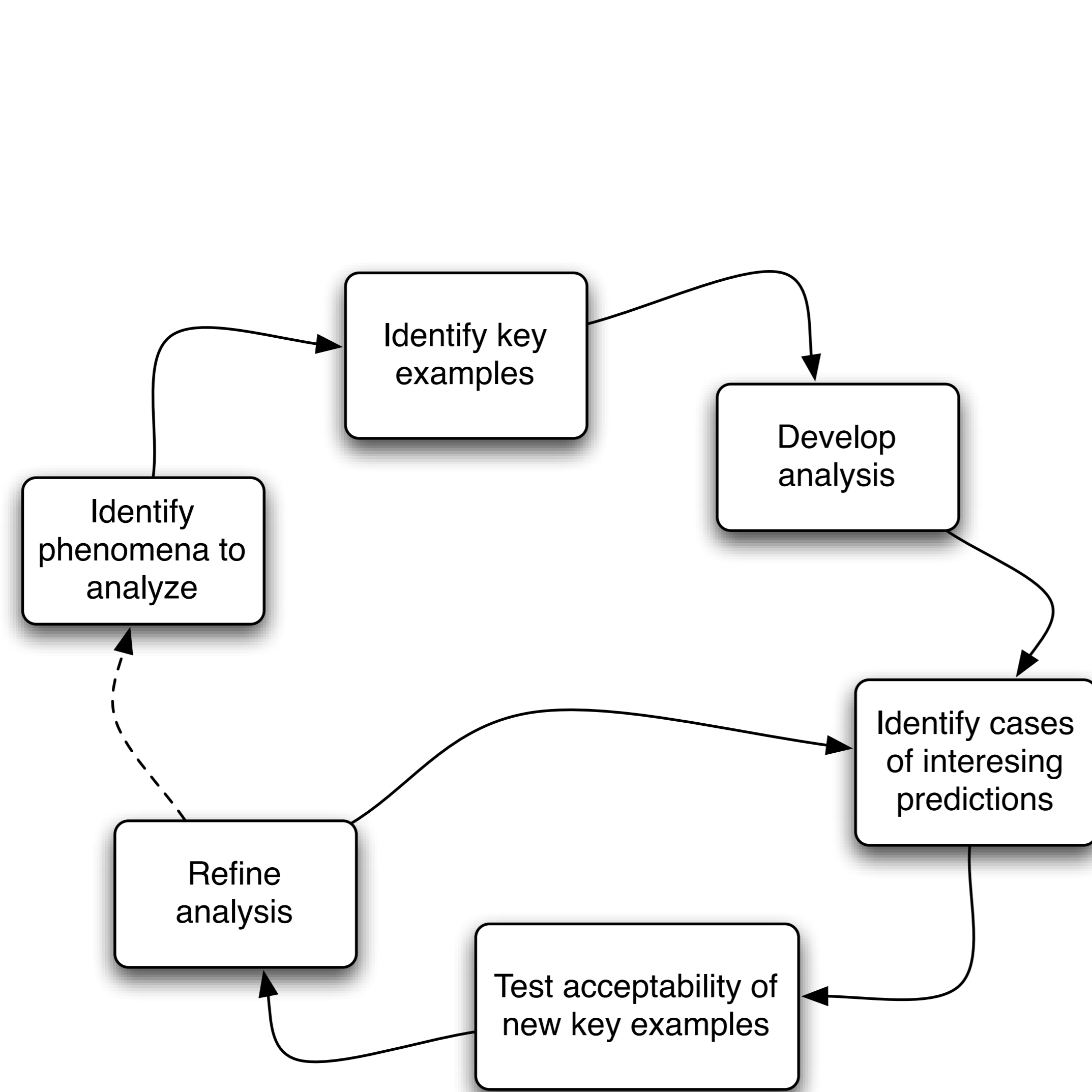
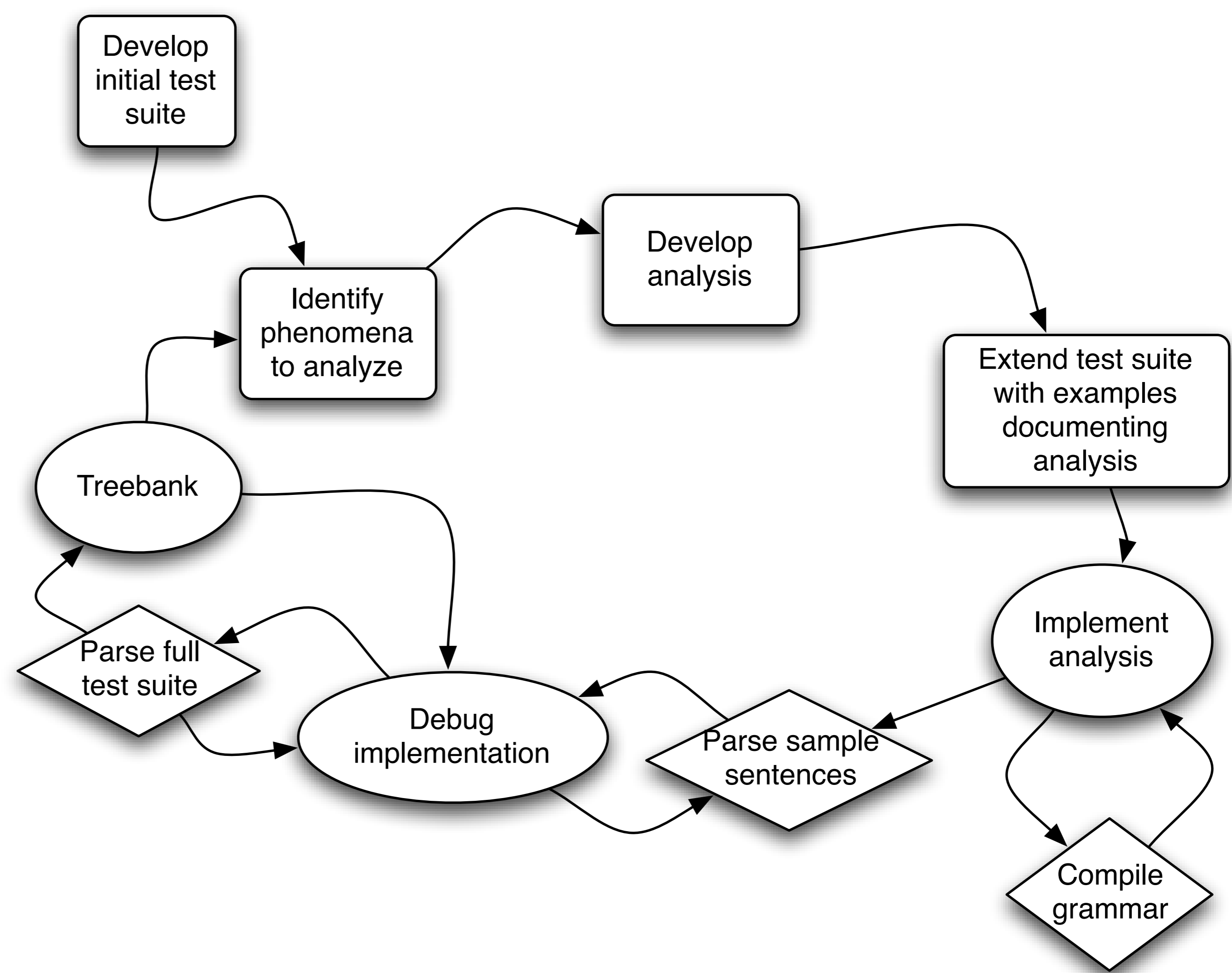


# Multilingual Grammar Engineering with the LinGO Grammar Matrix

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Workflow in syntactic research without computer assistance  
(Bender et al., 2011)



Workflow in syntactic research with computer assistance  
(Bender et al., 2011)

## 1. Grammar Engineering

- Grammar engineering is the practice of encoding linguistic grammars in machine readable form
- Useful for both linguistic hypothesis testing and practical applications
- Requires explicit, precise definition of grammatical constraints
- Exposes interactions between analyses

## 2. The LinGO Grammar Matrix

<http://www.delph-in.net/matrix>

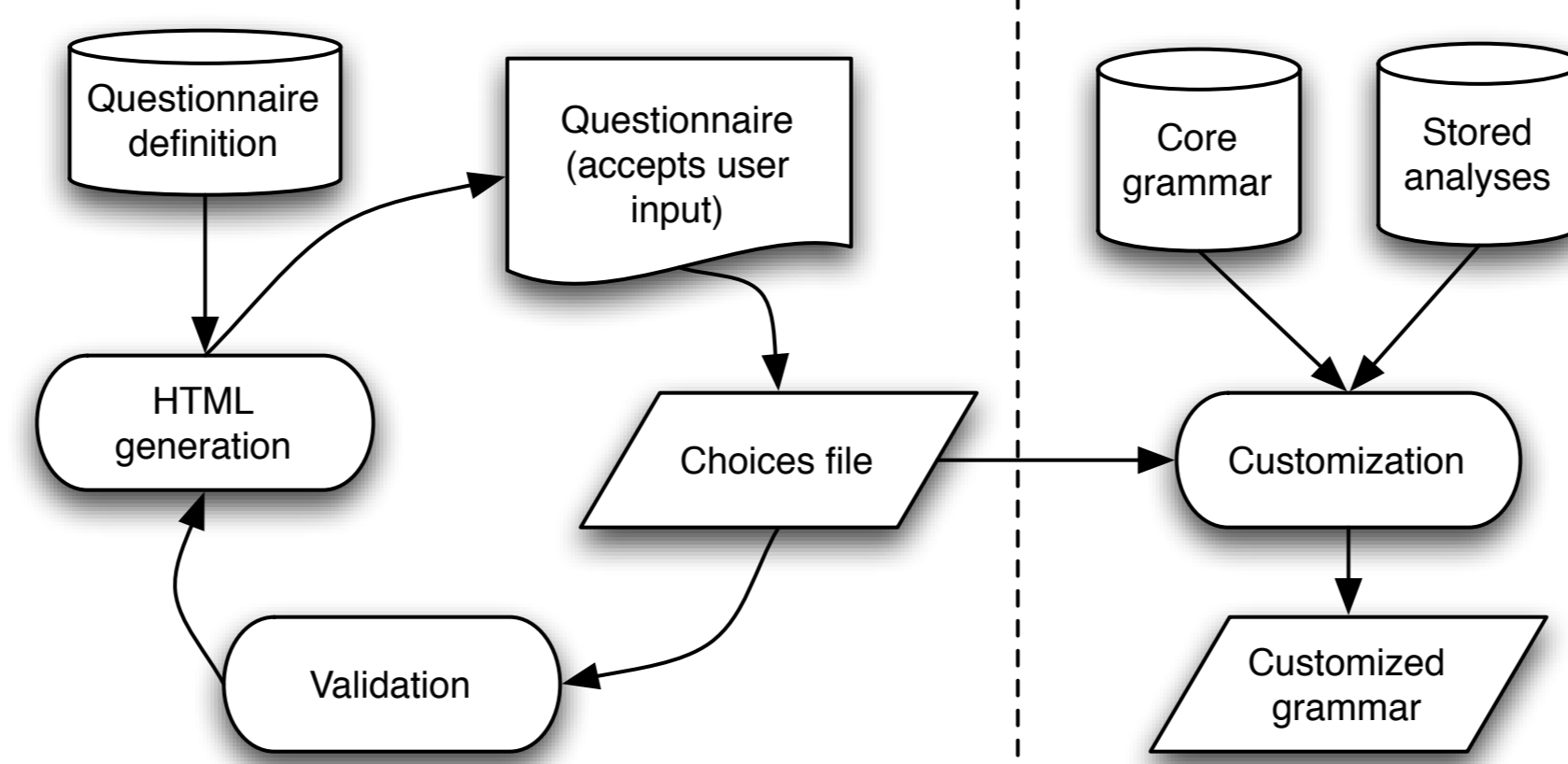
- A starter kit for the creation of implemented HPSG (Pollard and Sag, 1994) grammars, with Minimal Recursion Semantics (Copestake et al., 2005)
- Shared core grammar (Bender et al., 2002)
- Customization system, allowing users to specify both general typological information as well as defining lexical types, lexical rules and lexical entries (Bender et al., 2010)
- The customization system output is a working grammar fragment, mapping surface strings to semantic representations

## 3. Course goals

<http://courses.washington.edu/ling567>

- Hands-on grammar engineering experience
- A new perspective on natural language syntax and the interconnectedness of linguistic phenomena
- Deeper understanding of the syntax/semantics relationship
- Experience working with descriptive materials
- Practice building and debugging an extensible system
- Computational techniques for developing and testing formalizations

## Elicitation of typological information



Grammar customization system (figure from Bender et al. 2010)

## 4. Course assignments (weekly labs)

- W1 Practice with grammar of English
- W2-4 Develop test suite, work with customization system
- W5-8 Extend grammar to handle phenomena not covered by the customization system
- W9 Adapt grammars for MT system
- W10 "Multilingual MT extravaganza"

## 5. Lab write ups

- Description of phenomena
- Glossed examples
- Analyses applied
  - Through customization system
  - Through hand-editing
- Coverage & overgeneration (over test suite)

## 6. Phenomena covered

- Major constituent & NP-internal word order
- Person/number/gender & tense/aspect/mood
- Agreement, Case, Direct-inverse marking
- Non-verbal predicates
- Basic adnominal & adverbial modifiers
- Sentential negation, yes-no questions
- Coordination
- Basic lexical types, clausal complements
- Information status & information structure

## 7. Additional software used

- LKB (Copestake, 2002): grammar development environment
- [incr tsdb()] (Oepen, 2001): competence & performance profiling, regression testing
- emacs: source file editing
- svn: version control

## 8. Generalizable skills

- Test suite development
- Regression testing
- Version control
- Debugging

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## 9. Acknowledgments

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