coordination (t.b.d.)

2 Subordinators (t.b.d.)

3 Conjuncts (t.b.d.)

4 Subjuncts (t.b.d.)

IX. EMBEDDED SENTENCES

A complex sentence consists of a *main* or *superordinate* sentence (clause) with an *embedded* sentence (clause) called the subordinate sentence (clause). In this Procedure, the sections on relative clauses and comparatives have included certain types of embedded clauses. Embedded or subordinate clauses may function as subject, object, complement, or adverbial in a superordinate sentence (clause). In the following list of examples, the embedded sentence or clause is enclosed in brackets for ease of identification.

Subject: *[That the Personnel Department works a 4-day week] is unacceptable to the other employees.*

Direct object: *The employees in Department A preferred [to retrain].*

Indirect object: *You can tell [whoever is waiting] that I'll be back in ten minutes.*

Subject complement: *One result of layoffs is [that morale will go down].*

Object complement: *I know her [to be reliable].*

Adverbial: *[When John reaches \$1,000,000 in sales], he will be promoted.*

Postmodifier in a noun phrase (relative clause): *The previous V.P. [that was in charge of the Systems Division] retired in 1985.*

Prepositional complement: *John's promotion depends on [whether he reaches \$1,000,000 in sales].*

Adjective complement: *It is true [that John Smith is V.P. of Finance].*

This section covers nominal embedded clauses and we defer coverage of the other types of embedded clauses to a subsequent version of the Procedure. Some other types of embedded clauses are covered in Section XII, *Semantics of Events*.

Nominal clauses are clauses that function as noun phrases. The following subsections cover different types of nominal clauses. In each of the following subsections, use sentence patterns which the system has successfully processed and substitute an embedded clause (as described in the subsection) for a noun phrase in the basic sentence pattern.

In the examples in the following subsections, the embedded clauses are enclosed in brackets for ease of identification.

1. THAT-Clauses

A *that*-clause consists of the word "*that*" followed by a complete sentence. The *that*-clause is embedded within a superordinate sentence as a nominal. In each of the following examples, the *that*-clause functioning as a nominal (in the place of a noun phrase) is enclosed in brackets.

Test a *that*-clause as an embedded nominal.

- Eg, Is it true [that John Smith earns \$30,000]?
- Eg, Is it the case [that Mary Jones works in the Chicago branch]?
- Eg, John was informed [that he will travel to the Boston office next week].
- Eg, Government officials reported [that terrorists bombed the government house in Andahua].
- Eg, Investigators announced [that the mayor was murdered by terrorists].
- Eg, The FMLN claimed [that FMLN members bombed the National Bank].
- Eg, [That the URNG guerrillas attacked the presidential farm] was reported in the newspaper.
- Eg, The guerrillas claimed [that they had kidnapped the mayor].

Criteria: Demonstrated understanding of the embedded sentence (THAT-clause) in the context of the superordinate sentence (the sentence in which it is embedded).

Score: _____

2. Wh-interrogative clauses

A Wh-Interrogative clause is a sentence that begins with a WH-word such as *what, who, which, why, etc.*

Test a Wh-interrogative clause as an embedded nominal.

- Eg, Tell me [who is the head of the sales department].
- Eg, Tell me [which employees are members of the sales department].
- Eg, Tell me [when John Smith was hired].
- Eg, Authorities are trying to determine [who bombed the National Bank].
- Eg, The government has not determined [who attacked the presidential farm].
- Eg, February 4 was [when guerrillas attacked the presidential farm].

Criteria: Demonstrated understanding of the embedded sentence (Wh-Interrogative clause) in the context of the superordinate sentence (the sentence in which it is embedded).

Score: _____

3. Yes-No interrogative clauses

A Yes-no interrogative clause is introduced by *whether* or *if*. The sentence following the word *whether* or *if* is either true or false.

Test a Yes-No interrogative clause as an embedded nominal.

- Eg, Tell me [whether John Smith is a salesperson].
- Eg, Tell me [if Ted Harris is a Senior Engineer].
- Eg, Tell me [if Mary Jones earned \$30,000 in 1989].
- Eg, State [whether John Smith works in Boston].
- Eg, The authorities are investigating [whether the bombing of the bank was done by the FMLN].
- Eg, It is not clear [whether the damage caused by the guerrilla attack on the presidential farm was severe].
- Eg, It is unknown [whether the American citizen kidnapped by the the guerrillas is still alive].

Criteria: Demonstrated understanding of the embedded sentence (Yes-No interrogative clause) in the context of the superordinate sentence (the sentence in which it is embedded).

Score: _____

4. Infinitive clauses introduced by *TO*

A *TO*-infinitive clause consists of the work *TO* followed by a verb phrase.

Test a *TO*-infinitive clause as an embedded nominal.

- Eg, Who decided [to work in the Chicago branch]?
- Eg, Who does Xidec employ [to manage the sales department]?
- Eg, Which employees were able [to earn \$40,000 in 1989]?
- Eg, The terrorists claimed [to have kidnapped three cabinet members].
- Eg, Terrorists were reported [to have kidnapped the mayor of Bogota].
- Eg, The guerrillas attempted [to bomb the Central Bank this morning].

Criteria: Demonstrated understanding of the embedded sentence (*TO*-infinitive clause) in the context of the superordinate sentence (the sentence in which it is embedded).

Score: _____

5. *-ING* clauses

An *-ING* clause consists of an *-ING* participle used as the head of a noun phrase with optional premodification and postmodification.

Test an *-ING* clause as an embedded nominal.

- Eg, Is [earning \$50,000] an attribute of John Smith?
- Eg, Is [working in Boston] a characteristic of Mary Jones?

- Eg, [Being 50 years old] makes someone "a senior employee".
Eg, [Bombing the bank] was the work of the FMLN.
Eg, The FMLN are claiming credit for [kidnapping the mayor].
Eg, [Attacking the presidential farm] was carried out by the URNG guerrillas.
Eg, The URNG guerrillas claimed credit for [burning the presidential farm].

Criteria: Demonstrated understanding of the embedded sentence (-ING clause) in the context of the superordinate sentence (the sentence in which it is embedded).

_____ Score: _____

X. REFERENCE

There are many ways of referring to an entity, concept, situation, or proposition. For example, Luis Carlos Galan, a well-known victim of the drug war in Colombia, could be referred to as:

*Luis Carlos Galan,
a well-known victim of the drug war in Colombia,
Luis Carlos Galan Sarmiento,
Senator Galan,
presidential candidate,
presidential hopeful,
liberal senator,
murder victim,
the Colombian government official assassinated on August 18, 1989*

among many other possibilities. All these words and phrases, as well as others too numerous to list, represent a subset of the set of referring expressions indicating the same referent in the real world, i.e., the unfortunate Senator Galan of Colombia. Since these expressions refer to the same referent, they are called *co-referential*.

References may be categorized as *specific* or *generic*. Generally, a reference is called specific when it refers to a particular object, and generic if it refers to a class or type of object, without specific reference to one or more particular objects within the class or type.

1. Specific Reference

1.1 Anaphoric Reference

“The term ANAPHORIC REFERENCE is used where the uniqueness of reference of some phrase *the X* is supplied by information given earlier in the discourse.” (Quirk et. al., 1985, p. 267) Typically, a fairly explicit referring expression brings an object into the discourse focus and a subsequent terse and less explicit expression may refer to the same object (and they are thereby co-referential). The initial referring expression is called the *antecedent* expression and the subsequent expression that refers to the same object is called the *anaphoric* expression. The anaphoric expression “refers to the referent of the antecedent expression with which it is correlated” (Lyons, 1977, p. 660).

The expression which provides the referent of an anaphoric expression must precede the anaphoric expression in the discourse. If it is a constituent of the same sentence, the type of anaphora is called *intra-sentential* anaphora, and if it is a constituent of some preceding sentence, the type of anaphora is called *inter-sentential* anaphora. The following sections on anaphora have included both. We include one specific subsection that tests for each type explicitly.

In the following example, the phrase “*Shining Path guerrillas*” is the antecedent expression for the anaphoric expression “*they*”. In this and following examples, brackets are added to

aid the reader in identifying the expressions of interest.

[Shining Path guerrillas] appeared in Andahua, where [they] murdered the mayor.

Anaphoric expressions are commonly pronouns, as in the above example, or definite noun phrases (i.e., a noun phrase with the definite article "the"). In the following example, the phrase "Shining Path guerrillas" is the antecedent expression and the phrase "the guerrillas" is the anaphoric expression.

On January 5, [Shining Path guerrillas] entered Andahua and murdered the mayor. [The guerrillas] were apprehended and jailed the next day.

A sentence or clause describing an event can also be the antecedent expression for an anaphoric expression. In the following example, the first sentence is the antecedent expression for the anaphoric reference "the assassination" in the second sentence:

On August 18, 1989, Senator Galan was assassinated in Bogota. [The assassination] was attributed to a group called the Sinister Extraditables.

Procedures for testing these and other types of anaphora, such as anaphoric references generated by the pro-predicates "so" and "as" are given in the following subsections. Suggested patterns and examples are provided. You may use different sentence types with which the system has been successful, as long as you incorporate a test for anaphora that fits the classification or specifications of each subsection.

Since there is great variety in the types of anaphora, it is unfeasible to test all forms or types of anaphora in the Benchmark Procedure, especially all the anaphoric devices which involve vaguely specified sets of propositions. For this reason, the procedure for evaluating anaphora will be limited to the common anaphoric phenomena that involve relatively direct reference and are testable in a straightforward manner.

1.1.1 Pronominal Anaphora

Pronominal reference is the classic case of anaphora, as in the sentence:

[The Human Rights Commission of the National Dialog, which emerged from the Esquipulas Peace Agreement], expressed [its] concern.

In this sentence, "its", a possessive pronoun, is an example of pronominal anaphora, which refers to the referent of the expression "The Human Rights Commission of the National Dialog, which emerged from the Esquipulas Peace Agreement".

In the following subsections, the anaphoric pronoun is represented as [NP +_{PRO}], indicating a noun phrase that is realized as a pronoun, and the antecedent noun phrase or sentence is labeled.

1.1.1.1 Anaphoric References With NP Antecedents

1.1.1.1.1 Anaphoric Reference Functions as Subject

This subsection tests the use of the anaphoric reference (pronoun) as the subject of a sentence. Discussion and examples of both active and passive voice constructions are included. You are to create an input to the NLP system that used either voice. Be sure that the anaphoric reference that you use is NOT ambiguous. A reference is ambiguous if there is more than one meaning (interpretation or referent) that can be assigned to the expression or word. Ambiguous references are covered in a later subsection.

ACTIVE CONSTRUCTION. (Anaphoric reference functions as subject of active verb)

In this first example, the anaphoric reference is the pronoun "they" in the second sentence. Its referent (meaning) is the group of employees mentioned in the first sentence.

Which [Antecedent NP] [VP] ?
[BE-Verb] [NP +PRO] [NP] ?

Eg, Which [employees] earn over \$5,000 a month ?
Are [they] managers ?

In this second example, the anaphoric reference is the pronoun "they" in the second sentence. Its referent (meaning) is the group called the Shining Path guerrillas, mentioned in the first sentence.

[Antecedent NP] [VP] [Rel-Pronoun] [NP +PRO] [VP] .

Eg, [The Shining Path guerrillas] appeared in Andahua,
where [they] murdered the mayor.

PASSIVE CONSTRUCTION. (Anaphoric reference functions as subject of passive verb)

[BE-Verb] [Antecedent NP] [Verb +PASSIVE] ([Complement])?
When [BE-Verb] [NP +PRO] [Verb +PASSIVE] ([Complement])?

Eg, Was John Smith hired in 1989 ?
When was [he] promoted ?

[Antecedent NP] [VP] [Conj +SUBORD] [NP +PRO] [VP].

Eg, [The Brazilian journalist Juan Castellar] was in Bogota
when [he] was kidnapped by Colombian Army of National
Liberation guerrillas.

Criteria: Correctly determined which entity, previously mentioned in the same or preceding sentence, is referred to by the anaphoric reference (pronoun).

Score: _____

1.1.1.1.2 Anaphoric Reference Functions as Object

This subsection tests the use of the anaphoric reference (pronoun) as the object of a sentence (the object upon which the action expressed by the verb is carried out). When you create your input to the NLP system, be sure that the anaphoric reference that you use is NOT ambiguous.

In this first example, the anaphoric reference is the pronoun "him", used as the object of "hire" in the second sentence. Its referent (meaning) is the entity John Smith mentioned in the first sentence.

[BE-Verb] [Antecedent NP] ([Complement])?
When [DO-Verb] [NP] [Verb] [NP +PRO] ?

Eg, Is [John Smith] in the sales department?
When did Xidec hire [him] ?

[Antecedent NP] [VP].
[NP] [Verb] [NP +PRO].

Eg, [The mayor] was kidnapped on December 12.
On December 14, the kidnappers killed [him].

[Antecedent NP] [VP] [Conj +SUBORD] [NP] [Verb] [NP +PRO].

Eg, [The Brazilian journalist Juan Castellar] was in Bogota
to write an article about the drug war
when Colombian Army of National Liberation guerrillas
kidnapped [him].

[Antecedent NP] [VP] [RelPronoun] [NP] [Verb] [NP +PRO] ([Complement]).

Eg, [The Shining Path guerrillas] appeared in Andahua, where
the authorities accused [them] of murdering the mayor.

Criteria: Correctly determined which entity, previously mentioned in the same or preceding sentence, is referred to by the anaphoric reference (pronoun) used as an object.

Score: _____

1.1.1.1.3 Anaphoric Reference Functions as Possessive

This section tests a systems' understanding of an anaphoric referring pronoun used in the possessive sense. The possessive pronouns are "my", "our", "your", "his", "her", "its", "their". Create a test input that mentions some entity and subsequently refers back to the entity by using a possessive pronoun.

In the first example below, the person John Smith is mentioned and the possessive pronoun "his" is used to refer back to this same person. The other examples are similar.

Eg, Did [John Smith] meet [his] sales quota ?

Eg, Did [Mary Harris] meet [her] sales quota for July ?

Eg, The Shining Path guerrillas murdered [the mayor] by bombing [his] home.

Eg, The Guatemalan guerrilla murdered [the Bolivian woman] in [her] own country.

Eg, The guerrillas attacked [the president] at [his] farm.

Eg, [The mayor] blamed the URNG guerrillas for [his] kidnapping.

Eg, [The guerrillas] reported [their] attack on the presidential farm.

Criteria: Correctly determined which entity, previously mentioned in the same or preceding sentence, is referred to by the anaphoric reference (possessive pronoun).

Score: _____

1.1.1.1.4 Ambiguous Anaphoric References

An anaphoric reference is ambiguous if there is more than one entity to which the reference could refer. Gender, number (singular or plural), and recency of mention are used to determine the proper referent of an anaphoric expression. You are to create an input for the NLP system which consists of one or more sentences. The input must mention two possible referents before the anaphoric use of the pronoun. The system should use its knowledge of the topic or application domain in order to determine the correct referent of the pronoun.

In the first example below, there are two candidate referents for the pronoun "he" (in brackets), the FMLN leader and the Andahua mayor. They are both recently mentioned and both satisfy the gender and number requirements. To decide which is the logical choice to be the referent of the pronoun "he", the system needs to use knowledge of reasonable or typical

behavior for the two types of people mentioned (terrorist group leaders and mayors). The system should, of course, select the FMLN leader as the appropriate referent in this example.

The FMLN leader kidnapped the Andahua mayor and [he] destroyed the government house.

The following example contrasts with the one above in that the anaphoric pronoun refers to the object of the first sentence instead of the subject. The sentence structure in this example is very similar to that of the sentence above. The NLP system must use general knowledge of woundings to decide which candidate referent would be the most likely interpretation of the pronoun "he".

The FMLN leader kidnapped the wounded mayor on January 1st and [he] subsequently died.

In the following example, there are two candidate referents for the pronoun "they" (in brackets), the Shining Path guerrillas and the three government officials. To decide which is the logical choice to be the referent of the pronoun "they", the system needs to use general knowledge about the act of shooting, the participants, and possible results of such an act. The system should, of course, select the government officials as the appropriate referent of "they" in this example. Example:

Shining Path guerrillas shot three government officials in Andahua. [They] died in the hospital.

Criteria: Correctly determined which entity, previously mentioned in the same or preceding sentence, is referred to by the ambiguous anaphoric reference.

_____ Score: _____

1.1.1.2 Anaphoric References with Verb Phrase or Sentence Antecedents

This subsection tests a system's understanding of an anaphoric reference (pronoun) used to refer back to an event, activity, or happening that was previously expressed using a verb phrase or sentence. The pronouns that are commonly used to refer to events, activities, or happenings are "this", "that", "these", "those", and "it". Be sure that the anaphoric reference that you create is NOT ambiguous.

In the following example, the pronoun "this" refers to John Smith's earning over \$40,000 in 1989. So the referent of "this" is the same as the action expressed by the verb phrase "earn more than \$40,000 in 1989".

[DO-Verb] [NP] [Antecedent VP]?
[DO-Verb] [NP] [DO-Verb] [NP +PRO]?

Eg, Did John Smith [earn more than \$40,000 in 1989]?
Did Mary Jones do [this] ?

In the following example, the pronoun "that" in the second sentence refers to the event expressed by the first sentence, namely, John Smith's being hired. Thus the entire first sentence is the antecedent expression for the pronoun "that".

[Antecedent S]?
[DO-Verb] [NP +PRO] [VP]?

Eg, [When was John Smith hired] ?
Did [that] bring the number of employees to 500 ?

In the following example, the pronoun "this" in the second sentence refers to the event expressed by the first sentence, namely, the explosion of the Avianca 727 on November 7th. Thus the entire first sentence is the antecedent expression for the pronoun "this".

[Antecedent S].
[NP] [Verb] [NP +PRO] [NP] ([Complement]).

Eg, [On November 7, an Avianca 727 exploded in midair near Bogota.]
Authorities attribute [this] to the Sinister Extraditables.

When [Antecedent S], [NP +PRO] [Verb +PASSIVE] to [VP].

Eg, When [the Avianca 727 was destroyed near Bogota],
[it] was believed to be a terrorist bombing incident.

Criteria: Correctly determined which event, activity, or happening (one or more) previously mentioned in the same or preceding sentence, is referred to by the anaphoric reference (pronoun).

Score: _____

1.1.2 Nominal Anaphora

In addition to pronouns, definite noun phrases (i.e., a noun phrase containing the definite article "the") can function as anaphoric referring expressions. Section 1.1.2.1 addresses the case in which the antecedent expression is also a noun phrase, while Section 1.1.2.2 addresses the case in which the antecedent expression is a clause or sentence. In the following sections,

the symbol [Anaphoric NP] represents a definite noun phrase (i.e., a noun phrase including the definite article "the").

1.1.2.1 Anaphoric References with NP Antecedents

Anaphoric references consisting of definite noun phrases are typically classified into two types: *direct* and *indirect*. These two types are covered and defined in the following two subsections.

1.1.2.1.1 Direct

A definite noun phrase receives *direct* anaphoric interpretation when the same noun head has already occurred in the text, and it is clear that a relation of coreference exists between the two noun phrases (Quirk et. al., 1985, p. 267). "Coreference" means that the two noun phrases refer to the same entity. In this subsection, since we are testing the *direct* type of anaphoric reference, be sure that the same noun head is used in the anaphoric referring expression and in the preceding corefering expression.

In the following example, "*the benefits*" in the second sentence is an anaphoric reference to the employee benefits mentioned in the first sentence. Note that the same noun head is used in both noun phrases, namely, "benefits".

[BE-Verb] [Antecedent NP] [VP]?
[DO-Verb] [Anaphoric NP] [VP]?

Eg, Are [employee benefits] listed in the personnel records ?
Do [the benefits] include a pension plan ?

In the following example, "*these managers*" in the second sentence is an anaphoric reference to the managers with Ph.Ds mentioned in the first sentence. Note that the same noun head is used in both noun phrases, namely, "managers".

List [Antecedent NP].
[DO-Verb] [Anaphoric NP] [VP]?

Eg, List [the managers with Ph.Ds].
Do [these managers] earn over \$5,000 a month ?

In the following example, "*the bomb*" in the second sentence is an anaphoric reference to the car bomb mentioned in the first sentence. Note that the same noun head is used in both noun phrases, namely, "bomb".

([AdvP]) [Antecedent NP] [VP].
[Anaphoric NP] [VP].

Eg, On January 5, [a car bomb] exploded in front of the U.S. embassy.
[The bomb] broke windows, but no injuries were reported.

Criteria: Correctly determined which object(s) or event(s), previously mentioned in the same or preceding sentence, is referred to by the anaphoric reference (definite noun phrase).

Score: _____

1.1.2.1.2 Indirect

Indirect anaphora occurs when a reference is made to an object or entity that has become part of the reader's (or hearer's) knowledge indirectly, not by direct mention, but by association or inference from what has already been mentioned (Quirk et. al., 1985, p. 267). The anaphoric reference is made with a definite noun phrase. For example, once a building is mentioned, then its parts are within the focus of the discourse context without being explicitly mentioned and can be referred to with a definite noun phrase. In the first example below, after the mention of the government house, any part thereof can be referred to with a definite noun phrase such as "*the left wing*".

[NP] [Verb] [Antecedent NP].
[Anaphoric NP] [VP].

Eg, FMLN terrorists bombed [the Andahua government house].
[The left wing] was destroyed.

In the next example below, after the mention of the particular massacre, any aspect or part of the massacre can be referred to with a definite noun phrase since it is automatically within the discourse focus by association with the massacre. So in this example, the noun phrase "*these murders*" is understood to refer to murders that were part of the massacre mentioned previously.

[Antecedent NP] [VP].
[NP] [BE-Verb] [Adjective] [Prep] [Anaphoric NP].

Eg, [The massacre of the Jesuit priests and their maids in El Salvador] caused an international outcry against the Salvadoran government. Members of the Salvadoran armed forces were responsible for [these murders].

You are to enter input to the NLP system that consists of one or more sentences in which an object or event is mentioned and subsequently a reference to some aspect or part of the

object or event is mentioned using a definite noun phrase. The latter definite noun phrase should NOT explicitly mention the original object or event.

Criteria: Correctly determined the referent (meaning) for the anaphoric definite noun phrase. This referent must be the correct aspect or part of the object or event which was previously mentioned in the same or preceding sentences.

Score: _____

1.1.2.2 Anaphoric References With Clause or Sentence Antecedents

This subsection tests a system's understanding of an anaphoric definite noun phrase, used to refer back to an event, activity, or happening that was previously expressed using a clause or sentence. When entering input to the NLP system, be sure that the anaphoric reference that you use is NOT ambiguous.

In the following example, the definite noun phrase "*the incident*" is an anaphoric expression that refers to the event described by the first sentence.

[Antecedent S].
[Anaphoric NP] [VP].

Eg, [On January 5, a car bomb exploded in front of the U.S. embassy].
[The incident] resulted in some damage, but no injuries were reported.

In the following example, the definite noun phrase "*the incident*" in the second sentence is an anaphoric expression that refers to the event described by the first sentence.

[Antecedent S].
[NP] [Verb] [NP] [Prep] [Anaphoric NP].

Eg, [On January 5, a car bomb exploded in front of the U. S. embassy].
The ELN claimed responsibility for [the incident].

In the following example, the definite noun phrase "*the event*" is an anaphoric expression that refers to the happening described by the first sentence.

When [Antecedent S], [Anaphoric NP] [Verb +PASSIVE] to [VP].

Eg, [When the Avianca 727 was destroyed near Bogota],
[the event] was believed to be a terrorist bombing.

Criteria: Correctly determined which event, activity, or happening, previously expressed by a clause or sentence, is referred to by the anaphoric reference (definite noun phrase).

Score: _____

1.1.3 Anaphora with *SO* and *AS*

Other anaphoric devices include the pro-predicates “*so*” and “*as*”.

The Human Rights Commission of the National Dialogue expressed concern over the violence, and [so] did the highest government officials.

The Human Rights Commission of the National Dialogue expressed concern over the violence, [as] did the highest government officials.

In the above examples, the expressions “*so*” and “*as*” are anaphoric expressions that have the verb phrase “*expressed concern over the violence*” as antecedent expression. The latter clause in each of the above sentences could be expressed as:

The highest government officials did [express concern over the violence].

In the following patterns, the [Aux-Verb] is filled by a closed class of verbs which includes the classes described as “Primary” and “Modal” in Sections I and II of the Procedure. The [Aux-Verb] of the anaphoric clause is the same as that of the antecedent sentence, except in the case of open class verbs in the present tense. If the verb in the antecedent sentence is an open class verb in the present tense, the [Aux-Verb] in the clause beginning with “*so*” or “*as*” is filled by “*do*”. The main verb is omitted in the anaphoric clause unless it is a Primary Verb (i.e., “*be*”, “*do*”, “*have*”).

In the following patterns and examples, the conjunction “*and*” could be eliminated and the two embedded sentences could each be stated separately. For alternative variation, a comma could be inserted at the end of the first embedded sentence.

Pattern: [Aux-Verb] [NP] [Verb] ([NP]) ([Adverbial])?
Example: Did John Smith earn \$30,000 in 1989 ?

 ([Aux-Verb]) [NP] [DO-Verb] so (also)?
 Did Mary Harris do so also?
 John Smith did so also?

Pattern: [NP] [Verb] ([NP]) and so
Example: The ELN kidnapped three government officials and so

([Aux-Verb]) [DO-Verb] [NP].
did the FARC.

Pattern: [NP] [Verb] ([NP]) as ([Aux-Verb]) [DO-Verb] [NP].

Pattern: [NP] [Verb] ([NP]) and
Example: The ELN kidnapped several government officials and
[NP] ([Aux-Verb]) [DO-Verb] so (also).
the FARC did so also.

1.1.3.1 Anaphora with *SO*

In this subsection, test the use of “*so*” as an anaphoric reference which refers back to a situation, event, or predicate expressed by a verb phrase or sentence.

In the first example below, the anaphoric pronoun-like word “*so*” refers to the attribute or predicate “*earns \$30,000*” expressed as part of the first sentence.

Eg, John Smith [earns \$30,000], doesn't he?
Mary Harris does [so] also, doesn't she?

Eg, Did John Smith [earn over \$30,000 in sales commissions]?
Did Mary Harris do [so] also?

Eg, The ELN [kidnapped several government officials] in
???? and the FARC did [so] in ?????

Eg, The ELN has [claimed responsibility for the bombing
of the government house], and [so] has the FARC.

Criteria: Correctly determined which action, activity, predicate, or happening, previously expressed by a verb phrase or sentence in the same or preceding sentence, is referred to by the anaphoric pro-word “*so*”.

Score: _____

1.1.3.2 Anaphora with *AS*

In this subsection, test the use of “*as*” as an anaphoric reference which refers back to a situation, event, or predicate expressed by a verb phrase or sentence.

In the first example below, the anaphoric pronoun-like word “*as*” refers to the attribute or predicate “*earns \$30,000*” expressed as part of the first sentence. The clause “*as does Mary*

Harris" is used as a presupposition and if you use a test input such as this, you must make sure that the presupposition is true.

Eg, Does John Smith [earn over \$30,000]
[as] does Mary Harris?

Eg, Did John Smith [earn over \$30,000 in commissions in 1989]
[as] did Mary Harris?

Eg, The ELN has [claimed responsibility for the bombing],
[as] has the FARC.

Criteria: Correctly determined which action, activity, predicate, or happening, previously expressed by a verb phrase or sentence in the same or preceding sentence, is referred to by the anaphoric pro-word "as".

Score: _____

1.1.4 Intra- and Inter-Sentential Anaphora

The expression which provides the referent of an anaphoric expression must precede the anaphoric expression in the discourse. However, it may be a constituent of the same sentence, called *intra-sentential* anaphora, or it may be a constituent of some preceding sentence, called *inter-sentential* anaphora. The preceding sections on anaphora have included both. We include an example of each here. Test the system for each type.

1.1.4.1 Intra-sentential anaphora

Test the NLP system's ability to understand intra-sentential anaphora.

Eg, Did [Mary Harris] meet [her] sales quota for July ?
Eg, The Shining Path guerrillas murdered [the mayor] by bombing
[his] home.

Criteria: Correctly determined which entity, previously mentioned in the same sentence, is referred to by the anaphoric reference (pronoun).

Score: _____

1.1.4.2 Inter-sentential anaphora

Test the NLP system's ability to understand inter-sentential anaphora.

Eg, Which [employees] earn over \$5,000 a month ?
Are [they] salespersons ?
Eg, Shining Path guerrillas kidnapped [the mayor] on January 4.
The guerrillas subsequently killed [him].

Criteria: Correctly determined which entity, previously mentioned in a preceding sentence, is referred to by the anaphoric reference (pronoun).

Score: _____

1.2 Cataphoric Reference

Cataphoric reference is the opposite of anaphoric reference in that in the case of a *cataphoric* referring expression, the expression which provides the unique referent follows the cataphoric expression in the discourse, instead of preceding it as in the case of anaphora. Thus a cataphoric reference is actually an anticipatory reference, where the item referred to follows the expression that refers to it initially. Cataphoric reference is used less frequently than anaphoric references. In the following example, the pronoun “*it*” is a cataphoric expression that refers to the the Human Rights Commission of the National Dialog mentioned later in the discourse.

After [it] emerged from the Esquipulas Peace Agreement, [the Human Rights Commission of the National Dialog] expressed concern over the current escalation of violence in Guatemala.

Anticipatory references are called “cataphora”, since the ‘ana-’ prefix in “anaphora” is derived from Greek, and means “upward, backward” indicating the direction of reference to a previous item called an “antecedent” (in turn derived from Latin ‘ante-’ and ‘cedere’, meaning “to go before”), whereas ‘cata-’ has the sense “down, downward”, indicating a referent further down in the discourse, which we will call the “*postcedent*”.

1.2.1 Cataphoric References With NP Postcedents

In this subsection, we test a system’s ability to determine the meaning of cataphoric references that have referents expressed as noun phrases. The referent would typically be an object or entity. In the first example below, the pronoun “*he*” is used as a cataphoric reference to the person (entity) John Smith referred to subsequently in the same sentence.

[Conj +SUBORD] [NP +PRO] [VP], [DO-Verb] [Postcedent NP] [VP]?

Eg, Before [he] was promoted, did [John Smith] earn over \$30,000?

Eg, When [he] was promoted, did [John Smith] work in the sales department?

[Conj +SUBORD] [NP +PRO] [VP], [Postcedent NP] [VP]

Eg, When [he] was in Bogota writing an article about the drug war,
[the Brazilian journalist Juan Castellar] was kidnapped by

Colombian Army of National Liberation guerrillas.

Eg, When [he] was kidnapped by Colombian Army of National Liberation guerrillas, [the Brazilian journalist Juan Castellar] was in Bogota writing an article about the drug war.

[Conj +SUBORD] [NP +PRO] [VP], [Postcedent NP] [VP].

Eg, Before [they] appeared in Andahua, [the Shining Path guerrillas] murdered the mayor.

[Conj +SUBORD] [VP] [NP +PRO], [Postcedent NP] [VP]

Eg, When Colombian Army of National Liberation guerrillas kidnapped [him], [the Brazilian journalist Juan Castellar] was in Bogota writing an article about the drug war.

[Conj +SUBORD] [NP] [Verb] [NP +PRO] ([Complement]), [Postcedent NP] [VP].

Eg, When the authorities accused [them] of murdering the mayor, [the Shining Path guerrillas] were in the town of Andahua.

Criteria: Correctly determined which entity, subsequently mentioned using a noun phrase in the same or a following sentence, is referred to by the cataphoric reference (pronoun).

Score: _____

1.2.2 Cataphoric References With Verb Phrase or Sentence Antecedents

In this subsection, we test a system's ability to determine the meaning of cataphoric references that have referents (meanings) expressed as verb phrases or sentences. The referent (meaning) would typically be an event, happening, or state of affairs. In the first example below, the pronoun "it" is used as a cataphoric reference to the event of John Smith's earning over \$40,000 in 1989, expressed subsequently as an embedded sentence within the same sentence.

Eg, Is [it] true that [John Smith earned over \$40,000 in 1989]?

Eg, When was [it] that [John Smith was hired]?

Eg, Was [it] in 1989 that [John Smith was hired]?

Eg, Is [it] the case that [John Smith earns over \$40,000]?

Eg, [It] was announced that [the FMLN had kidnapped the mayor].

Eg, After [it] was announced that [the FMLN had bombed the governor's car], the FMLN also bombed the government house.

Eg, When [it] was announced that [the Andahua mayor had been kidnapped], the FMLN announced ransom demands.

Eg, When authorities announced [it], the FMLN denied [having bombed the government house].

Eg, After [it] was discovered that [the FMLN had kidnapped the mayor], police found his body in the woods.

Eg, After [it] was confirmed by the FMLN leader, a government spokesman announced that [the mayor had been kidnapped by the FMLN].

Criteria: Correctly determined which event, happening, or state of affairs, subsequently mentioned using a verb phrase or sentence in the same or a following sentence, is referred to by the cataphoric reference (pronoun).

Score: _____

1.3 General Knowledge or the Larger Situation

The identity of the referent of a phrase may be evident from knowledge of the 'larger situation' which the writer (speaker) and reader (hearer) share. The 'larger situation' may be some application domain or may be so encompassing as to be general world knowledge. (Quirk et. al., 1985, p. 266)

In this subsection, we will treat the application domain of the NLP system or some more limited context established by input text as the 'larger situation'. You are to test the system's understanding of some definite noun phrases which the system should be able to interpret based on knowledge of the domain.

In the first examples, the referent of the definite noun phrase "the president" should be the president of Xidec for the Xidec employee database application.

Eg, What is the salary of [the president]?

Eg, Who is [the president]?

In the next example, the referent of the definite noun phrase "the mayor" should be the

mayor of Andahua, a government official.

**Eg, When the Andahua bank exploded, [the mayor] was shot
by the FMLN as he rushed into the street.**

Criteria: Correctly determined the referent (meaning) for the situational reference (a definite noun phrase). This referent is the correct object or entity, which is known to the system because of its knowledge of the larger situation or application domain.

Score: _____

2. Generic Reference (t.b.d.)

In the sentence "*Tigers are dangerous animals*, the reference "*Tigers*" is a generic reference, since we are thinking of the class 'tiger' without specific reference to particular tigers. Singular or plural, definite or indefinite, noun phrases can often be used without appreciable difference of meaning in generic contexts, as in the following examples. (Quirk et. al., 1985, p.265)

[A tiger] is a dangerous animal.
[Tigers] are dangerous animals.
[The tiger] can be a dangerous animal.

In other words, we are testing whether an NLP system can treat any class or type as such (namely, as a class or type), rather than as a collection of individuals. That is, does the system know anything about the class as a whole, rather than just information about the individuals within the class or group?

You are to test the ability of the NLP system to understand generic references. Submit input to the system which includes a generic noun phrase. Use any of the three types of noun phrases listed above.

In the first example, for the employee database domain, we inquire whether the system knows whether the Xidec employees, as a group, are well paid.

Eg, Are Xidec employees well paid?

For the terrorist domain, we test whether the system can treat the concept of 'terrorists' as a class or type.

**Eg, [Terrorists] were responsible for over 50 kidnappings
in South America during 1989.**

Criteria: Correctly determined the referent (meaning) for the generic reference (a noun phrase). The referent must be a general class or type of entity, not a specific individual or group of individuals of the mentioned type.

_____ Score: _____

XI. ELLIPSIS

Ellipsis may be defined as the omission of grammatical elements of a sentence which are predictable and recoverable from context. In some special cases (e.g., comparative clauses, coordinate constructions) the possibilities of omission are closely determined by the relation between the antecedent construction and the elliptical construction within the larger construction of which they are both a part. The special ellipsis types are covered in the Procedure sections on the respective construction types (e.g., comparative constructions, coordinate constructions). This section of the Procedure focuses on non-special (**general**) ellipsis in which the relation between the two constructions does *not* determine or restrict the possibilities for omission.

According to Quirk et. al. (1985), the types of recoverability include:

- Textual: the full grammatical element can be recovered from a neighboring part of the text (e.g., "*Jane Smith earns more money than Sue Jones (earns).*")
- Situational: the full grammatical element can be recovered from the extralinguistic situation (e.g., ("*He/She Doesn't look too well*").
- Structural: the full grammatical element can be recovered through knowledge of the grammatical structure. For example, in the sentence "*It is true (that) George Bush is president of the U.S.*", the conjunction "*that*" is recoverable from knowledge of the structure of such a sentence with an embedded clause.

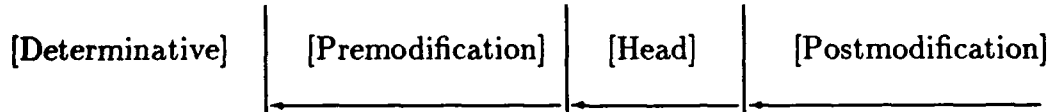
Many forms of *structural ellipsis* are covered in the different Procedure sections that focus on the different types of grammatical structures, without specifically referring to the particular phenomenon as ellipsis. For example, a certain form of structural ellipsis in relative clauses produces what are referred to as *reduced relative clauses*. However, in this Application Procedure, the concept of reduced relative clauses is covered in the section on Noun Phrases without explicitly identifying them as a form of structural ellipsis.

General textual ellipsis is also called *standard ellipsis* and is the focus of this section of the Procedure. In this type of ellipsis, the elliptical element can be recovered from neighboring text, it is typically the final element of a construction, and it is typically anaphoric (as opposed to cataphoric). *Anaphoric* means that the recovery of the missing grammatical element can be ascertained from *earlier* or preceding text. Typically, a grammatical pattern (e.g., noun phrase, verb phrase, clause) is used twice in succession: the first time with complete constituents, the second time with omitted elements that can be recovered by comparing the language structure to the similar preceding structure.

In the examples of this section, ellipted (omitted) sentence elements are included in parentheses, but are not to be used as part of the test input to an NLP system.

1. Elliptical noun phrases

The elements ellipited in noun phrases are most frequently the final elements of the phrases. This means that the ellipsis tends to follow the right-to-left precedence shown below:



For noun phrase ellipsis, a noun phrase pattern is used twice. The second time it is used, one or more phrase elements are omitted, but can be recovered from the closely preceding use of the same pattern.

1.1 Ellipsis of head only, no postmodifiers present

For this case of ellipsis, when the noun phrase pattern is used the first time, the noun phrase must include a head element and usually includes a determinative and premodifier. When used the second time, the head alone is omitted. Remember that the words in parentheses are the omitted words and are not included in the text submitted to the NLP system. Thus using first sentential example below, the evaluator would first input *"Who is the youngest employee?"* to the system, wait for a correct response, and then input *"Who is the oldest?"* without the word *"employee"* and determine whether the system understood correctly.

Noun Phrase Pattern and Examples:

	[Determinative]	[Premodification]	[Head]
1st:	the	youngest	employee
2nd:	the	oldest	(employee)

Sentential Examples:

Eg, Who is the youngest employee?

Who is the oldest (employee)?

Eg, The terrorist attack on Andahua killed the oldest villager.

The terrorist attack on Andahua also killed the youngest (villager).

Eg, Several civilians were killed and several (civilians) were wounded by the ELN attack.

Eg, Seven soldiers were killed and several (soldiers) were wounded by a bomb when a group of ELN rebels ambushed a military convoy in Saravena.

Eg, The guerrillas kidnapped the richest businessman and the most famous (businessman).

Eg, One pe sant was killed and another (peasant) was wounded during the guerrilla attack on the presidential farm.

Criteria: Demonstrated that it determined the correct head for the noun phrase whose head had been omitted, and correctly interpreted the noun phrase.

1.2 Ellipsis of premodifier(s) and head, no postmodifiers present

For this case of ellipsis, when the noun phrase pattern is used the first time, the noun phrase must include a head element and a premodifier and usually includes a determinative. When used the second time, the head and last (right-most) premodifier(s) are omitted.

Noun Phrase Pattern and Examples:

	[Determinative]	[Premodification]	[Head]
1st:	the	oldest New York	employee
2nd:	the	youngest (New York)	(employee)

Sentential Examples:

Eg, Who is the oldest New York employee?

Who is the youngest (New York employee)?

Eg, The ambush on February 1st was the most unexpected terrorist action. The ambush was also the least organized (terrorist action).

Eg, The kidnapping on February 1st was the first terrorist action. The assassination on March 4th was the second (terrorist action).

Eg, The guerrillas kidnapped the richest Guatemalan businessman and the most famous (Guatemalan businessman).

Eg, A young peasant was killed and another (young peasant) was wounded in a guerrilla attack.

Criteria: Demonstrated that it determined the correct premodifier and head for the noun phrase whose premodifier and head had been omitted, and correctly interpreted the noun phrase.

1.3 Ellipsis of post-modifier(s) only

For this case of ellipsis, when the noun phrase pattern is used the first time, the noun phrase must include a head element and at least one postmodifier. When used the second time, the postmodifiers are omitted.

Noun Phrase Pattern and Examples:

	[Determinative]	[Head]	[Postmodification]
1st:	the	women	in the Computer Science Department
2nd:	the	men	(in the Computer Science Department)

Sentential Examples:

Eg, List the women in the Computer Science Department.

- List the men (in the Computer Science Department).
- Eg, The mayor of Andahua was kidnapped on January 8.
The mayor (of Andahua) was killed on January 10.
- Eg, Terrorists kidnapped two members of the embassy staff.
The terrorists killed the other members (of the embassy staff).
- Eg, Terrorists burned the stores in Andahua.
Then the terrorists burned the banks (in Andahua).
- Eg, The houses on the presidential farm were burned and some
trucks (on the presidential farm) were stolen by the guerrillas.

Criteria: Demonstrated that it determined the correct premodifier(s) for the noun phrase whose premodifier(s) had been omitted, and correctly interpreted the noun phrase.

Score: _____

1.4 Ellipsis of head and post-modifier(s)

For this case of ellipsis, when the noun phrase pattern is used the first time, the noun phrase must include a head element and at least one postmodifier. When used the second time, both the head and postmodifiers are ellipted.

Noun Phrase Pattern and Examples:

	[Determinative]	[Premodification]	[Head]	[Postmodification]
1st:	the	oldest	person	in the Marketing Department
2nd:	the	youngest	(person)	(in the Marketing Department)

Sentential Examples:

- Eg, Who is the oldest person in the Marketing Department?
Who is the youngest (person in the Marketing Department)?
- Eg, The guerrillas won the first attack on Andahua.
The guerrillas lost the second (attack on Andahua).
- Eg, Six terrorists of the ELN kidnapped the mayor.
The six (terrorists of the ELN) murdered the governor.
- Eg, The first kidnapping of Andahua civilians took place on
January 9 and
the second (kidnapping of Andahua civilians) took place
on January 12.
- Eg, The guerrillas kidnapped the richest businessman in Guatemala
and the poorest (businessman in Guatemala).

Criteria: Demonstrated that it determined the correct head and postmodifier(s) for the noun phrase whose head and postmodifier(s) had been omitted, and correctly interpreted the noun phrase.

Score: _____

1.5 Ellipsis of premodifier(s) and head and postmodifier(s)

For this case of ellipsis, when the noun phrase pattern is used the first time, the noun phrase must include a head element, at least one premodifier, and at least one postmodifier. When used the second time, the last (right-most) premodifier(s), the head, and the postmodifiers are ellipped.

Noun Phrase Pattern and Examples:

	[Determinative]	[Premodification]	[Head]	[Postmodification]
1st:	the	oldest New York	employee	in sales
2nd:	the	youngest (New York)	(employee)	(in sales)

Sentential Examples:

Eg, Who is the oldest New York employee in sales?

Who is the youngest (New York employee in sales)?

Eg, The first terrorist attack on Usulután killed 30 civilians.

The second (terrorist attack on Usulután) killed 50 civilians.

Eg, The June terrorist attack on Usulután killed 30 civilians.

The next (terrorist attack on Usulután) killed 50 civilians.

Eg, The first URNG attack on the presidential farm killed a peasant.

The second (URNG attack on the presidential farm) caused damage to the farm.

Eg, The first guerrilla kidnapping of civilians occurred on January 10. The next (guerrilla kidnapping of civilians) occurred on February 2.

Criteria: Demonstrated that it determined the correct premodifier, head, and postmodifier(s) for the noun phrase from which these three elements had been omitted, and correctly interpreted the noun phrase.

Score: _____

1.6 Ellipsis of head with postmodifier(s) retained (Medial Ellipsis)

Medial ellipsis in a noun phrase occurs when a postmodifier is present and retained, while the head of the noun phrase is ellipped. For this case of ellipsis, when the noun phrase pattern is used the first time, the noun phrase must include a head element and at least one postmodifier. When used the second time, the head is ellipped, but the postmodifiers are retained.

Noun Phrase Pattern and Examples:

	[Determinative]	[Premodification]	[Head]	[Postmodification]
1st:	the	oldest	female	in the Marketing Department
2nd:	the	youngest	(female)	in the Marketing Department

Sentential Examples:

- Eg, Who is the oldest female in the Marketing Department?
Who is the youngest (female) in the Marketing Department?
- Eg, The first attack by the terrorists on Usulutun killed 20 civilians. The second (attack) by the terrorists on Usulutun killed 50 civilians.
- Eg, The first attack by the guerrillas on the presidential farm killed a peasant. The second (attack) by the guerrillas on the presidential farm caused damage to the farm.
- Eg, The first bombing by the guerrillas caused the destruction of the Central Bank. The next (bombing) by the guerrillas caused some damage to the Government House.

Criteria: Demonstrated that it determined the correct head for the noun phrase whose head had been omitted but not its premodifer(s) or postmodifier(s), and correctly interpreted the noun phrase.

Score: _____

2. Elliptical Clauses

Ellipsis in clauses is similar to ellipsis in noun phrases in that the ellipited elements tend to be the final (right-most) phrase elements. Therefore in this section, we start with the more common forms of ellipsis, namely ellipsis of right-most clause elements, and move left in our consideration of ellipited clause elements. As in the case of noun phrases, the ellipsis being tested in the following subsections will entail the use of a grammatical pattern twice in succession (within the same sentence or in subsequent sentences). Elements are omitted in the second use of the grammatical pattern such that they can be recovered from the first use of the grammatical pattern.

2.1 Ellipsis of Subject Complement

Recall that a subject complement is an adjective phrase or a noun phrase which applies some attribute or definition to the subject, and it is generally used following a copular verb such as "is", "seem", "become". The pattern for the verb phrase consists of a verb of the type just mentioned, followed by an adjective phrase or noun phrase.

Select a sentence pattern that contains a subject complement. Use this pattern to create two input test sentences: the first sentence should be complete with no omitted elements and the second should be input with the subject complement omitted (forming an instance of ellipsis).

	[BE-Verb]	[NP]	[Subject Complement] ?
1st:	Is	John Wilson	an engineer ?
2nd:	Is	Don Thomas	(an engineer) ?

	[NP]	[BE-Verb]	[Subject Complement] ?

- 1st: Which men are New York salespersons?
 2nd: Which women are (New York salespersons)?
- 1st: The persons who killed the defense minister are terrorists.
 2nd: The persons who killed the mayor are (terrorists) also.
- 1st: The terrorist organization which conducted an attack on the presidential farm was the URNG.
 2nd: The terrorist organization which killed a civilian was (the URNG) also.

Criteria: Demonstrated that it determined the correct subject complement for the sentence from which the subject complement had been omitted, and correctly interpreted the sentence.

Score: _____

2.2 Ellipsis of Subject Complement and Adverbial

For this type of ellipsis, the first use of the sentence pattern should include a subject complement and an adverbial. In the second use of the sentence pattern, the subject complement and adverbial should be omitted.

- | | [Subject Complement] | [Adverbial] |
|--|---------------------------------------|---------------------------|
| Eg, Was John Smith | an employee in the Sales Department | last year? |
| Was Paul Martin | (an employee in the Sales Department) | (last year)? |
| Eg, The kidnap victim | was a cabinet member | this year and |
| Manuel Baldeon | | |
| the murder victim | was (a cabinet member) | (this year) also. |
| Eduardo Lopez | | |
| Eg, (Preliminary Sentence: Guerrillas kidnapped a man and murdered a man.) | | |
| The kidnap victim | is a businessman | in Guatemala City. |
| The murder victim | is (a businessman) | (in Guatemala City) also. |

Criteria: Demonstrated that it determined the correct subject complement and adverbial for the sentence or clause from which the subject complement and adverbial had been omitted, and correctly interpreted the sentence.

Score: _____

2.3 Ellipsis of Adverbial

For this type of ellipsis, the sentence pattern should include an adverbial. The first use of the sentence pattern should include the adverbial and the second should omit the adverbial.

	[BE-Verb]	[NP]	[PP]	[Adverbial]
1st:	Was	John Smith	in the Marketing Department	in 1989?
2nd:	Was	Harold Thomas	in the Sales Department	(in 1989)?

	[NP]	[VP]	[Adverbial]
1st:	Five government soldiers	were killed	during a terrorist attack.
2nd:	A military vehicle	was also destroyed	(during the terrorist attack).

1st:	A peasant	was killed	during the guerrilla attack on the presidential farm.
2nd:	Some farm facilities	were destroyed	(during the guerrilla attack on the presidential farm) also.

Criteria: Demonstrated that it determined the correct adverbial for the sentence from which the adverbial had been omitted, and correctly interpreted the sentence.

Score: _____

2.4 Ellipsis of Verb Head

For this type of ellipsis, the first use of the sentence pattern should include a verb phrase and the second use of the pattern omits the verb head only.

	[BE-Verb]	[NP]	[Verb Head]	[Adverbial]
1st:	Was	John Smith	hired	in 1979?
2nd:	Was	Mike Thomas	(hired)	in 1980?

	[NP]	[VP]
1st:	The FMLN terrorists	attacked.
2nd:	The Shining Path terrorists	will (attack) also.

(Preliminary Sentence: Guerrillas attacked yesterday.)

1st:	The presidential farm	was burned.
2nd:	A government building	was also (burned).

Criteria: Demonstrated that it determined the correct verb head for the sentence from which the verb head had been omitted, and correctly interpreted the sentence.

Score: _____

2.5 Ellipsis of Verb Head and Adverbial

For this type of ellipsis, the sentence pattern should include an adverbial in the verb phrase. When the sentence pattern is used the first time, all elements should be included. When the pattern is used the second time, the verb head and the adverbial should be omitted.

	[BE-Verb]	[NP]	[Verb]	[Adverbial]
1st:	Is	John Smith	working	in sales?
2nd:	Is	Mike Thomas	(working)	(in sales)?
1st:	Was	John Smith	hired	in 1987?
2nd:	Was	Mike Thomas	(hired)	(in 1987)?

Other Examples:

- Eg, How long has John Smith worked in sales?
How long has Mike Thomas (worked in sales)?
- Eg, The Bogata bank was bombed in 1990 and
the Andahua bank was (bombed in 1990) also.
- Eg, The presidential farm was burned during the guerrilla attack.
A government building was also (burned during the guerrilla attack).

Criteria: Demonstrated that it determined the correct verb head and adverbial for the sentence from which the verb head and adverbial had been omitted, and correctly interpreted the sentence.

Score: _____

2.6 Ellipsis of Verb Head and Object and Adverbial

For this type of ellipsis, the sentence pattern should include a verb phrase with an object and adverbial. When the sentence pattern is used the first time, all sentence elements are included. When the sentence pattern is used the second time, the verb head, object, and adverbial are omitted.

	[DO-Verb]	[NP]	[Verb]	[Object]	[Adverbial]
1st:	Did	Mary Smith	meet	quota	last month?
2nd:	Did	John Thomas	(meet)	(quota)	(last month)?
1st:	Did	Mary Smith	earn	a bonus	last year?
2nd:	Did	John Thomas	(earn)	(a bonus)	(last year)?

Another example:

- Eg, FMLN terrorists have killed over 20 citizens in 1990 and
the Shining Path have (killed over 20 citizens in 1990) also.
- Eg, The URNG guerrillas kidnapped two local officials this week.
The FMLN terrorists have (kidnapped two local officials this
week) also.

Criteria: Demonstrated that it determined the correct verb head, object, and adverbial for the sentence from which the verb head, object, and adverbial had been omitted, and correctly interpreted the sentence.

2.7 Ellipsis of the Verb Phrase with Do-Support

For this type of ellipsis, when the sentence pattern is used the second time, the verb phrase is omitted and the DO-verb is used in its place.

	List	[NP]		[Relative Clause]
			[[Rel Pronoun] [VP]]
1st:	List the salespersons		who	earn more than \$40,000.
2nd:	List the engineers		who	do (earn more than \$40,000).

	[DO-Verb]		[NP]		[VP]
1st:	Did		John Smith		start at Xidec
2nd:	when		Mike Thomas		did (start at Xidec)?

		[NP]		[VP]
1st:		The FMLN terrorists		attacked yesterday.
2nd:		The Shining Path terrorists		did (attack yesterday) also.

1st:		The 10th Army Battalion		attacked the guerrillas in Usulután
2nd:		when the 12th Army Battalion		did (attack the guerrillas in Usulután).

1st:		The guerrillas		attacked the presidential farm yesterday.
2nd:		The rebels		did (attack the presidential farm yesterday) also.

Criteria: Demonstrated that it determined the correct verb phrase for the sentence in which a form of the DO-verb has been substituted for the verb phrase, and correctly interpreted the sentence.

2.8 Medial Verb Head Ellipsis

When an adverbial or noun phrase follows an ellipted element, the ellipsis becomes medial rather than final (with respect to the positioning of the elements of the sentence).

Select a sentence pattern with an object noun phrase or adverbial following the main verb. When used the first time, the sentence should not have any omitted elements. When used the second time, omit the main verb.

Eg, Does Mary Jones earn \$30,000?

(Does) Ken Smith (earn) \$40,000?

Eg, The terrorist Commander shot President Mubarto and his Lieutenant (shot) Vice President Winnego.

Eg, The guerrillas attacked the presidential farm and the rebels (attacked) the Central Bank.

Criteria: Demonstrated that it determined the correct constituent (e.g., verb) for the sentence from which the constituent had been omitted with an adverbial or noun phrase following the position of the omitted element, and correctly interpreted the sentence.

Score: _____

2.9 Ellipsis of Subject and Verb

For this type of ellipsis, both subject and verb are omitted during the second use of the sentence pattern.

- Eg, Does the Sales Department employ Mary Davis?
(Does the Sales Department employ) Peter Walker?
- Eg, Did John Smith manage the Data Base Project?
(Did John Smith manage) The Communications Project?
- Eg, Did GE hire Mary Davis?
(Did GE hire) Peter Walker?
- Eg, The terrorists invaded Usulután, then (they invaded) Morazan.
- Eg, The terrorists attacked the Government House with grenades and (the terrorists attacked) the embassy building with bombs.
- Eg, The guerrillas attacked the presidential farm and then (they attacked) the government building.
- Eg, The guerrillas bombed the American Embassy, then (they bombed) the British Embassy.

Criteria: Demonstrated that it determined the correct subject and verb for the sentence from which the subject and verb had been omitted, and correctly interpreted the sentence.

Score: _____

2.10 Ellipsis in TO-Infinitive Clauses

A TO-infinitive clause consists of the word "to" followed by a verb phrase. Select a sentence pattern and include a TO-infinitive clause for the first of two test sentences. In the case of the second test sentence, use the same sentence pattern, but omit the verb phrase from the TO-infinitive clause so that the clause consists of only the word "to".

- Eg, Does John Smith manage the Computer Department?
Was John Smith hired to (manage the Computer Department)?
- Eg, The guerrillas invaded Usulután although they were warned not to (invade Usulután).
- Eg, The US soldiers did not attack the terrorists

- although they planned to (attack the terrorists).
- Eg, The guerrillas did not burn the presidential farm although they attempted to (burn the presidential farm).
- Eg, The guerrillas did not kill the mayor although they planned to (kill the mayor).

Criteria: Demonstrated that it determined the verb phrase for the TO-infinitive clause for the second sentence (from which the verb phrase of the TO-infinitive clause had been omitted), and correctly interpreted the sentence.

Score: _____

2.11 Ellipsis of Entire Clauses

Ellipsis of entire clauses is limited to dependent clauses, and mainly to TO-infinitive clauses. Usually the word whose clause is ellipsed is either a verb of communication or cognition such as *ask, know, force, wish* or an adjective such as *willing, eager, sure*.

- Eg, Captain Landers did not want to reveal the location of the battalion, but the terrorists forced him (to reveal the location of the battalion).
- Eg, When the captured terrorist was asked to identify the terrorist leader, he was willing (to identify the terrorist leader).
- Eg, The peasant did not want to set fire to the presidential farm but the guerrillas forced him (to set fire to the presidential farm).
- Eg, When the guerrillas were asked to release the kidnapped bank manager, they were willing (to release the kidnapped bank manager).

Criteria: Demonstrated that it determined the clause for the (second) sentence (from which the clause had been omitted), and correctly interpreted the sentence.

Score: _____

XII. SEMANTICS OF EVENTS

An event is an intersection of three-dimensional space with an interval of time in some world. This definition includes both happenings and states. The verb in a sentence generally expresses the main concept of an event. Other features of an event, such as the participants, the time, the place, the manner in which the event happened, any instruments used, and how the participants felt, may be expressed using linguistic devices such as noun phrases, or adverbials.

In the following sections we will categorize and test these components of events.

1. Main Concept of Events

In English, verbs are used to express the main concept of an event. In the following subsections, we categorize actions and statives expressed by the verb. When testing the following categories of verbs, use sentence types on which the system has succeeded.

1.1 Verbs Of Motion

1.1.1 Deictic Verbs Of Motion

Deictic motion verbs are verbs which express some object's motion relative to a reference point or location determined from the situational context of the utterance. This reference point is called the "*deictic center*". For example, the deictic motion verb "*go*" has the extra meaning of *away from "here"* where "*here*" is the speaker's location. Other examples of deictic motion verbs are "*come*", "*bring*", "*take*", "*approach*", and "*leave*".

Eg, Did Jones go to New York?

Eg, What salespersons came from Chicago?

Eg, Honduran terrorists brought guns into Guatemala.

Eg, Terrorists went into Guatemala and killed the Prime Minister.

Eg, (Preliminary Sentence: Police arrested 12 terrorists at the Government House.) Police took the terrorists to jail.

Eg, Guerrillas went to the presidential farm and burned the buildings.

Criteria: Demonstrated understanding that the deictic motion verb signals movement with respect to a reference point determined from the situational context.

Score: _____

1.1.2 Non-Deictic Verbs Of Motion

Non-deictic motion verbs express some object's motion, and the verb alone does not evoke a deictic center. For example, the non-deictic motion verb "*move*" has no meaning in itself

of a relationship to a deictic center, though it may be used with other deictic elements, for example "there", in the sentence:

The shortstop moved there.

"There" is deictic because it refers to a location known only in the situational context of the utterance.

Other examples of non-deictic motion verbs are "run", "roll", "fall", "bounce", "slide", "fly", "walk", "ship", "travel", etc.

Eg, Which departments ship printers?

Eg, Which salesman moved from New York?

Eg, ARENA flew over El Salvador and dropped bombs.

Eg, Terrorists dropped bombs on El Salvador.

Eg, Honduran terrorists moved to El Salvador and killed the Prime Minister.

Eg, Guerrillas moved onto the presidential farm and burned the buildings.

Criteria: Demonstrated understanding that the non-deictic motion verb expressed some object's movement.

Score: _____

1.2 Verbs Of Mental Phenomenon

1.2.1 Verbs of Perception (t.b.d.)

Verbs which express perception can be divided into those which express the perception from an external, or public, viewpoint and those which express the perception from an internal, or private, viewpoint.

1.2.1.1 Perception from an External Viewpoint (t.b.d.)

By "*perception from an external viewpoint*", we mean events of perception, the occurrence of which can be known by someone outside of the perceiver, from external cues. For example, in

John sees Mary.

the *seeing* is an event assumed by the speaker to have happened from external cues. Other verbs in this category are "see", "hear", and "taste".

1.2.1.2 Perception from an Internal Viewpoint (t.b.d.)

By "*perception from an internal viewpoint*", we mean events of perception, the occurrence of which cannot be known by someone outside of the perceiver, unless specifically made aware. For example, in:

John looks ill.

the perceptual act is not visible from the outside, but is the speaker's internal perception. In:

It looks like a spider, to Bill.

the speaker has presumably been told of Bill's perception. Other verbs in this category are "*sounds (like)*"; and "*seems*".

1.2.2 Verbs of Emotion (t.b.d.)

Verbs of Emotion express emotional events like *feel*, *hurt*, or *ache*.

1.2.3 Verbs of Cognition (t.b.d.)

Cognitive processes include processes like *emotions* and *perceptions*, treated above, as well as *thinking*, *judging*, and *learning*. Verbs of Cognition express these latter processes which are often thought of as being part of "conscious" experience.

1.3 Verbs of Communication

Verbs of expression express communicative events.

1.3.1 Illocutionary Verbs

Illocutionary verbs express communicative events which result in the movement of information from speaker to hearer. Examples are "*ask*", "*say*", "*tell*", and so on.

Eg, List the employees.

Eg, Tell me who sells in the New York Region.

Eg, Reporters said that guerrillas killed the Prime Minister.

Eg, Reporters announced guerrillas killed the Prime Minister.

Eg, The government said that the guerrilla attack killed one civilian.

Eg, URNG guerrillas announced that they had attacked the presidential farm.

Criteria: Demonstrated understanding of the communicative event expressed by the illocutionary verb.

1.3.2 Performative Verbs

Performatives verbs express communicative events during which something besides simply the movement of information from speaker to hearer occurs. For example, the verb "to convince" expresses a communication event with the extra meaning of someone's belief being changed. Other examples are *command*, *concede*, and so on.

Eg, Who orders new parts?

Eg, Who claims to be a college graduate?

Eg, Did Jones hire John Smith?

Eg, ARENA claimed to have attacked a town in El Salvador.

Eg, Police reported that guerrillas killed the Prime Minister.

Eg, The government accused the URNG guerrillas of the attack on the presidential farm.

Eg, URNG guerrillas claimed responsibility for the attack on the presidential farm.

Criteria: Demonstrated understanding of both the communication and the additional occurrence expressed by the performative verb.

Score: _____

1.4 Verbs of Happenings

Verbs of happenings express events not covered in the above groups. Examples from this group are "find", "kill", "get", "hit", "pay", "buy", "shoot", and so on.

Eg, Who sells in New York?

Eg, What salary does John Smith earn?

Eg, Terrorists killed the Prime Minister.

Eg, Guerrillas bombed the Central Bank of Peru yesterday.

Eg, Guerrillas burned the presidential farm.

Eg, The rebels bombed the Central Bank yesterday.

Criteria: Demonstrated understanding of the event expressed by the verb of happening.

Score: _____

EVENT PARTICIPANTS

Event participants are persons or things which participate in the event. There are different types of roles that entities can fill with respect to the event. These roles are called "*semantic roles*" since they are used to capture the semantics or meanings of natural language utterances or texts. There may be more than one participant who fills a certain semantic role. If the second participant fills a lesser role than the first participant, s/he is a *co-participant*. For example, a secondary agent is a *co-agent*, and a secondary theme is a *co-theme*. If two participants are recognized as having an equal role, then the "co-" prefix is not used. The latter can be signaled by using a conjunctive noun phrase.

Note that these participants naturally occur in certain combinations. Therefore, the same sentence may be used to test a number of the following semantic roles.

2. Agency

2.1 Agent

An *agent* is the animate being or group of such beings who instigates or is responsible for the action of an event. The agent is generally found in subject position, or is signaled with a *by*-phrase in a passive sentence. For example,

John walked the dog.

John was arrested by *the police*.

John and Joe played a game.

Eg, List the salesperson who earns the highest salary.

Eg, Who manages department 17?

Eg, Who sold the most printers in 1990?

Eg, Terrorists killed the Prime Minister.

Eg, Guerrillas bombed the Central Bank of Peru yesterday.

Eg, Guerrillas attacked the presidential farm.

Eg, President Cerezo was kidnapped by URNG guerrillas.

Criteria: Correctly determined the *agent* and its responsibility for the action or its role in instigating the action expressed by the sentence.

Score: _____

2.2 Co-Agent

A *co-agent* is the animate being who performs the action along with the agent, but in a lesser, subsidiary role. This case is signaled by the use of a *with*-phrase. A co-agent only occurs in a sentence with an agent.

John walked the dog with *Jim*.

Eg, Who manages department 17 with John Smith?

Eg, Who sells with John Doe?

Eg, ARENA attacked a village with a group of armed men.

Eg, Shining Path bombed an electric facility with unidentified individuals.

Eg, The URNG guerrilla leader attacked the presidential farm with an unidentified companion.

Criteria: Correctly determined the *co-agent* and its responsibility for the action or its role in instigating the action expressed by the sentence.

_____ Score: _____

3. Experiencer

An *experiencer* is the animate being who is passively involved in event of perception or in a psychological event. Certain psychological events, for example *thinking*, require an active animate being. Others, such as *notice*, are more accidental. For example,

John noticed a rose-breasted grossbeak.

Eg, Who heard that Joe Smith is getting a raise?

Eg, Employees saw guerrillas bomb the Telephone Company Building.

Eg, Peasants heard terrorists attack a town in Peru yesterday.

Eg, Guards saw guerrillas attack the presidential farm.

Eg, The peasants heard guerrillas blow up the tank truck.

Criteria: Correctly determined the *experiencer* and its involvement in the event of perception or in the psychological event expressed by the sentence.

_____ Score: _____

4. Beneficiary

The *beneficiary* is the animate being for whom a certain event is performed.

I painted *Susan* a picture.

I painted a picture for *Susan*.

Eg, Who worked for X corporation in 1989?

Eg, Who sells for Xidec?

Eg, Who pays John Smith?

Eg, Employees bombed the Telephone Company Building for ARENA.

Eg, Peasants kidnapped the Prime Minister for Shining Path.

Eg, The URNG guerrillas burned the presidential farm for their leader.

Eg, THE URNG guerrillas stole food for their families.

Criteria: Correctly determined the *beneficiary* and its role as the animate being for whom the event expressed by the sentence is performed.

Score: _____

5. Patient

A *patient* is the animate being who is acted upon, or who is undergoing some change. For example,

The Mayor was assassinated.

John kissed *Mary*.

Eg, Which department hired John Smith?

Eg, When was Smith promoted?

Eg, The Prime Minister was assassinated.

Eg, A terrorist group assassinated the Prime Minister.

Eg, The guerrilla attack on the presidential farm killed one security guard.

Eg, The URNG guerrillas kidnapped President Cerezo.

Criteria: Correctly determined the *patient* and demonstrated understanding that some was action is performed upon it or that it undergoes some change.

Score: _____

6. Theme

A *theme* is a non-animate object being acted upon, or undergoing some change. For example, *the window* is the theme in the next sentence, where it appears in object position:

John broke *the window*.

The theme of a sentence may also appear in subject position. In the next sentence *the window* is also the theme:

The window broke.

6.1 Theme in Object Position

Test for the theme in object position (the position following the verb).

- Eg, Who manages department 17?
- Eg, List the salesperson who earns the highest salary?
- Eg, Guerrillas bombed the Central Bank of Peru yesterday.
- Eg, Guerrillas burned the presidential farm.
- Eg, The rebels bombed the Central Bank.

Criteria: Correctly determined the *theme* in object position and demonstrated understanding that some action is performed upon it or that it undergoes some change.

_____ Score: _____

6.2 Theme in Subject Position

Test for the theme in subject position (the initial position in the sentence).

- Eg, CPUs are sold by which office?
- Eg, The Telephone Company Building exploded yesterday.
- Eg, The electric facility was bombed by ARENA.
- Eg, The presidential farm was burned by guerrillas.
- Eg, The presidential farm burned in yesterday's attack.

Criteria: Correctly determined the *theme* in subject position and demonstrated understanding that some action is performed upon it or that it undergoes some change.

_____ Score: _____

6.3 Co-Theme

In sentences where there are two or more actions each with a theme, or in events where there is an exchange of objects, tangible or otherwise, the secondary theme (in the subordinate clause or phrase) is the *co-theme*. A co-theme only occurs in a sentence which has a theme. The secondary theme is *the physics book* in the following sentence:

Joe gave John \$20 for *a physics book*.

- Eg, Who sells vacuum cleaners for \$300?
- Eg, Who works a 40 hour week for \$500?

Eg, Terrorists kidnapped the Prime Minister for a \$74,000 ransom.

Eg, ARENA traded guns for bombs with Shining Path.

Eg, Guerrillas attacked the presidential farm and stole the the trucks.

Criteria: Correctly determined the *co-theme* and demonstrated understanding that some action is performed upon it or that it undergoes some change.

Score: _____

7. Source

Source is the *animate* or *inanimate* entity from which an object is transferred. The object can be either tangible or intangible. An animate source is sometimes called the "*from-possessor*" and is the original possessor of the object. For example, *Joe* is the source in the following:

John got a physics book from *Joe*.

An inanimate source is generally the entity from which something is transferred. The transfer may be a transfer of information, ideas, possession, ownership, and so on, and may involve no movement in any spatial dimension.

There is often an overlap of thematic roles. For example, in the following sentence *Joe* is both the agent and the source:

Joe gave John \$20.

Eg, Which department pays John Smith?

Eg, From which office does John Smith sell printers?

Eg, Terrorists stole \$25,000 from the Central Bank of Peru.

Eg, Peasants attacked the Peruvian Embassy with guns from the Soviet Union.

Eg, Guerrillas stole food from peasants in Flores.

Criteria: Correctly determined the *source* and its role of being the *animate* or *inanimate* entity from which an object is transferred.

Score: _____

8. Goal

Goal is the *animate* or *inanimate* entity to which an object is transferred. The object can be either tangible or intangible. An animate goal is sometimes called the "to-possessor" and is the final possessor of the object. For example, *Joe* is the goal in both of the following examples:

Joe got a physics book from *JOHN*.
John gave a physics book to *Joe*.

An inanimate goal is generally the entity to which something is transferred, for example, in:

John donated \$20 to *Muscular Dystrophy Research*.

The transfer may be a transfer of information, ideas, possession, ownership, and so on, and may involve no movement in any spatial dimension. The destination of the movement of some object along a spatial path is not necessarily a goal.

- Eg, Which salesperson transferred to the Chicago office?
- Eg, Terrorists robbed the Central Bank of Peru and gave the money to ARENA.
- Eg, Guerrillas smuggled guns to peasants in El Salvador.
- Eg, Terrorists fired on peasants in Peru.
- Eg, Guerrillas gave guns to Honduran rebels who attacked the presidential farm.

Criteria: Correctly determined the *goal* and its role of being the *animate* or *inanimate* entity to which an object is transferred.

Score: _____

9. Instrument

An *instrument* is a tool or material used to perform some action. Instrument can be expressed:

- Using a noun phrase:

The hammer broke the window.
John broke the window with *the hammer*.

- Using a verb which explicitly names the instrument:

Jack *hammered* the nail.
The villagers *stoned* the woman.

- Using a verb in which the instrument is not explicit. For example, the verb *kick* always implies *a foot* as a covert instrument.

Using either a noun phrase or an explicit verb, test for use of an instrument in a sentence.

- Eg, Which salesperson phones orders to the Chicago office?
- Eg, Terrorists attacked the Central bank in Peru with bombs.
- Eg, Terrorists bombed the Central bank in Peru.
- Eg, Guerrillas attacked the presidential farm with guns.

Criteria: Correctly determined the *instrument* and its role as the tool or material used to perform the action expressed by the sentence.

Score: _____

0. Participant Combinations

In the following sections, we will test the common participant combinations.

0.1 Agent and Theme

Our examples show the agent in subject position and the theme in object position.

- Eg, List the people who earn \$15,000.
- Eg, Who sells CPUs?
- Eg, Employees bombed the Telephone Company Building.
- Eg, Terrorists attacked the electric facility.
- Eg, Guerrillas attacked the presidential farm.

Criteria: Correctly determined the *agent* and the *theme* and demonstrated understanding of their roles as instigator and undergoer, respectively, of the event expressed by the sentence.

Score: _____

0.2 Agent, Theme and Instrument

Our examples show the agent in subject position, the theme in object position, and the instrument signaled by a "*with*", or a "*using*".

- Eg, Who sells CPUs using a telephone?
- Eg, Terrorists attacked the Telephone Company Building with a lightplane.
- Eg, Maoists attacked the electric facility with machineguns.
- Eg, Guerrillas attacked the presidential farm with guns.

Criteria: Correctly determined the *agent*, the *theme*, and the *instrument* and demonstrated understanding of their roles as instigator, undergoer, and tool or material, respectively, of the event expressed by the sentence.

_____ Score: _____

10.3 Agent, Patient and Instrument

Our examples show the agent in subject position, the patient in object position, and the instrument signaled by a "with", or a "using".

Eg, John Smith sold CPUs to customers using a telephone.

Eg, Terrorists killed the Prime Minister with a gun.

Eg, ARENA shot the Mayor with a submachinegun.

Eg, Guerrillas attacked the presidential farm with a machinegun.

Criteria: Correctly determined the *agent*, the *patient*, and the *instrument* and demonstrated understanding of their roles as instigator, undergoer, and tool or material, respectively, of the event expressed by the sentence.

_____ Score: _____

10.4 Source, Goal, Theme and Co-theme

In events where there is an exchange of objects, we can think of the event as having two sub-events, each being a transfer of an object from a source to a goal. Test a sentence which describes this type of event.

Eg, Did the New York office trade John Doe to the Boston office for Fred Smith?

Eg, Who sold printers to customers for \$400?

Eg, Guerrillas traded guns for food with peasants in El Salvador.

Criteria: Correctly determined the *source*, *goal*, *theme*, and *co-theme* and demonstrated understanding of their roles in the exchange event expressed by the sentence.

_____ Score: _____

OTHER SEMANTIC ROLES

There are a number of other semantic roles aside from participants. These additional roles are frequently expressed using adverbials.

I. Spatial Information of Events

Spatial information can be categorized as follows:

I.1 Position

Position is where an event occurs:

He lay *on the bed*.

They were walking *in the park*.

Eg, Who works in New York?

Eg, What employees work in department 17?

Eg, Guerrillas assassinated the Prime Minister in El Salvador.

Eg, Terrorists attacked civilians at the Government House.

Eg, Guerrillas killed a security guard at the presidential farm.

Criteria: Demonstrated understanding of the *spatial position* involved in the event expressed in the sentence.

Score: _____

I.2 Path

Path includes several subparts, including

- *direction*:

They drove *westwards*.

She walked *around the park*.

- *origin*:

She was walking from *the store*.

The race started at *the store*.

- *destination*:

She was walking *to the store*.

The race ended at *the highway*.

Path is often incorporated into verbs of motion, for example in: "*enter*" (go into), "*exit*" (go out from), "*ascend*" (go up), "*descend*" (go down), and "*circumnavigate*" (go around).

- Eg, Was Jones transferred to Chicago?
- Eg, Did Smith move from the New York Office?
- Eg, Terrorists attacked targets in a path from Peru to Colombia.
- Eg, Terrorists went to Peru and killed 12 civilians.
- Eg, Guerrillas went to the presidential farm and killed a security guard.
- Eg, Guerrillas brought guns to the presidential farm and attacked.

Criteria: Demonstrated understanding of the *path* involved in the event expressed by the sentence.

_____ Score: _____

11.3 Distance

Distance is linear spatial measure:

They traveled *a long way*.
She drove *fifty kilometers*.

- Eg, How many miles did Smith travel last month?
- Eg, Did Jones move 500 miles to Chicago?
- Eg, Terrorists traveled 500 kilometers and killed 12 civilians.
- Eg, Terrorists went 200 kilometers to kill the Prime Minister.
- Eg, Guerrillas drove fifty miles to the presidential farm and burned the buildings.

Criteria: Demonstrated understanding of the *distance* involved in the event expressed by the sentence.

_____ Score: _____

12. Temporal Information of Events

Time is often conceptualized as a position on or a movement along a time scale. Temporal issues are also covered in the section titled "Temporal Aspect of Verb Phrases".

Temporal information can be categorized as follows:

12.1 Position

Position is the point or interval on the relevant time scale:

She drove to Chicago *on Sunday*.
He was there *last week*. [Quirk et al 1985, p. 481]

- Eg, Who worked in 1989?
- Eg, List the men who worked in December.
- Eg, Yesterday terrorists bombed the Central Bank in Cuba.
- Eg, On December 2, guerrillas kidnapped the Prime Minister.
- Eg, Guerrillas attacked the presidential farm on 2 February.

Criteria: Demonstrated understanding of the *temporal position* on some time scale for the event expressed by the sentence.

_____ Score: _____

12.2 Duration

Duration may be talked about in terms of:

- *time length*, which is unspecified as to direction:

I am staying *three weeks*. [Quirk et al 1985, p. 482]
I wrote *for an hour*.

- forward span, called *temporal destination*:

I'll be here *until next week*.

- backward span, called *temporal origin*:

I've been here *since Saturday*.

- Eg, Who has worked for 3 years?
- Eg, List the employees who have worked since 1984.
- Eg, Terrorists bombed the Central Bank in Cuba for 2 hours.
- Eg, Terrorists have attacked the Government House since December 25.
- Eg, Guerrillas attacked on December 12 and bombed the Government House for 5 days.
- Eg, The government has reported two guerrilla attacks on the presidential farm since 1 February.

Criteria: Demonstrated understanding of the *duration* of the event expressed by the sentence.

_____ Score: _____

12.3 Frequency

Frequency is elicited by the question "*How often ... ?*"

I wash my car *frequently/weekly/once a month/as often as possible*.

Eg, Who is paid weekly?

Eg, Who is paid biweekly?

Eg, What salesperson earned a commission every month in 1989?

Eg, Terrorists bombed the Central Bank in Cuba every two hours yesterday.

Eg, In December, guerrillas kidnapped a Government Official every day.

Eg, Guerrillas kidnapped a Government Official three times in December.

Eg, Guerrillas have attacked the presidential farm twice since February 1.

Criteria: Demonstrated understanding of the *frequency* of the event expressed by the sentence.

Score: _____

12.4 Relationship

Relationship expresses the relation of the time frame of one event to the time frame of another:

He had visited his mother *already* when I saw him yesterday. [Quirk et al 1985, p. 482]

Eg, List the employees who sold while they worked in New York.

Eg, Who managed department 17 before John Smith was hired?

Eg, Terrorists bombed the Government House after ARENA killed the Prime Minister.

Eg, Guerrillas killed a Government Official during an attack on the Government House.

Criteria: Demonstrated understanding of the *relationship* of the time frame of two events as expressed by the sentence.

Score: _____

13. Participant Combination with Time and Location

Combine agent, theme and instrument with time and location. Our examples show the agent in subject position, and the theme in object position and propositional phrases for the instrument, the time, and the location.

- Eg, Who sold CPUs using a telephone in January at the New York office?
- Eg, Who sold CPUs in January at the New York office using a telephone?
- Eg, Terrorists attacked the Telephone Company Building in Nicaragua with a lightplane on December 12.
- Eg, In El Salvador on November 26, ARENA attacked the Government House with machineguns.
- Eg, Guerrillas attacked the president with machineguns on February 2 in Flores.

Criteria: Correctly determined the *agent*, *theme*, and *instrument* and demonstrated understanding of their roles as instigator, undergoer, and tool or material, respectively, of the event expressed by the sentence. Also demonstrated understanding of the *temporal position* and *spatial position*.

Score: _____

14. Manner

Manner is the manner or style in which an action is carried out.

He prayed *fervently*. [Quirk et al 1985, p. 558]
 She spoke *with cold deliberation*.

Manner is often expressed by a motion verb which conflates an event of motion with the manner or style of that motion [Talmy 1975]:

The ball *rolled/bounced/slid* down the hall.

- Eg, What salesperson works productively?
- Eg, Does Smith manage department 12 efficiently?
- Eg, Terrorists efficiently bombed the Central Bank in Cuba.
- Eg, Guerrillas ruthlessly murdered the Prime Minister.

Criteria: Demonstrated understanding of the *manner* in which the action expressed by the sentence is carried out.

Score: _____

15. Means

Means is the technique or method by which an action is carried out:

He decided to treat the patient *surgically*.
I go to school *by car*. [Quirk et al 1985, p. 559]

(Means is often implicit in the verb chosen to express an event. For instance, in:

The doctor operated on the patient.

the means is also *surgically*, as above.)

- Eg, Who was rewarded for high sales with a pay raise?
- Eg, Who is paid by commission?
- Eg, Guerrillas destroyed the Peruvian Embassy with an explosion.
- Eg, Guerrillas destroyed the Peruvian Embassy by bombing it.
- Eg, The rebels destroyed the bank by burning it.

Criteria: Demonstrated understanding of the *means* by which the action expressed by the sentence is carried out.

Score: _____

16. Respect

Respect is an abstract semantic category which is concerned with identifying a point of reference, or attitude, with respect to which the clause being qualified derives its truth value.

For example, the next sentence refers first to location, then to time, as the abstract *respect*:

So far as traveling facilities are concerned, we have obviously made a popular decision; but *with respect to the date*, many people are expressing dissatisfaction.
[Quirk et al 1985, p. 438]

- Eg, With respect to education, who is the highest qualified employee?
- Eg, Regarding 1990, which salesperson sold the most vacuum cleaners?
- Eg, Regarding the terrorist attack on Peru, seven civilians were killed.
- Eg, Concerning civilians, the ARENA bombing in December resulted in 12 deaths.
- Eg, Regarding the guerrilla attack on the presidential farm, one security guard was killed.

Criteria: Demonstrated understanding of the *respect* that is used to derive the truth value of the main sentence.

Score: _____

17. Contingency

Contingency refers to the possible dependency relationships between two events, for example *cause* or *result*. One of the events, usually that expressed by the main clause of the sentence, is felt to be a more central part of a sentence. The contingency relationship describes the lesser event's relationship to this central event and may be categorized as in the following subsections:

17.1 Cause

Cause is the type of relationship in which an event causes or motivates what we conceptualize as the central event (expressed by the verb) in the sentence:

She died *of cancer*.

Cause may also be expressed by an inanimate agent in the sentence's subject position:

Cancer killed her.

Eg, Jane Smith earned the highest commission because of high sales.

Eg, The Prime Minister died from gunshot wounds.

Eg, Because of yesterday's bombing in Peru, 12 people died.

Eg, The guerrilla attack on the presidential farm killed a security guard.

Criteria: Demonstrated understanding of the causal relationship between a sub-event (the *cause*) and the primary event expressed by the sentence.

Score: _____

17.2 Reason

A *reason* is the rationale for the central event:

He bought the book *because of his interest in metaphysics*. [Quirk et al 1985, p. 484]

Eg, Jane Smith is a salesperson to send her children to college.

- Eg, Who moved to New York because she got married?
- Eg, List the people who were promoted because they had high sales.
- Eg, Terrorists attacked the Peruvian Embassy because of food shortages.
- Eg, Because of food shortages, terrorists attacked the Peruvian Embassy.
- Eg, Guerrillas killed the security guard because he shot a guerrilla during the attack.

Criteria: Demonstrated understanding of the rationale relationship between a sub-event (the *reason*) and the primary event expressed by the sentence.

_____ Score: _____

17.3 Purpose

Purpose is the desired result of the sentence's central event. For example:

He bought the book *so he could study metaphysics*.

- Eg, Who moved to New York because of a possible promotion?
- Eg, List the employees who attended college so they could become managers.
- Eg, Terrorists kidnapped the Prime Minister so that they could kill him.
- Eg, To gain the release of five prisoners, Shining Path killed twelve peasants.
- Eg, Guerrillas attacked the presidential farm to kidnap President Cerezo.

Criteria: Demonstrated understanding that the sub-event (the *purpose*) is the desired result of the primary event expressed by the sentence.

_____ Score: _____

17.4 Result

Result is the relationship such that there is a subordinate event which directly results from the central event in the sentence. For example:

He read the book carefully, *and so he acquired some knowledge of metaphysics*.
[Quirk et al, 1985, p. 484]

- Eg, Who moved to New York and so received a promotion?
- Eg, List the employees who earned an MBA and therefore were made managers.
- Eg, Terrorists attacked the Government House and as a result the Prime Minister was killed.
- Eg, The Prime Minister was killed as a result of the terrorist attack on the Government House.
- Eg, Shining Path bombed a bank and thereby killed 30 people.
- Eg, As a result of the guerrilla attack on the presidential farm, one security guard died.

Criteria: Demonstrated understanding that the sub-event (the *result*) directly results from the primary event expressed by the sentence.

Score: _____

17.5 Condition

Condition is the relationship such that the subordinate event occurs in time prior to the central event and sets the condition for the central event, as in:

If he reads the book carefully, he will acquire some knowledge of metaphysics.

[Quirk et al, 1985, p. 484]

Who will receive a promotion *if they earn an MBA?*

- Eg, If a person has been employed for 20 years, then the person is a senior employee.
- Eg, Who will earn \$30,000 if they receive a 10% raise?
- Eg, If terrorists bomb the Government House, the army will attack them.
- Eg, If people die, police will say that the guerrillas killed them.
- Eg, If the army kills people, police say that the guerrillas killed the people.
- Eg, If the president dies, the government will charge the URNG guerrillas with murder.

Criteria: Demonstrated understanding that the sub-event (the *condition*) occurs prior to and sets the condition for the primary event expressed by the sentence.

Score: _____

17.6 Concession

Concession is the relationship such that the subordinate event would be expected to enable the central event, except the expectation failed. For example, in:

In spite of his enthusiasm, he didn't win. [Quirk et al, 1985, p. 485]

the expectation is that a large amount of enthusiasm would lead to the event of winning, and that expectation failed. In the sentence:

Who will receive a demotion *even if they earn an MBA ?*

the expectation is that earning a MBA does not lead to demotions, but in this case the expectation fails.

Eg, List the salespersons who will not earn a commission in spite of a 10% sales increase.

Eg, Even if terrorists do not bomb the Government House, the terrorists will bomb the bank.

Eg, Even if terrorists bomb the Government House, the terrorists will bomb the bank.

Eg, Even if people do not die, police will say that the guerrillas killed people.

Eg, Even if the guerrillas kill people, they say that the police killed them.

Eg, Even if the president had not died, the URNG guerrillas would have been arrested for the attack.

Criteria: Demonstrated understanding that the sub-event (the *concession*) is expected to set the condition for the primary event expressed by the sentence, however the expectation failed.

Score: _____

18. Degree

Degree is the grade or position on the scale upon which the action expressed by the verb is measured. For example,

the action expressed by:	is measured on the scale:
<i>like</i>	<i>subjective pleasure</i>
<i>hurt</i>	<i>injury</i>
<i>help</i>	<i>helpfulness</i>
<i>want</i>	<i>desire</i>

Degree may be broken into three categories, discussed in the following subsections.

18.1 Amplification (t.b.d.)

Amplification heightens the degree on the gradability scale upon which the action expressed by the verb is measured. For example,

I *badly* want a drink. [Quirk et al, 1985, p. 486]

18.2 Diminution (t.b.d)

Diminution lowers the degree on the gradability scale upon which the action expressed by the verb is measured. For example,

She helped him *a little* with his book. [Quirk et al, 1985, p. 486]

18.3 Measure (t.b.d)

Measure is the measure on the gradability scale upon which the action expressed by the verb is measured, when there is no implication that the degree is high or low. For example,

He likes playing squash *more than his sister does*. [Quirk et al, 1985, p. 486]

19. Modality

Modality expresses *possibility*, or less than complete knowledge in the truth of an event. In cases where the truth of an event is not certain, the speaker expresses his/her degree of uncertainty by using modality. Modality is often expressed using adverbs, as in:

She probably enjoys living in Florida.

Modality is also expressed using modal auxiliary verbs, for example "*will*", "*may*", "*must*", "*might*" and so on, as in:

She may enjoy living in Florida.

Eg, List the employees who possibly will receive a raise in 1991.

Eg, Who will definitely receive a bonus this year?

Eg, Terrorists probably killed the Prime Minister.

Eg, It is possible that ARENA bombed the Government House.

Eg, URNG guerrillas probably attacked the La Eminencia farm.

Criteria: Demonstrated understanding of the *modality* of the sentence.

_____ Score: _____

20. Evidentials

Evidentials are the basis on which the hearer is to assess the truth of a sentence.

It is generally assumed that a speaker speaks true utterances. In cases where the truth of a proposition is less than completely reliable, the doubtful proposition is expressed by an embedded sentence. in the main clause, as in the following:

Reporters said today that <*proposition*>.

I heard (that) <*proposition*>.

Eg, According to the sales manager, who is the best salesman?

Eg, ARENA claimed to have attacked a town in El Salvador.

Eg, Police reported that guerrillas killed the Prime Minister.

Eg, URNG guerrillas claim to have attacked the Santo Tomas farm.

Criteria: Demonstrated understanding of the *evidential*, the basis on which the hearer is to assess the truth of a sentence.

_____ Score: _____

APPENDIX B

Example NLP System Profile

This appendix contains an example profile for an NLP system produced by the NLP Evaluation Tool profiling facility. This profile was produced as part of the final assessment task when each of four evaluators applied the Tool to two NLP systems. Although this profile shows all levels of the classification hierarchy, profiles can also be generated that show only the top N levels, where $N = 1, 2, 3$, etc.

Evaluation Profile: All Levels

		System 1, Person 1														
Total																
Number	of	S_	uccessfully	_C_	orrect	P_	artially	_F_	ailure	_N_	o	Response	Time:	Total	Average	
Items		#	%	Response:		Correct:		#	%	#	%	#	%	Time:	Per Item	
I. BASIC SENTENCES																
16		39	81%	4	8%	2	4%	0	0%	3	6%	2:35	0:09:41			
1. Basic Sentence Types																
3		9	100%	0	0%	0	0%	0	0%	0	0%					
1		3	100%	0	0%	0	0%	0	0%	0	0%					
1		3	100%	0	0%	0	0%	0	0%	0	0%					
1		3	100%	0	0%	0	0%	0	0%	0	0%					
2		6	100%	0	0%	0	0%	0	0%	0	0%					
1		3	100%	0	0%	0	0%	0	0%	0	0%					
1		3	100%	0	0%	0	0%	0	0%	0	0%					
2. Simple Determiners																
1		3	100%	0	0%	0	0%	0	0%	0	0%					
1		3	100%	0	0%	0	0%	0	0%	0	0%					
3		6	67%	1	11%	0	0%	0	0%	2	22%					
1		2	67%	0	0%	0	0%	0	0%	1	33%					
1		2	67%	0	0%	0	0%	0	0%	1	33%					
1		2	67%	1	33%	0	0%	0	0%	0	0%					
8		18	75%	3	12%	2	8%	0	0%	1	4%					
1		3	100%	0	0%	0	0%	0	0%	0	0%					
2		6	100%	0	0%	0	0%	0	0%	0	0%					
1		3	100%	0	0%	0	0%	0	0%	0	0%					
1		3	100%	0	0%	0	0%	0	0%	0	0%					
3		6	67%	1	11%	1	11%	0	0%	1	11%					
1		3	100%	0	0%	0	0%	0	0%	0	0%					
2		6	100%	0	0%	0	0%	0	0%	0	0%					
1		3	100%	0	0%	0	0%	0	0%	0	0%					
1		3	100%	0	0%	0	0%	0	0%	0	0%					
3		6	67%	1	11%	1	11%	0	0%	1	11%					
1		3	100%	0	0%	0	0%	0	0%	0	0%					
1		2	67%	0	0%	0	0%	0	0%	0	0%					
1		2	67%	0	0%	0	0%	0	0%	0	0%					
1		2	67%	1	33%	0	0%	0	0%	0	0%					
2		3	50%	2	33%	1	17%	0	0%	0	0%					
1		2	67%	1	33%	0	0%	0	0%	0	0%					
1		1	33%	1	33%	1	33%	0	0%	0	0%					
II. INTERROGATIVE SENTENCES																
9		26	96%	0	0%	0	0%	0	0%	1	4%	1:50	0:12:13			
2		6	100%	0	0%	0	0%	0	0%	0	0%					
1		3	100%	0	0%	0	0%	0	0%	0	0%					

Evaluation Profile: All Levels

	System 1, Person 1									
	Total	Number of Items	Successfully met Criteria: #	Correctly: #	Partially Correct: #	Failure: #	No Response: #	Total	Average	Time
1.2 What as a determiner.	1	3	100%	0	0%	0	0%	0	0%	0%
2. Who-questions.	1	3	100%	0	0%	0	0%	0	0%	0%
3. Where-questions.	1	3	100%	0	0%	0	0%	0	0%	0%
4. When-questions.	1	2	67%	0	0%	0	0%	1	33%	0%
5. Which-questions.	1	3	100%	0	0%	0	0%	0	0%	0%
6. How-questions.	1	3	100%	0	0%	0	0%	0	0%	0%
7. Wh-Word in Prepositional Phrase	1	3	100%	0	0%	0	0%	0	0%	0%
8. Yes/No-Questions.	1	3	100%	0	0%	0	0%	0	0%	0%
III. NOUN PHRASES	83	159	64%	17	7%	11	4%	54	22%	6:05
1. Prepositional Phrase as Postmodifier in NP	1	3	100%	0	0%	0	0%	0	0%	0:04:24
2. The Noun Head	6	9	50%	1	6%	1	6%	7	39%	0%
2.1 Nouns	3	6	67%	1	11%	0	0%	2	22%	0%
2.1.1 Count Noun (Covered in Section I, Basic Sentence)	1	2	67%	0	0%	0	0%	1	33%	0%
2.1.2 Proper Noun (Covered in Section I, Basic Sentence)	1	2	67%	0	0%	0	0%	1	33%	0%
2.1.3 Mass Nouns (Covered in Section I, Basic Sentence)	1	2	67%	1	33%	0	0%	0	0%	0%
2.2 Nominals	3	3	33%	0	0%	1	11%	5	56%	0%
2.2.1 Adjective Nominal	1	3	100%	0	0%	0	0%	0	0%	0%
2.2.2 Passive Participle as Nominal	1	0	0%	0	0%	0	0%	3	100%	0%
2.2.3 Progressive Participle as Nominal	1	0	0%	0	0%	1	33%	2	67%	0%
3. Determinatives in More Detail	17	33	65%	6	12%	0	4%	10	20%	0%
3.1 Predeterminers	4	8	67%	1	8%	0	0%	3	25%	0%
3.1.1 Quantifier Predeterminers (Covered in Section VI, Quantifiers)	2	5	83%	1	17%	0	0%	0	0%	0%
3.1.2 Multipliers, Fractions (Covered in Section VI, Quantifiers)	2	3	50%	0	0%	0	0%	3	50%	0%
3.2 Central Determiners	9	19	70%	3	11%	0	0%	5	19%	0%
3.2.1 Articles (Covered in Section I, Basic Sentences)	2	6	100%	0	0%	0	0%	0	0%	0%
3.2.3 Quantifier-type (Covered in Section VI, Quantifiers)	1	1	33%	1	33%	0	0%	1	33%	0%
3.2.5 Possessive Determiners (Covered in Section X, Relative Pronouns)	1	3	100%	0	0%	0	0%	0	0%	0%

Evaluation Profile: All Levels

Total Number of Items	System 1, Person 1				P_artially Correct:	_F_ailure	_N_o Response	Total Average Time:		
	S_uccessfully _C_orrect		R_esponse:						R_esponse	
	#	%	#	%					#	%
3.2.6 Relative Determiners (Covered in Section III:6 Rel)	1	3	100%	0	0%	0	0%	0	0%	
3.2.7 Interrogative Determiners (Covered in Sec. II, Inter)	2	6	100%	0	0%	0	0%	0	0%	
3.2.8 Wh-Determiners	2	0	0%	2	33%	0	0%	4	67%	
3.2.8.1 Indefinite Reference (WHATEVER)	1	0	0%	1	33%	0	0%	2	67%	
3.2.8.2 Definite Reference (WHICHEVER)	1	0	0%	1	33%	0	0%	2	67%	
3.3 Postdeterminers	2	4	67%	0	0%	1	17%	1	17%	
3.3.1 Cardinal Numbers (Covered in Section VI, Quantif)	1	2	67%	0	0%	1	33%	0	0%	
3.3.2 Ordinal Numbers (Covered in Section VI, Quantif)	1	2	67%	0	0%	0	0%	1	33%	
3.4 Determinative Combinations (Covered in Sec. VI, Qu)	2	2	33%	2	33%	0	0%	1	17%	
4. Premodification	26	33	42%	9	12%	6	8%	3	4%	
4.2 Central Premodifiers	2	5	83%	0	0%	1	17%	0	0%	
4.2.1 Simple Adjectives	1	2	67%	0	0%	1	33%	0	0%	
4.2.2 Superlative Adjectives	1	3	100%	0	0%	0	0%	0	0%	
4.3 Precentral Premodifiers	1	2	67%	1	33%	0	0%	0	0%	
4.4 Postcentral Premodifiers	2	5	83%	0	0%	0	0%	1	17%	
4.4.1 Passive Participle as Premodifier	1	3	100%	0	0%	0	0%	0	0%	
4.4.2 Progressive Participle as Premodifier	1	2	67%	0	0%	0	0%	1	33%	
4.5 Noun-Noun Phrases or Nominal Compounds	14	11	26%	6	14%	3	7%	2	5%	
4.5.1 AT-TIME Nominal Compound Type	1	1	33%	0	0%	0	0%	1	33%	
4.5.2 AT-LOCATION Nominal Compound Type	1	3	100%	0	0%	0	0%	0	0%	
4.5.3 PURPOSE-CONCERNS Nominal Compound Type	1	2	67%	0	0%	0	0%	1	33%	
4.5.4 BELONGS-TO Nominal Compound Type	1	2	67%	0	0%	1	33%	0	0%	
4.5.5 PART-OF Nominal Compound Type	1	1	33%	1	33%	0	0%	1	33%	
4.5.6 PRODUCES Nominal Compound Type	1	0	0%	2	67%	0	0%	1	33%	
4.5.7 EXECUTED-BY Nominal Compound Type	1	1	33%	0	0%	0	0%	2	67%	
4.5.8 MADE-OF Nominal Compound Type	1	0	0%	1	33%	0	0%	2	67%	
4.5.9 PRODUCED-BY Nominal Compound Type	1	0	0%	0	0%	1	33%	2	67%	
4.5.10 PURPOSE-BENEFITS Nominal Compound Type	1	0	0%	0	0%	0	0%	3	100%	

Evaluation Profile: All Levels

Total Number of Items	System1, Person 1										Total Average Time Per Item
	S_uccessfully met Criteria:		C_orrect Response:		P_artially Correct:		F_ailure		N_o Response		
	#	%	#	%	#	%	#	%	#	%	
1	0	0%	1	33%	0	0%	0	0%	2	67%	
1	1	33%	1	33%	1	33%	0	0%	0	0%	
1	0	0%	0	0%	0	0%	1	33%	2	67%	
1	0	0%	0	0%	0	0%	0	0%	3	100%	
7	10	48%	2	10%	2	10%	1	5%	6	29%	
1	3	100%	0	0%	0	0%	0	0%	0	0%	
1	3	100%	0	0%	0	0%	0	0%	0	0%	
1	1	33%	0	0%	2	67%	0	0%	0	0%	
1	1	33%	0	0%	0	0%	0	0%	2	67%	
1	1	33%	2	67%	0	0%	0	0%	0	0%	
1	0	0%	0	0%	0	0%	0	0%	3	100%	
1	1	33%	0	0%	0	0%	1	33%	1	33%	
13	31	79%	0	0%	1	3%	1	3%	6	15%	
9	22	81%	0	0%	1	4%	1	4%	3	11%	
3	7	78%	0	0%	0	0%	1	11%	1	11%	
1	3	100%	0	0%	0	0%	0	0%	0	0%	
1	2	67%	0	0%	0	0%	0	0%	1	33%	
1	2	67%	0	0%	0	0%	1	33%	0	0%	
6	15	83%	0	0%	1	6%	0	0%	2	11%	
1	3	100%	0	0%	0	0%	0	0%	0	0%	
1	3	100%	0	0%	0	0%	0	0%	0	0%	
1	0	0%	0	0%	1	33%	0	0%	2	67%	
1	3	100%	0	0%	0	0%	0	0%	0	0%	
1	3	100%	0	0%	0	0%	0	0%	0	0%	
1	3	100%	0	0%	0	0%	0	0%	0	0%	
1	3	100%	0	0%	0	0%	0	0%	0	0%	
1	3	100%	0	0%	0	0%	0	0%	0	0%	
1	3	100%	0	0%	0	0%	0	0%	0	0%	
2	3	50%	0	0%	0	0%	0	0%	3	50%	

Evaluation Profile: All Levels

	Total	System1, Person 1										Total	Average	
		Number of Items	S_uccessfully		C_orrect		P_artially		F_ailure		N_o			Total
			#	%	#	%	Correct	%	#	%				
5.4.1 Genitive and OF-Phrase	1	0	0%	0	0%	0	0%	0	0%	3	100%			
5.4.2 Combination of the OF-Phrase and the WITH-Phr	1	3	100%	0	0%	0	0%	0	0%	0	0%			
6. Postmodification	20	50	83%	1	2%	0	0%	5	8%	4	7%			
6.1 Relative Clauses	16	41	85%	1	2%	0	0%	2	4%	4	8%			
6.1.1 Relative Pronoun as Subject	3	7	78%	1	11%	0	0%	0	0%	1	11%			
6.1.1.1 The Relative Pronoun THAT - Restrictive Only	1	3	100%	0	0%	0	0%	0	0%	0	0%			
6.1.1.2 Personal Relative Pronoun WHO	1	3	100%	0	0%	0	0%	0	0%	0	0%			
6.1.1.3 Non-Personal Relative Pronoun WHICH	1	1	33%	1	33%	0	0%	0	0%	1	33%			
6.1.2 Possessive Relative Pronoun (WHOSE) as a Det	1	3	100%	0	0%	0	0%	0	0%	0	0%			
6.1.3 Relative Pronoun as Object	3	9	100%	0	0%	0	0%	0	0%	0	0%			
6.1.3.1 Relative Pronoun THAT as Object - Restrictive	1	3	100%	0	0%	0	0%	0	0%	0	0%			
6.1.3.2 Personal Relative Pronoun WHOM as Object	1	3	100%	0	0%	0	0%	0	0%	0	0%			
6.1.3.3 Non-Personal Relative Pronoun WHICH as O	1	3	100%	0	0%	0	0%	0	0%	0	0%			
6.1.4 Deletion of Relative Pronoun Object.	1	3	100%	0	0%	0	0%	0	0%	0	0%			
6.1.5 Relative Pronoun Prepositional Object	2	5	83%	0	0%	0	0%	0	0%	1	17%			
6.1.5.1 Preposition First in the Relative Clause	1	3	100%	0	0%	0	0%	0	0%	0	0%			
6.1.5.2 Preposition Following the Verb in the Relative	1	2	67%	0	0%	0	0%	0	0%	1	33%			
6.1.6 Relative Pronoun as Adverbial	5	11	73%	0	0%	0	0%	2	13%	2	13%			
6.1.6.1 Relative Pronoun as Adverbial for Place	2	5	83%	0	0%	0	0%	0	0%	1	17%			
6.1.6.1.1 With Preposition and Relative Pronoun	1	2	67%	0	0%	0	0%	0	0%	1	33%			
6.1.6.1.2 With WHERE	1	3	100%	0	0%	0	0%	0	0%	0	0%			
6.1.6.2 Relative Pronoun as Adverbial for Time	2	3	50%	0	0%	0	0%	2	33%	1	17%			
6.1.6.2.1 With Preposition and Relative Pronoun	1	3	100%	0	0%	0	0%	0	0%	0	0%			
6.1.6.2.2 With WHEN	1	0	0%	0	0%	0	0%	2	67%	1	33%			
6.1.6.3 Omitted Relative Pronoun - Adverbial Case	1	3	100%	0	0%	0	0%	0	0%	0	0%			
6.1.7 Multiple Relative Clauses Within the Same Noun	1	3	100%	0	0%	0	0%	0	0%	0	0%			
6.2 Reduced Relative Clauses	4	9	75%	0	0%	0	0%	0	0%	3	25%			
6.2.1 Subject Complement Clauses	1	3	100%	0	0%	0	0%	0	0%	0	0%			

Evaluation Profile: All Levels

Total Number of Items	System1, Person 1				Partially Correct:	F_allure	N_o	Total Average Time				
	S_uccessfully C_orrect		Response:						#	%	Response	%
	#	%	#	%								
1	3	100%	0	0%	0	0%	0	0%				
1	3	100%	0	0%	0	0%	0	0%				
1	0	0%	0	0%	3	100%	0	0%				
IV. ADVERBIALS												
6	13	72%	0	0%	0	0%	5	28%				
6	13	72%	0	0%	0	0%	5	28%				
2	5	83%	0	0%	0	0%	1	17%				
1	3	100%	0	0%	0	0%	0	0%				
1	2	67%	0	0%	0	0%	1	33%				
2	4	67%	0	0%	0	0%	2	33%				
1	3	100%	0	0%	0	0%	0	0%				
1	1	33%	0	0%	0	0%	2	67%				
2	4	67%	0	0%	0	0%	2	33%				
1	2	67%	0	0%	0	0%	1	33%				
1	2	67%	0	0%	0	0%	1	33%				
V. VERBS AND VERB PHRASES												
19	27	47%	17	30%	0	0%	12	21%				
19	27	47%	17	30%	0	0%	12	21%				
4	5	42%	4	33%	0	0%	2	17%				
1	2	67%	1	33%	0	0%	0	0%				
1	3	100%	0	0%	0	0%	0	0%				
1	0	0%	2	67%	0	0%	1	33%				
1	0	0%	1	33%	0	0%	1	33%				
15	22	49%	13	29%	0	0%	10	22%				
3	7	78%	2	22%	0	0%	0	0%				
1	3	100%	0	0%	0	0%	0	0%				
1	3	100%	0	0%	0	0%	0	0%				
1	1	33%	2	67%	0	0%	0	0%				
1	1	33%	2	67%	0	0%	0	0%				
1. Temporal Aspect of Verb Phrases												
19	27	47%	17	30%	0	0%	12	21%				
19	27	47%	17	30%	0	0%	12	21%				
4	5	42%	4	33%	0	0%	2	17%				
1	2	67%	1	33%	0	0%	0	0%				
1	3	100%	0	0%	0	0%	0	0%				
1	0	0%	2	67%	0	0%	1	33%				
1	0	0%	1	33%	0	0%	1	33%				
15	22	49%	13	29%	0	0%	10	22%				
3	7	78%	2	22%	0	0%	0	0%				
1	3	100%	0	0%	0	0%	0	0%				
1	3	100%	0	0%	0	0%	0	0%				
1	1	33%	2	67%	0	0%	0	0%				

Evaluation Profile: All Levels

Total Number of Items	System1, Person 1				Partially Correct:	Failure		Response		Total Average Time
	Successfully		Correct			F		N		
	#	%	#	%		#	%	#	%	
4	8	67%	1	8%	0	0%	0	0%	3	25%
2	5	83%	1	17%	0	0%	0	0%	0	0%
1	2	67%	1	33%	0	0%	0	0%	0	0%
1	3	100%	0	0%	0	0%	0	0%	0	0%
1	3	100%	0	0%	0	0%	0	0%	0	0%
1	0	0%	0	0%	0	0%	0	0%	3	100%
5	5	33%	9	60%	0	0%	0	0%	1	7%
3	4	44%	4	44%	0	0%	0	0%	1	11%
1	3	100%	0	0%	0	0%	0	0%	0	0%
1	1	33%	1	33%	0	0%	0	0%	1	33%
1	0	0%	3	100%	0	0%	0	0%	0	0%
1	0	0%	3	100%	0	0%	0	0%	0	0%
1	1	33%	2	67%	0	0%	0	0%	0	0%
3	2	22%	1	11%	0	0%	0	0%	6	67%
1	2	67%	1	33%	0	0%	0	0%	0	0%
1	0	0%	0	0%	0	0%	0	0%	3	100%
1	0	0%	0	0%	0	0%	0	0%	3	100%
45	79	59%	11	8%	4	3%	8	6%	33	24%
8	15	62%	4	17%	0	0%	2	8%	3	12%
7	13	62%	4	19%	0	0%	2	10%	2	10%
2	5	83%	1	17%	0	0%	0	0%	0	0%
1	3	100%	0	0%	0	0%	0	0%	0	0%
1	2	67%	1	33%	0	0%	0	0%	0	0%
2	5	83%	0	0%	0	0%	1	17%	0	0%
1	2	67%	0	0%	0	0%	0	0%	0	0%
1	2	67%	0	0%	0	0%	1	33%	0	0%
1	3	100%	0	0%	0	0%	0	0%	0	0%
1	1	33%	1	33%	0	0%	0	0%	1	33%

VI. QUANTIFIERS

1. Functional Position of Quantifiers

1.1 Quantifiers in Determinative Positions

1.1.1 Quantifiers in Predeterminer Position

1.1.1.1 With Count Nouns

1.1.1.2 With Mass Nouns

1.1.2 Quantifiers in Postdeterminer Position

1.1.2.1 Successful Presupposition

1.1.2.2 Failed Presupposition

1.1.3 Quantifiers in Central Determiner Position

Evaluation Profile: All Levels

Total Number of Items	System 1, Person 1				Partially Correct:	F ailure	N_o	Total Average Time: Per Item				
	S_uccessfully		C_orrect						#	%	#	%
	#	%	#	%								
2	2	33%	2	33%	0	0%	1	17%	1	17%		
1	2	67%	0	0%	0	0%	1	33%	0	0%		
1	0	0%	2	67%	0	0%	0	0%	1	33%		
1	2	67%	0	0%	0	0%	0	0%	1	33%		
23	37	54%	7	10%	2	3%	6	9%	17	25%		
5	11	73%	2	13%	1	7%	1	7%	0	0%		
1	2	67%	0	0%	1	33%	0	0%	0	0%		
2	4	67%	1	17%	0	0%	1	17%	0	0%		
1	3	100%	0	0%	0	0%	0	0%	0	0%		
1	1	33%	1	33%	0	0%	1	33%	0	0%		
1	2	67%	1	33%	0	0%	0	0%	0	0%		
1	3	100%	0	0%	0	0%	0	0%	0	0%		
8	9	37%	4	17%	1	4%	2	8%	8	33%		
1	1	33%	2	67%	0	0%	0	0%	0	0%		
1	0	0%	0	0%	0	0%	0	0%	3	100%		
3	3	33%	2	22%	0	0%	1	11%	3	33%		
1	1	33%	1	33%	0	0%	0	0%	1	33%		
1	0	0%	0	0%	0	0%	1	33%	2	67%		
1	2	67%	1	33%	0	0%	0	0%	0	0%		
3	5	56%	0	0%	1	11%	1	11%	2	22%		
1	1	33%	0	0%	0	0%	1	33%	1	33%		
1	1	33%	0	0%	1	33%	0	0%	1	33%		
1	3	100%	0	0%	0	0%	0	0%	0	0%		
3	7	78%	1	11%	0	0%	1	11%	0	0%		
1	3	100%	0	0%	0	0%	0	0%	0	0%		
2	4	67%	1	17%	0	0%	1	17%	0	0%		
1	3	100%	0	0%	0	0%	0	0%	0	0%		
1	1	33%	1	33%	0	0%	1	33%	0	0%		

Evaluation Profile: All Levels

	System1, Person 1		P_artially		F_ailure		N_o		Total Average		
	Total		Correct:	%	#	%	#	%	Response	Time:	
	Number of Items	S_uccessfully	Response:	%	#	%	#	%	Time:	Per Item	
2.4 Negative Quantifiers	3	3	33%	0	0%	0	0%	1	11%	5	56%
2.4.1 NO	1	3	100%	0	0%	0	0%	0	0%	0	0%
2.4.2 NONE	1	0	0%	0	0%	0	0%	0	0%	3	100%
2.4.3 NEITHER	1	0	0%	0	0%	0	0%	1	33%	2	67%
2.5 Numerical Quantifiers	4	7	58%	0	0%	0	0%	1	8%	4	33%
2.5.1 Cardinal Numbers	1	2	67%	0	0%	0	0%	1	33%	0	0%
2.5.2 Ordinal Numbers	1	2	67%	0	0%	0	0%	0	0%	1	33%
2.5.3 Fractions	1	1	33%	0	0%	0	0%	0	0%	2	67%
2.5.4 Multipliers	1	2	67%	0	0%	0	0%	0	0%	1	33%
3. Indefinite Quantifier Pronouns	8	14	58%	0	0%	2	8%	0	0%	8	33%
3.1 Universal	2	5	83%	0	0%	1	17%	0	0%	0	0%
3.1.1 Personal	1	2	67%	0	0%	1	33%	0	0%	0	0%
3.1.2 Nonpersonal	1	3	100%	0	0%	0	0%	0	0%	0	0%
3.2 Existential Assertive	2	3	50%	0	0%	1	17%	0	0%	2	33%
3.2.1 Personal	1	2	67%	0	0%	0	0%	0	0%	1	33%
3.2.2 Nonpersonal	1	1	33%	0	0%	1	33%	0	0%	1	33%
3.3 Existential Nonassertive	2	5	83%	0	0%	0	0%	0	0%	1	17%
3.3.1 Personal	1	2	67%	0	0%	0	0%	0	0%	1	33%
3.3.2 Nonpersonal	1	3	100%	0	0%	0	0%	0	0%	0	0%
3.4 Negative	2	1	17%	0	0%	0	0%	0	0%	5	83%
3.4.1 Personal	1	0	0%	0	0%	0	0%	0	0%	3	100%
3.4.2 Nonpersonal	1	1	33%	0	0%	0	0%	0	0%	2	67%
4. Existential There	5	13	87%	0	0%	0	0%	0	0%	2	13%
4.1 Declaratives	1	3	100%	0	0%	0	0%	0	0%	0	0%
4.2 In Relative Clauses	1	1	33%	0	0%	0	0%	0	0%	2	67%
4.3 What Questions	1	3	100%	0	0%	0	0%	0	0%	0	0%
4.4 Yes-No Questions	1	3	100%	0	0%	0	0%	0	0%	0	0%
4.5 Tag Questions	1	3	100%	0	0%	0	0%	0	0%	0	0%

Evaluation Profile: All Levels

		System1, Person 1				System1, Person 2				System1, Person 3				System1, Person 4													
Total		S_uccessfully_C_orrect		P_artially_C_orrect		F_ailure		N_o_A_nswer		S_uccessfully_C_orrect		P_artially_C_orrect		F_ailure		N_o_A_nswer		S_uccessfully_C_orrect		P_artially_C_orrect		F_ailure		N_o_A_nswer		Total_Average	
Number	of	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	Time	Per Item
5. Universal Adjectives	1		0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	3	100%										
VII. COMPARATIVES																											
1. Comparative Adjectives	63	87	46%	2	1%	11	6%	6	3%	83	44%	25	46%													5:30	0:05.14
1.1 Comparison to a Higher Degree	18	29	54%	0	0%	0	0%	0	0%	0	0%	0	0%														
1.1.1 No Gapping	4	7	58%	0	0%	0	0%	0	0%	0	0%	0	0%														
1.1.2 Adjective Gapping	1	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%														
1.1.3 Copular and Adjective Gapping	1	2	67%	0	0%	0	0%	0	0%	0	0%	0	0%														
1.1.4 NP and Copular Gapping (Pseudo-Comparatives)	1	3	100%	0	0%	0	0%	0	0%	0	0%	0	0%														
1.2 Comparison to a Lower Degree	1	2	67%	0	0%	0	0%	0	0%	0	0%	0	0%														
1.2.1 No Gapping	4	5	42%	0	0%	0	0%	0	0%	0	0%	0	0%														
1.2.2 Adjective Gapping	1	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%														
1.2.3 Copular and Adjective Gapping	1	2	67%	0	0%	0	0%	0	0%	0	0%	0	0%														
1.2.4 NP and Copular Gapping (Pseudo-Comparatives)	1	2	67%	0	0%	0	0%	0	0%	0	0%	0	0%														
1.3 Comparisons To the Same Degree	1	1	33%	0	0%	0	0%	0	0%	0	0%	0	0%														
1.3.1 In Assertive Contexts	8	14	58%	0	0%	0	0%	0	0%	0	0%	0	0%														
1.3.1.1 No Gapping	4	6	50%	0	0%	0	0%	0	0%	0	0%	0	0%														
1.3.1.2 Adjective Gapping	1	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%														
1.3.1.3 Copular and Adjective Gapping	1	2	67%	0	0%	0	0%	0	0%	0	0%	0	0%														
1.3.1.4 NP and Copular Gapping (Pseudo-Comparatives)	1	3	100%	0	0%	0	0%	0	0%	0	0%	0	0%														
1.3.2 In Non-Assertive Contexts	1	1	33%	0	0%	0	0%	0	0%	0	0%	0	0%														
1.3.2.1 No Gapping	4	8	67%	0	0%	0	0%	0	0%	0	0%	0	0%														
1.3.2.2 Adjective Gapping	1	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%														
1.3.2.3 Copular and Adjective Gapping	1	3	100%	0	0%	0	0%	0	0%	0	0%	0	0%														
1.3.2.4 NP and Copular Gapping (Pseudo-Comparatives)	1	3	100%	0	0%	0	0%	0	0%	0	0%	0	0%														
1.4 Comparison to a Constant	1	2	67%	0	0%	0	0%	0	0%	0	0%	0	0%														
1.5 Comparative Phrases Used as Premodifiers in a NP	1	3	100%	0	0%	0	0%	0	0%	0	0%	0	0%														
2. Superlative Adjectives	1	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%														
	3	7	78%	0	0%	0	0%	0	0%	0	0%	0	0%														

Evaluation Profile: All Levels

Total Number of Items	System 1, Person 1				Total Average Time: Per Item					
	S_uccessfully C_orrect		P_artially C_orrect			F_ailure		N_o		
	#	%	#	%		#	%	#	%	
2	5	83%	0	0%	0	0%	0	0%	1	17%
1	2	67%	0	0%	0	0%	0	0%	1	33%
1	3	100%	0	0%	0	0%	0	0%	0	0%
1	2	67%	0	0%	0	0%	0	0%	1	33%
13	5	13%	1	3%	1	3%	0	0%	32	82%
3	2	22%	0	0%	1	11%	0	0%	6	67%
1	1	33%	0	0%	0	0%	0	0%	2	67%
1	1	33%	0	0%	1	33%	0	0%	1	33%
1	0	0%	0	0%	0	0%	0	0%	3	100%
3	0	0%	0	0%	0	0%	0	0%	9	100%
1	0	0%	0	0%	0	0%	0	0%	3	100%
1	0	0%	0	0%	0	0%	0	0%	3	100%
1	0	0%	0	0%	0	0%	0	0%	3	100%
6	3	17%	1	6%	0	0%	0	0%	14	78%
3	1	11%	1	11%	0	0%	0	0%	7	78%
1	0	0%	0	0%	0	0%	0	0%	3	100%
1	1	33%	0	0%	0	0%	0	0%	2	67%
1	0	0%	1	33%	0	0%	0	0%	2	67%
3	2	22%	0	0%	0	0%	0	0%	7	78%
1	1	33%	0	0%	0	0%	0	0%	2	67%
1	1	33%	0	0%	0	0%	0	0%	2	67%
1	0	0%	0	0%	0	0%	0	0%	3	100%
1	0	0%	0	0%	0	0%	0	0%	3	100%
2	2	33%	0	0%	0	0%	0	0%	4	67%
1	1	33%	0	0%	0	0%	0	0%	2	67%
1	1	33%	0	0%	0	0%	0	0%	2	67%
1	1	33%	0	0%	0	0%	0	0%	2	67%
8	18	75%	0	0%	0	0%	2	8%	4	17%

Evaluation Profile: All Levels

	Total Number of Items	System1, Person 1				P_artially Correct:	_F_ailure #	_N_o Response	Total Average Time: Per Item:
		S_uccessfully met Criteria:		_C_orrect Response:					
		#	%	#	%				
6.1 Comparative Noun Phrases w/ Comparative Quants	4	8	67%	0	0%	1	8%	3	25%
6.1.1 No Gapping	1	1	33%	0	0%	1	33%	1	33%
6.1.2 Object Gapping	1	2	67%	0	0%	0	0%	1	33%
6.1.3 Verb and Object Gapping	1	3	100%	0	0%	0	0%	0	0%
6.1.4 Noun Phrase and Verb Gapping	1	2	67%	0	0%	0	0%	1	33%
6.2 Comparative Noun Phrases w/ Comparative Adjcs.	4	10	83%	0	0%	1	8%	1	8%
6.2.1 No Gapping	1	2	67%	0	0%	1	33%	0	0%
6.2.2 Object Gapping	1	2	67%	0	0%	0	0%	1	33%
6.2.3 Verb and Object Gapping	1	3	100%	0	0%	0	0%	0	0%
6.2.4 Noun Phrase and Verb Gapping	1	3	100%	0	0%	0	0%	0	0%
7. Comparing Objects of VPs with Extra Adjunct	15	22	49%	1	2%	10	22%	2	4%
7.1 No Gapping	1	0	0%	0	0%	1	33%	0	0%
7.2 Single Gapping	4	3	25%	1	8%	6	50%	0	0%
(a)	1	2	67%	1	33%	0	0%	0	0%
(b)	1	0	0%	0	0%	3	100%	0	0%
(c)	1	1	33%	0	0%	1	33%	0	0%
(d)	1	0	0%	0	0%	2	67%	0	0%
7.3 Double Gapping	6	9	50%	0	0%	3	17%	1	6%
(a)	1	1	33%	0	0%	0	0%	1	33%
(b)	1	3	100%	0	0%	0	0%	0	0%
(c)	1	3	100%	0	0%	0	0%	0	0%
(d)	1	0	0%	0	0%	0	0%	0	0%
(e)	1	0	0%	0	0%	3	100%	0	0%
(f)	1	2	67%	0	0%	0	0%	1	33%
7.4 Triple Gapping	4	10	83%	0	0%	0	0%	1	8%
(a)	1	3	100%	0	0%	0	0%	0	0%
(b)	1	1	33%	0	0%	0	0%	1	33%
(c)	1	3	100%	0	0%	0	0%	0	0%

Evaluation Profile: All Levels

	System1, Person 1										Total Average Time Per Item	
	Total	S_successfully		C_correct		P_partially		F_failure		N_o		
	Number of Items	#	%	#	%	#	%	#	%	#		%
(d)	1	3	100%	0	0%	0	0%	0	0%	0	0%	
8. Implicit Comparatives	1	1	33%	0	0%	0	0%	0	0%	2	67%	
9. Multipliers and Fractions in Comparisons	2	2	33%	0	0%	0	0%	2	33%	2	33%	
9.1 Multipliers	1	1	33%	0	0%	0	0%	1	33%	1	33%	
9.2 Fractions	1	1	33%	0	0%	0	0%	1	33%	1	33%	
VIII. CONNECTIVES												
1 Coordinators (Single Pair Coordination)	34	74	73%	2	2%	2	2%	5	5%	19	19%	3:15
1.1 AND	34	74	73%	2	2%	2	2%	5	5%	19	19%	
1.1.1 Sentential Connectives	3	9	100%	0	0%	0	0%	0	0%	0	0%	
1.1.1.1 Declaratives Conjoined by AND	1	3	100%	0	0%	0	0%	0	0%	0	0%	
1.1.1.2 Imperatives Conjoined by AND	1	3	100%	0	0%	0	0%	0	0%	0	0%	
1.1.1.3 Interrogatives Conjoined by AND	1	3	100%	0	0%	0	0%	0	0%	0	0%	
1.1.2 Relative Clauses Conjoined by AND	1	3	100%	0	0%	0	0%	0	0%	0	0%	
1.1.3 Noun Phrase Constructions with the Conjunction AND	4	7	58%	0	0%	0	0%	2	17%	3	25%	
1.1.3.1 Conjunction of Simple Noun within Scope of Article	1	1	33%	0	0%	0	0%	1	33%	1	33%	
1.1.3.2 Conjunction of Nouns with Adjective Premodifier	1	2	67%	0	0%	0	0%	1	33%	0	0%	
1.1.3.3 Conjunction of Nouns with Articles and Adj. Pre	1	2	67%	0	0%	0	0%	0	0%	1	33%	
1.1.3.4 Conjunction of NPs with Premodifiers and Post	1	2	67%	0	0%	0	0%	0	0%	1	33%	
1.1.4 The Conjunction AND in a Premodification of a NP	5	10	67%	2	13%	2	13%	1	7%	0	0%	
1.1.4.1 Conjunctions of Adjectives	1	3	100%	0	0%	0	0%	0	0%	0	0%	
1.1.4.2 Conjunctions of Article with Adjective	1	2	67%	0	0%	0	0%	1	33%	0	0%	
1.1.4.3 Conjunction of Genitive Noun Phrases	1	3	100%	0	0%	0	0%	0	0%	0	0%	
1.1.4.4 Scope of Adjectives over Nouns	2	2	33%	2	33%	2	33%	0	0%	0	0%	
1.1.4.4.1 Scope of Adjective Includes First Noun Only	1	0	0%	2	67%	1	33%	0	0%	0	0%	
1.1.4.4.2 Scope of Adjective Includes Both Nouns	1	2	67%	0	0%	1	33%	0	0%	0	0%	
1.1.6 Verb Phrases with the Conjunction AND	17	36	71%	0	0%	0	0%	0	0%	15	29%	
1.1.6.1 BE-Verb Conjoined by AND	5	11	73%	0	0%	0	0%	0	0%	4	27%	

Evaluation Profile: All Levels

		System 1, Person 1											
Total		S_uccessfully _C_orrect		P_artially		F_ailure		N_o		Total		Average	
Number	of	#	%	#	%	#	%	#	%	#	%	Time	Per Item
Items													
1.1.6.1.1 BE-Verb With Complement Conjoined by /	3	7	78%	0	0%	0	0%	0	0%	2	22%		
1.1.6.1.1.1 Adjectival Complements:	1	2	67%	0	0%	0	0%	0	0%	1	33%		
1.1.6.1.1.2 Noun Phrase Complements:	1	2	67%	0	0%	0	0%	0	0%	1	33%		
1.1.6.1.1.3 Mixed Complements	1	3	100%	0	0%	0	0%	0	0%	0	0%		
1.1.6.1.2 Passive Constructions with the Conjunction	2	4	67%	0	0%	0	0%	0	0%	2	33%		
1.1.6.1.2.1 Conjunction of the Verb in Passive Ver	1	3	100%	0	0%	0	0%	0	0%	0	0%		
1.1.6.1.2.2 Conjunction of a Passive Verb Phrase	1	1	33%	0	0%	0	0%	0	0%	2	67%		
1.1.6.2 DO-Verb Constructions with the Conjunction A	1	0	0%	0	0%	0	0%	0	0%	3	100%		
1.1.6.3 Full Verb Constructions with the Conjunction A	3	4	44%	0	0%	0	0%	0	0%	5	56%		
1.1.6.3.1 Conjunction of Intransitive Verbs	1	2	67%	0	0%	0	0%	0	0%	1	33%		
1.1.6.3.2 Conjunction of Transitive Verbs	2	2	33%	0	0%	0	0%	0	0%	4	67%		
1.1.6.3.2.1 Conjunction of Transitive Verb Phrases	1	2	67%	0	0%	0	0%	0	0%	1	33%		
1.1.6.3.2.2 Conj. of Two Transitive Verbs w/ One C	1	0	0%	0	0%	0	0%	0	0%	3	100%		
1.1.6.4 Mixed Verb Phrases in Constructions with AND	8	21	87%	0	0%	0	0%	0	0%	3	12%		
1.1.6.4.1 Conjunction of Transitive and Intransitive V	2	6	100%	0	0%	0	0%	0	0%	0	0%		
1.1.6.4.1.1 Conjunction of Transitive with Intransiti	1	3	100%	0	0%	0	0%	0	0%	0	0%		
1.1.6.4.1.2 Conjunction of Intransitive with Transiti	1	3	100%	0	0%	0	0%	0	0%	0	0%		
1.1.6.4.2 Conjunction of Copular with Non-Copular A	2	6	100%	0	0%	0	0%	0	0%	0	0%		
1.1.6.4.2.1 With Copular First	1	3	100%	0	0%	0	0%	0	0%	0	0%		
1.1.6.4.2.2 With Non-Copular First	1	3	100%	0	0%	0	0%	0	0%	0	0%		
1.1.6.4.3 Conjunction of Passive with Non-Copular A	2	6	100%	0	0%	0	0%	0	0%	0	0%		
1.1.6.4.3.1 With Passive First	1	3	100%	0	0%	0	0%	0	0%	0	0%		
1.1.6.4.3.2 With Non-Copular Active Verb Phrase	1	3	100%	0	0%	0	0%	0	0%	0	0%		
1.1.6.4.4 Conjunction of Copular with Passive	2	3	50%	0	0%	0	0%	0	0%	3	50%		
1.1.6.4.4.1 With Copular First	1	1	33%	0	0%	0	0%	0	0%	2	67%		
1.1.6.4.4.2 With Passive First	1	2	67%	0	0%	0	0%	0	0%	1	33%		
1.1.7 Conjunction of Adverbials	1	3	100%	0	0%	0	0%	0	0%	0	0%		
1.1.8 Conjunction within Prepositional Phrases	3	6	67%	0	0%	0	0%	0	0%	2	22%		

Evaluation Profile: All Levels

Total	System1, Person 1										Total Average Time: Per Item	
	Number of Items	S_uccessfully		C_orrect		P_artially		F_ailure		N_o		
		#	%	#	%	#	%	#	%	#		%
	1	3	100%	0	0%	0	0%	0	0%	0	0%	
1.1.8.1 Conjunction of Prepositional Phrases												
1.1.8.2 Conjunction of Noun Phrases within a PP	1	2	67%	0	0%	0	0%	1	33%	0	0%	
1.1.8.3 Conjunction of Prepositions within a PP	1	1	33%	0	0%	0	0%	1	33%	1	33%	
IX. EMBEDDED SENTENCES												
1. THAT-Clauses	5	4	27%	0	0%	0	0%	0	0%	11	73%	0:30
2. Wh-interrogative clauses	1	0	0%	0	0%	0	0%	0	0%	3	100%	
3. Yes-No interrogative clauses	1	2	67%	0	0%	0	0%	0	0%	1	33%	
4. Infinitive clauses introduced by TO	1	1	33%	0	0%	0	0%	0	0%	2	67%	
5. -ING clauses	1	1	33%	0	0%	0	0%	0	0%	2	67%	
	1	0	0%	0	0%	0	0%	0	0%	3	100%	
X. REFERENCE												
1. Specific Reference	16	22	46%	2	4%	3	6%	5	10%	16	33%	2:20
1.1 Anaphoric Reference	15	22	49%	0	0%	3	7%	5	11%	15	33%	
1.1.1 Pronominal Anaphora	12	18	50%	0	0%	3	8%	4	11%	11	31%	
1.1.1.1 Anaphoric References With NP Antecedents	5	8	53%	0	0%	0	0%	2	13%	5	33%	
1.1.1.1.1 Anaphoric References with NP Antecedents	4	8	67%	0	0%	0	0%	2	17%	2	17%	
1.1.1.1.2 Anaphoric Reference Functions as Subject	1	2	67%	0	0%	0	0%	1	33%	0	0%	
1.1.1.1.3 Anaphoric Reference Functions as Object	1	2	67%	0	0%	0	0%	1	33%	0	0%	
1.1.1.1.4 Anaphoric Reference Functions as Posses	1	3	100%	0	0%	0	0%	0	0%	0	0%	
1.1.1.1.4 Ambiguous Anaphoric References	1	1	33%	0	0%	0	0%	0	0%	2	67%	
1.1.1.2 Anaphoric References w/ VP or Sentence Ant	1	0	0%	0	0%	0	0%	0	0%	3	100%	
1.1.2 Nominal Anaphora	3	1	11%	0	0%	0	0%	2	22%	6	67%	
1.1.2.1 Anaphoric References with NP Antecedents	2	1	17%	0	0%	0	0%	2	33%	3	50%	
1.1.2.1.1 Direct	1	1	33%	0	0%	0	0%	1	33%	1	33%	
1.1.2.1.2 Indirect	1	0	0%	0	0%	0	0%	1	33%	2	67%	
1.1.2.2 Anaphoric Refs. with Clause or Sentence Ant	1	0	0%	0	0%	0	0%	0	0%	3	100%	
1.1.3 Anaphora with SO and AS	2	3	50%	0	0%	3	50%	0	0%	0	0%	
1.1.3.1 Anaphora with SO	1	3	100%	0	0%	0	0%	0	0%	0	0%	

Evaluation Profile: All Levels

		System 1, Person 1											
Total		S_ successfully		C_ orrect		P_ artially		F_ ailure		_ N_ o		Average	
Number	of	#	%	#	%	#	%	#	%	#	%	Time:	Time
Items												Per Item	
1.1.3.2 Anaphora with AS	1	0	0%	0	0%	3	100%	0	0%	0	0%	0	0%
1.1.4 Intra- and Inter-Sentential Anaphora	2	6	100%	0	0%	0	0%	0	0%	0	0%	0	0%
1.1.4.1 Intra-sentential anaphora	1	3	100%	0	0%	0	0%	0	0%	0	0%	0	0%
1.1.4.2 Inter-sentential anaphora	1	3	100%	0	0%	0	0%	0	0%	0	0%	0	0%
1.2 Cataphoric Reference	2	1	17%	0	0%	0	0%	1	17%	4	67%		
1.2.1 Cataphoric References With NP Postcedents	1	1	33%	0	0%	0	0%	1	33%	1	33%		
1.2.2 Cataphoric Refs. with VP or Sentence Antecedent	1	0	0%	0	0%	0	0%	0	0%	3	100%		
1.3 General Knowledge or the Larger Situation	1	3	100%	0	0%	0	0%	0	0%	0	0%		
2. Generic Reference	1	0	0%	2	67%	0	0%	0	0%	1	33%		
	17	21	41%	6	12%	2	4%	6	12%	16	31%	3:00	0:10:35
XI. ELLIPSIS													
1. Elliptical noun phrases	6	7	39%	5	33%	2	11%	0	0%	3	17%		
1.1 Ellipsis of head only, no postmodifiers present	1	3	100%	0	0%	0	0%	0	0%	0	0%		
1.2 Ellipsis of premodifier(s) and head, no postmodifier	1	1	33%	0	0%	2	67%	0	0%	0	0%		
1.3 Ellipsis of post-modifier(s) only	1	1	33%	2	67%	0	0%	0	0%	0	0%		
1.4 Ellipsis of head and post-modifier(s)	1	1	33%	1	33%	1	33%	0	0%	1	33%		
1.5 Ellipsis of premodifier(s), head, and postmodifier(s)	1	0	0%	1	33%	0	0%	0	0%	2	67%		
1.6 Ellipsis of head with postmodifier(s) retained	1	1	33%	2	67%	0	0%	0	0%	0	0%		
2. Elliptical Clauses	11	14	42%	0	0%	0	0%	6	18%	13	39%		
2.1 Ellipsis of Subject Complement	1	2	67%	0	0%	0	0%	1	33%	0	0%		
2.2 Ellipsis of Subject Complement and Adverbial	1	1	33%	0	0%	0	0%	0	0%	2	67%		
2.3 Ellipsis of Adverbial	1	0	0%	0	0%	0	0%	0	0%	3	100%		
2.4 Ellipsis of Verb Head	1	3	100%	0	0%	0	0%	0	0%	0	0%		
2.5 Ellipsis of Verb Head and Adverbial	1	3	100%	0	0%	0	0%	0	0%	0	0%		
2.6 Ellipsis of Verb Head and Object and Adverbial	1	2	67%	0	0%	0	0%	1	33%	0	0%		
2.7 Ellipsis of the Verb Phrase with Do-Support	1	0	0%	0	0%	0	0%	0	0%	3	100%		
2.8 Medial Verb Head Ellipsis	1	0	0%	0	0%	0	0%	3	100%	0	0%		
2.9 Ellipsis of Subject and Verb	1	3	100%	0	0%	0	0%	0	0%	0	0%		

Evaluation Profile: All Levels

Total Number of Items	System1, Person 1				Total Average Time: Per Item
	S_uccessfully _C_orrect		P_artially _F_ailure		
	#	%	#	%	
1	0	0%	0	0%	
1	0	0%	0	0%	
39	37	32%	8	7%	
5	10	67%	0	0%	
2	2	33%	0	0%	
1	1	33%	0	0%	
1	1	33%	0	0%	
2	5	83%	0	0%	
1	3	100%	0	0%	
1	2	67%	0	0%	
1	3	100%	0	0%	
2	4	67%	0	0%	
1	3	100%	0	0%	
1	1	33%	0	0%	
1	1	33%	0	0%	
2	5	83%	0	0%	
1	3	100%	0	0%	
1	2	67%	0	0%	
1	3	100%	0	0%	
2	4	67%	0	0%	
1	3	100%	0	0%	
1	1	33%	0	0%	
1	0	0%	0	0%	
1	1	33%	0	0%	
1	0	0%	0	0%	
1	2	67%	0	0%	
1	3	100%	0	0%	
3	5	56%	0	0%	
1	3	100%	0	0%	
1	2	57%	0	0%	
1	0	0%	0	0%	
1	1	33%	0	0%	
1	0	0%	0	0%	
1	0	0%	0	0%	
4	3	25%	0	0%	
1	3	100%	0	0%	
1	0	0%	0	0%	

Evaluation Profile: All Levels

	System 1, Person 1										Total		
	Number of Items		S_ccessfully met Criteria		C_orrect Response		P_artially Correct		F_ailure			N_o Response	
	#	%	#	%	#	%	#	%	#	%		#	%
10.3 Agent, Patient and Instrument	1	0%	0	0%	0	0%	0	0%	0	0%	3	100%	
10.4 Source, Goal, Theme and Co-theme	1	0%	0	0%	0	0%	0	0%	0	0%	3	100%	
11. Spatial Information of Events	3	22%	1	11%	1	33%	0	0%	0	0%	6	67%	
11.1 Position	1	2	67%	1	33%	0	0%	0	0%	0	0	0%	
11.2 Path	1	0	0%	0	0%	0	0%	0	0%	0	3	100%	
11.3 Distance	1	0	0%	0	0%	0	0%	0	0%	0	3	100%	
12. Temporal Information of Events	4	6	50%	2	17%	1	8%	1	8%	2	17%	17%	
12.1 Position	1	2	67%	0	0%	0	0%	0	0%	1	33%	0%	
12.2 Duration	1	2	67%	1	33%	0	0%	0	0%	0	0	0%	
12.3 Frequency	1	0	0%	0	0%	1	33%	0	0%	0	2	67%	
12.4 Relationship	1	2	67%	1	33%	0	0%	0	0%	0	0	0%	
13. Participant Combination w/ Time and Location	1	0	0%	0	0%	0	0%	0	0%	0	3	100%	
14. Manner	1	0	0%	1	33%	0	0%	0	0%	0	2	67%	
15. Means	1	0	0%	0	0%	0	0%	1	33%	0	2	67%	
16. Respect	1	0	0%	1	33%	0	0%	0	0%	0	2	67%	
17. Contingency	6	1	6%	2	11%	1	6%	1	6%	7	39%	39%	
17.1 Cause	1	0	0%	1	33%	0	0%	0	0%	0	2	67%	
17.2 Reason	1	0	0%	0	0%	0	0%	0	0%	3	100%	0%	
17.3 Purpose	1	0	0%	0	0%	0	0%	0	0%	2	67%	33%	
17.4 Result	1	0	0%	0	0%	1	33%	0	0%	0	2	67%	
17.5 Condition	1	1	33%	0	0%	0	0%	0	0%	1	33%	33%	
17.6 Concession	1	0	0%	1	33%	0	0%	0	0%	1	33%	33%	
19. Modality	1	0	0%	0	0%	0	0%	0	0%	3	100%	0%	
20. Evidentials	1	0	0%	1	33%	0	0%	0	0%	0	2	67%	

APPENDIX C

Summary of Assessment Questionnaire Responses

This appendix provides a summary of the responses from the Interface Technologists to the Assessment Questionnaire concerning the NLP Evaluation Tool. The Questionnaire was completed by each Technologist after he/she finished applying the Tool to all of the NLP systems.

APPENDIX B. Summary of Assessment Questionnaire Responses

1. Ease of Use

IT #1: Long chapters are very "tedious." Should consider breaking it up into smaller chapters.

IT #2: Clearer than last time.

IT #3: Easy to use, but "tedious." Less exhaustive testing would make the tool easier to use.

IT #4: The Tool is clear and well laid out. Instructions are unambiguous and test inputs are easy to generate.

2. Helpfulness of Examples

IT #1: Examples are useful, but "too specific for the good of the tool." They should be general enough to apply to all domains. Also, more general examples would facilitate a wider range of inputs to the NLP system.

IT #2: They are helpful for "semi-automated evaluation" in which examples are used as inputs. When used this way, the diacritical markers like [] are cumbersome.

IT #3: They are okay. I used them in forming inputs.

IT #4: "Examples were invaluable." They keep interpretation of test items consistent across evaluators. They provide an "easily graspable form of what the Tool was struggling to say." They also save time because they avoid time that would be needed to pour over the glossary.

3. Face Validity of Scores

IT #1: Not always. Sometimes the system gets "lucky," especially when the system is able to use keywords. Having three tries helped face validity better for the database NLP system.

IT #2: Kind of, but there is still a lot of judgement required.

IT #3: Seemed to be adequate.

IT #4: In terms of semantics, "yes" for database system, but "no" for the system that used keywords.

4. Scoring Criteria

- IT #1: The criteria and scores (S,C,P,F, and N) should both be defined more explicitly. Also, there are many ways the systems can fail that are not captured (eg., no response, misordered input, didn't understand domain, produced garble, just paraphrased input). Could also note certainty of scores. Not clear what is meant by "demonstrated understanding." This was interpreted as "did it pretty much do the right thing?" In general, the criteria are positive and necessary – just need to be improved.
- IT #2: An improvement over last time, but they are too vague at times (e.g., saying the system must "demonstrate understanding" requires a lot of judgement). Also, consider having different criteria for different kinds of NLP systems.
- IT #3: The scoring criteria need more explicit definition. It should be made clear whether a strict or conversational standard applies. Consider demonstrating proper application of criteria with examples.
- IT #4: The criteria helped, but they need to be more clear. What is the point of comparison? Is comparison to what would be expected of a human or a machine? Also consider making F and N scores more explicit (e.g., word level, syntax level, semantics, and when system just paraphrased input).

5. Adequacy of Training

- IT #1: Training was important for proper application of the Tool, but the criteria and instructions should be improved so training will not be needed.
- IT #2: The training was somewhat adequate, but essential. Application of the criteria takes too much interpretation and hence training is needed. If the criteria can be made more precise, training would be less needed.
- IT #3: The training was somewhat helpful. However, there was still learning taking place during Tool application. Evaluators should be trained to go back over their answers to look for consistency.
- IT #4: Training is not very important, but some instruction is required to ensure consistent application of the Tool. Training embedded in the Tool which presents solved (i.e., scored) examples would be an improvement. This embedded training could include allowing evaluators to practice with automated feedback.

6. Adequacy of Structure

- IT #1: Some chapters are too long and should be broken down. Some of the long chapters cover very small distinctions. Often later items prompt reconsideration of earlier answers. Also, sometimes failed structures passed in a new context. Didn't have any trouble remembering what had previously failed.
- IT #2: The Tool is very exhaustive. Seems like things are tested over and over in full combinatorial style. Seems like overkill. Can the tool be shortened to cover all the material with less repetition?
- IT #3: Should organize in a way that will allow stopping when a failure makes subsequent items untestable (i.e., eliminate variations on failed features).
- IT #4: Didn't have trouble remembering what had failed, but on one system (System 2) early failure with a structure didn't mean that later structures including this structure would fail. I believe this is because the system looks for keywords.

7. Improvements Ideas

- IT #1: Make the scoring criteria more specific.
- IT #2: Covered under other topics throughout.
- IT #3: Should have a scoring category called "response inadequate" meaning that the NLP system's understanding could not be assessed. This was a problem with System 2 which built database templates.
- IT #4: Some sections of the Tool need to be marked for "parallel execution" since failed structures may work when used within more complicated structures (especially true for System 2).

8. Greatest Strengths

- IT #1: By applying the Tool to different systems you will get a sense of which is best for a given application irrespective of the actual score derived (i.e., tool strength is that it forces one to thoroughly experience the NLP system).
- IT #2: Wide coverage of linguistic phenomena.
- IT #3: Exhaustiveness and good examples.
- IT #4: Comprehensiveness.

9. Greatest Weaknesses

- IT #1: It takes a lot of time to apply the Tool. Also the nature of the Tool drains your mind – should limit application sessions to 4 hours.
- IT #2: Vagueness of criteria. Dreadful boredom in tool application (“this is brain-dead work of the worst kind”). The boredom affects scoring somehow.
- IT #3: Tediousness. Also there were a few bad examples.
- IT #4: The Tool is too general to be applied to all kinds of NLP systems – perhaps use only for database systems.

10. Features That Should be Added

- IT #1: Reorganize larger chapters so they aren't so tedious. Also, you could provide on-line error checking of inputs.
- IT #2: Provide a more automated way of grabbing examples for use in forming inputs and taking results from the NLP system for use in documenting scores in the Tool.
- IT #3: Provide examples that illustrate what responses would receive what scores. Provide more automated ways of grabbing examples for use in forming inputs.
- IT #4: Automate decisions about what items should be tested based on earlier failures. Add on-line training. The Tool should be used to define guidelines for further investigation. For example, when an NLP system fails an item the system could aid in specifying the cause of failure.

11. Other Comments

- IT #1: “The Tool can be very useful for NLP systems and particularly useful to people who are developing NLP system to judge two well they are accomplishing the different areas” The glossary did not provide enough detail. All parts of each test item are equally important and useful.
- IT #2: Limit daily evaluation time to approximately two hours to prevent boredom from affecting the results.
- IT #3: Consider completely automating the Tool using intelligent software to eliminate the human element or, if this is too ambitious, build a system to aid the human in the evaluation.
- IT #4: None.

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