How *not* to distinguish arguments from adjuncts in LFG

Adam Przepiórkowski

INSTITUTE OF COMPUTER SCIENCE
POLISH ACADEMY OF SCIENCES
ul. Jana Kazimierza 5, 01-248 Warsaw

UNIVERSITY
OF WARSAW

HeadLex16
Warsaw, 27 July 2016

Introduction

Example and terminology (**dependents = arguments + adjuncts**):

- [John] **put** [the book] [on the chair] [on Monday].
- [John] **read** [the book] [on the chair] [on Monday].

Outline:

- **no reliable tests** for the argument–adjunct dichotomy (AAD),
- LFG already **mostly does not distinguish them**,
- **easy to get rid of AAD** altogether.

Introduction

Example and **terminology** (**dependents** = **arguments** + **adjuncts**):

- [John] **put** [the book] [on the chair] [on Monday].
- [John] **read** [the book] [on the chair] [on Monday].

Outline:

- **no reliable tests** for the argument–adjunct dichotomy (AAD),
- LFG already **mostly does not distinguish them**,
- **easy to get rid of AAD** altogether.

Introduction

Example and terminology (**dependents** = **arguments** + **adjuncts**):

- [John] **put** [the book] [on the chair] [on Monday].
- [John] **read** [the book] [on the chair] [on Monday].

Outline:

- **no reliable tests** for the argument–adjunct dichotomy (AAD),
- LFG already **mostly does not distinguish them**,
- **easy to get rid of AAD** altogether.

Introduction

Example and terminology (**dependents = arguments + adjuncts**):

- [John] **put** [the book] [on the chair] [on Monday].
- [John] **read** [the book] [on the chair] [on Monday].

Outline:

- **no reliable tests** for the argument–adjunct dichotomy (AAD),
- LFG already **mostly does not distinguish them**,
- **easy to get rid of AAD** altogether.

Introduction

Example and terminology (**dependents = arguments + adjuncts**):

- [John] **put** [the book] [on the chair] [on Monday].
- [John] **read** [the book] [on the chair] [on Monday].

Outline:

- **no reliable tests** for the argument–adjunct dichotomy (AAD),
- LFG already **mostly does not distinguish them**,
- **easy to get rid of AAD** altogether.

Introduction

Example and terminology (**dependents = arguments + adjuncts**):

- [John] **put** [the book] [on the chair] [on Monday].
- [John] **read** [the book] [on the chair] [on Monday].

Outline:

- **no reliable tests** for the argument–adjunct dichotomy (AAD),
- **LFG** already **mostly does not distinguish them**,
- easy to get rid of AAD altogether.

Introduction

Example and terminology (**dependents = arguments + adjuncts**):

- [John] **put** [the book] [on the chair] [on Monday].
- [John] **read** [the book] [on the chair] [on Monday].

Outline:

- **no reliable tests** for the argument–adjunct dichotomy (AAD),
- **LFG** already **mostly does not distinguish them**,
- **easy to get rid of AAD** altogether.

Intuitions and tests 1

Obligatoriness: arguments are obligatory, adjuncts are optional.

Problem 1: syntactically optional arguments (even in English):

- I lost 20 lbs and nobody has **noticed**. Feeling down about it.
- He will tell you everything when he has **finished**.
- Andrew has already **eaten** and isn't hungry.

In all these cases **direct (passivisable) objects** – that is, clear cases of arguments – **are omitted**.

Attempted solution: it's **semantic obligatoriness**, not syntactic obligatoriness, that counts (Panevová 1974, Fillmore 1969, 1986).

Fewer predicates affected, but still a problem for predicates such as EAT:

- He's already **noticed** (#but I have no idea **what** he's noticed).
- He's already **finished** (#but I have no idea **what** he's finished).
- He's already **eaten** (but I have no idea **what** he's eaten).

Intuitions and tests 1

Obligatoriness: arguments are obligatory, adjuncts are optional.

Problem 1: syntactically optional arguments (even in English):

- I lost 20 lbs and nobody has **noticed**. Feeling down about it.
- He will tell you everything when he has **finished**.
- Andrew has already **eaten** and isn't hungry.

In all these cases **direct (passivisable) objects** – that is, clear cases of arguments – **are omitted**.

Attempted solution: it's **semantic obligatoriness**, not syntactic obligatoriness, that counts (Panevová 1974, Fillmore 1969, 1986).

Fewer predicates affected, but still a problem for predicates such as EAT:

- He's already **noticed** (#but I have no idea **what** he's noticed).
- He's already **finished** (#but I have no idea **what** he's finished).
- He's already **eaten** (but I have no idea **what** he's eaten).

Intuitions and tests 1

Obligatoriness: arguments are obligatory, adjuncts are optional.

Problem 1: syntactically optional arguments (even in English):

- I lost 20 lbs and nobody has **noticed**. Feeling down about it.
- He will tell you everything when he has **finished**.
- Andrew has already **eaten** and isn't hungry.

In all these cases **direct (passivisable) objects** – that is, clear cases of arguments – **are omitted**.

Attempted solution: it's **semantic obligatoriness**, not syntactic obligatoriness, that counts (Panevová 1974, Fillmore 1969, 1986).

Fewer predicates affected, but still a problem for predicates such as EAT:

- He's already **noticed** (#but I have no idea **what** he's noticed).
- He's already **finished** (#but I have no idea **what** he's finished).
- He's already **eaten** (but I have no idea **what** he's eaten).

Intuitions and tests 1

Obligatoriness: arguments are obligatory, adjuncts are optional.

Problem 1: syntactically optional arguments (even in English):

- I lost 20 lbs and nobody has **noticed**. Feeling down about it.
- He will tell you everything when he has **finished**.
- Andrew has already **eaten** and isn't hungry.

In all these cases **direct (passivisable) objects** – that is, clear cases of arguments – **are omitted**.

Attempted solution: it's **semantic obligatoriness**, not syntactic obligatoriness, that counts (Panevová 1974, Fillmore 1969, 1986).

Fewer predicates affected, but still a problem for predicates such as EAT:

- He's already **noticed** (#but I have no idea **what** he's noticed).
- He's already **finished** (#but I have no idea **what** he's finished).
- He's already **eaten** (but I have no idea **what** he's eaten).

Intuitions and tests 1

Obligatoriness: arguments are obligatory, adjuncts are optional.

Problem 1: syntactically optional arguments (even in English):

- I lost 20 lbs and nobody has **noticed**. Feeling down about it.
- He will tell you everything when he has **finished**.
- Andrew has already **eaten** and isn't hungry.

In all these cases **direct (passivisable) objects** – that is, clear cases of arguments – **are omitted**.

Attempted solution: it's **semantic obligatoriness**, not syntactic obligatoriness, that counts (Panevová 1974, Fillmore 1969, 1986).

Fewer predicates affected, but **still a problem** for predicates such as EAT:

- He's already **noticed** (#but I have no idea **what** he's noticed).
- He's already **finished** (#but I have no idea **what** he's finished).
- He's already **eaten** (but I have no idea **what** he's eaten).

Intuitions and tests 1

Obligatoriness: arguments are obligatory, adjuncts are optional.

Problem 1: syntactically optional arguments (even in English):

- I lost 20 lbs and nobody has **noticed**. Feeling down about it.
- He will tell you everything when he has **finished**.
- Andrew has already **eaten** and isn't hungry.

In all these cases **direct (passivisable) objects** – that is, clear cases of arguments – **are omitted**.

Attempted solution: it's **semantic obligatoriness**, not syntactic obligatoriness, that counts (Panevová 1974, Fillmore 1969, 1986).

Fewer predicates affected, but **still a problem** for predicates such as EAT:

- He's already **noticed** (#but I have no idea **what** he's noticed).
- He's already **finished** (#but I have no idea **what** he's finished).
- He's already **eaten** (but I have no idea **what** he's eaten).

Intuitions and tests 2

Obligatoriness: arguments are obligatory, adjuncts are optional.

Problem 2: obligatory adjuncts (Grimshaw and Vikner 1993):

- #The house was **built**.
- The house was **built**...
  - ...yesterday.
  - ...in ten days.
  - ...in a bad part of town.
  - ...only with great difficulty.
  - ...by a French architect.

Also e.g. (Goldberg and Ackerman 2001):

- The claim was **believed** #(in the seventh century / in the South).
- The car **drives** #(like a boat / easily / 365 days a year / only in the summertime).
- Pat laughed a #(hearty / quiet) **laugh**.

Intuitions and tests 2

Obligatoriness: arguments are obligatory, adjuncts are optional.

Problem 2: obligatory adjuncts (Grimshaw and Vikner 1993):

- #The house was **built**.
- The house was **built**...
  - ...yesterday.
  - ...in ten days.
  - ...in a bad part of town.
  - ...only with great difficulty.
  - ...by a French architect.

Also e.g. (Goldberg and Ackerman 2001):

- The claim was **believed** #(in the seventh century / in the South).
- The car **drives** #(like a boat / easily / 365 days a year / only in the summertime).
- Pat laughed a #(hearty / quiet) **laugh**.

Intuitions and tests 2

Obligatoriness: arguments are obligatory, adjuncts are optional.

Problem 2: obligatory adjuncts (Grimshaw and Vikner 1993):

- #The house was **built**.
- The house was **built**...
  - ...yesterday.
  - ...in ten days.
  - ...in a bad part of town.
  - ...only with great difficulty.
  - ...by a French architect.

Also e.g. (Goldberg and Ackerman 2001):

- The claim was **believed** #(in the seventh century / in the South).
- The car **drives** #(like a boat / easily / 365 days a year / only in the summertime).
- Pat laughed a #(hearty / quiet) **laugh**.

Intuitions and tests 2

Obligatoriness: arguments are obligatory, adjuncts are optional.

Problem 2: obligatory adjuncts (Grimshaw and Vikner 1993):

- #The house was **built**.
- The house was **built**...
  - ...yesterday.
  - ...in ten days.
  - ...in a bad part of town.
  - ...only with great difficulty.
  - ...by a French architect.

Also e.g. (Goldberg and Ackerman 2001):

- The claim was **believed** #(in the seventh century / in the South).
- The car **drives** #(like a boat / easily / 365 days a year / only in the summertime).
- Pat laughed a #(hearty / quiet) **laugh**.

Intuitions and tests 2

Obligatoriness: arguments are obligatory, adjuncts are optional.

Problem 2: obligatory adjuncts (Grimshaw and Vikner 1993):

- #The house was **built**.
- The house was **built**...
  - ...yesterday.
  - ...in ten days.
  - ...in a bad part of town.
  - ...only with great difficulty.
  - ...by a French architect.

Also e.g. (Goldberg and Ackerman 2001):

- The claim was **believed** #(in the seventh century / in the South).
- The car **drives** #(like a boat / easily / 365 days a year / only in the summertime).
- Pat laughed a #(hearty / quiet) **laugh**.

Intuitions and tests 2

Obligatoriness: arguments are obligatory, adjuncts are optional.

Problem 2: obligatory adjuncts (Grimshaw and Vikner 1993):

- #The house was **built**.
- The house was **built**...
  - ...yesterday.
  - ...in ten days.
  - ...in a bad part of town.
  - ...only with great difficulty.
  - ...by a French architect.

Also e.g. (Goldberg and Ackerman 2001):

- The claim was **believed** #(in the seventh century / in the South).
- The car **drives** #(like a boat / easily / 365 days a year / only in the summertime).
- Pat laughed a #(hearty / quiet) **laugh**.

Intuitions and tests 2

Obligatoriness: arguments are obligatory, adjuncts are optional.

Problem 2: obligatory adjuncts (Grimshaw and Vikner 1993):

- #The house was **built**.
- The house was **built**...
  - ...yesterday.
  - ...in ten days.
  - ...in a bad part of town.
  - ...only with great difficulty.
  - ...by a French architect.

Also e.g. (Goldberg and Ackerman 2001):

- The claim was **believed** #(in the seventh century / in the South).
- The car **drives** #(like a boat / easily / 365 days a year / only in the summertime).
- Pat laughed a #(hearty / quiet) **laugh**.

Intuitions and tests 2

Obligatoriness: arguments are obligatory, adjuncts are optional.

Problem 2: obligatory adjuncts (Grimshaw and Vikner 1993):

- #The house was **built**.
- The house was **built**...
  - ...yesterday.
  - ...in ten days.
  - ...in a bad part of town.
  - ...only with great difficulty.
  - ...by a French architect.

Also e.g. (Goldberg and Ackerman 2001):

- The claim was **believed** #(in the seventh century / in the South).
- The car **drives** #(like a boat / easily / 365 days a year / only in the summertime).
- Pat laughed a #(hearty / quiet) **laugh**.

Intuitions and tests 2

Obligatoriness: arguments are obligatory, adjuncts are optional.

Problem 2: obligatory adjuncts (Grimshaw and Vikner 1993):

- #The house was **built**.
- The house was **built**...
  - ...yesterday.
  - ...in ten days.
  - ...in a bad part of town.
  - ...only with great difficulty.
  - ...by a French architect.

Also e.g. (Goldberg and Ackerman 2001):

- The claim was **believed** #(in the seventh century / in the South).
- The car **drives** #(like a boat / easily / 365 days a year / only in the summertime).
- Pat laughed a #(hearty / quiet) **laugh**.

Intuitions and tests 2

Obligatoriness: arguments are obligatory, adjuncts are optional.

Problem 2: obligatory adjuncts (Grimshaw and Vikner 1993):

- #The house was **built**.
- The house was **built**...
  - ...yesterday.
  - ...in ten days.
  - ...in a bad part of town.
  - ...only with great difficulty.
  - ...by a French architect.

Also e.g. (Goldberg and Ackerman 2001):

- The claim was **believed** #(in the seventh century / in the South).
- The car **drives** #(like a boat / easily / 365 days a year / only in the summertime).
- Pat laughed a #(hearty / quiet) **laugh**.

Intuitions and tests 2

Obligatoriness: arguments are obligatory, adjuncts are optional.

Problem 2: obligatory adjuncts (Grimshaw and Vikner 1993):

- #The house was **built**.
- The house was **built**...
  - ...yesterday.
  - ...in ten days.
  - ...in a bad part of town.
  - ...only with great difficulty.
  - ...by a French architect.

Also e.g. (Goldberg and Ackerman 2001):

- The claim was **believed** #(in the seventh century / in the South).
- The car **drives** #(like a boat / easily / 365 days a year / only in the summertime).
- Pat laughed a #(hearty / quiet) **laugh**.

Intuitions and tests 3

Iterability: adjuncts – but not arguments – of the same type may iterate (Bresnan 1982b):

- Fred deftly [Manner] handed a toy to the baby by reaching behind his back [Manner] over lunch [Temp] at noon [Temp] in a restaurant [Loc] last Sunday [Temp] in Back Bay [Loc] without interrupting the discussion [Manner].
- *John escaped from prison with dynamite [Inst] with a machine gun [Inst].

Problem: iteration is possible if iterated dependents of the same type specify the same entity, but then **also iteration of arguments** (Zaenen and Crouch 2009, Goldberg 2002):

- I count on you, on your kindness.
- He lives in France, in a small village.
- With a slingshot he broke the window with a rock.

Intuitions and tests 3

Iterability: adjuncts – but not arguments – of the same type may iterate (Bresnan 1982b):

- Fred deftly [Manner] handed a toy to the baby by reaching behind his back [Manner] over lunch [Temp] at noon [Temp] in a restaurant [Loc] last Sunday [Temp] in Back Bay [Loc] without interrupting the discussion [Manner].
- *John escaped from prison with dynamite [Inst] with a machine gun [Inst].

Problem: iteration is possible if iterated dependents of the same type specify the same entity, but then **also iteration of arguments** (Zaenen and Crouch 2009, Goldberg 2002):

- I count on you, on your kindness.
- He lives in France, in a small village.
- With a slingshot he broke the window with a rock.

Intuitions and tests 4

Specificity: adjuncts may occur with all verbs, arguments are specific to certain classes of verbs.

Problem: counterexamples easy to find, e.g. (McConnell-Ginet 1982):

- *Annie weighs 120 pounds {heavily, beautifully, quickly, elegantly}.
- *Annie weighs 120 pounds {for her mother, with a fork, in an hour, toward Detroit}.

Koenig *et al.* 2003:

- manual examination of **3909 English verbs** (by two independent examiners),
- 0.2% (8) of them do not combine with temporal dependents,
- 1.8% (70) do not combine with locative dependents,
- probably many more with manner, instrument, etc. – **where to put the boundary**?

Intuitions and tests 4

Specificity: adjuncts may occur with all verbs, arguments are specific to certain classes of verbs.

Problem: counterexamples easy to find, e.g. (McConnell-Ginet 1982):

- *Annie weighs 120 pounds {heavily, beautifully, quickly, elegantly}.
- *Annie weighs 120 pounds {for her mother, with a fork, in an hour, toward Detroit}.

Koenig *et al.* 2003:

- manual examination of **3909 English verbs** (by two independent examiners),
- 0.2% (8) of them do not combine with temporal dependents,
- 1.8% (70) do not combine with locative dependents,
- probably many more with manner, instrument, etc. – **where to put the boundary?**

Intuitions and tests 4

Specificity: adjuncts may occur with all verbs, arguments are specific to certain classes of verbs.

Problem: counterexamples easy to find, e.g. (McConnell-Ginet 1982):

- *Annie weighs 120 pounds {heavily, beautifully, quickly, elegantly}.
- *Annie weighs 120 pounds {for her mother, with a fork, in an hour, toward Detroit}.

Koenig *et al.* 2003:

- manual examination of **3909 English verbs** (by two independent examiners),
- 0.2% (8) of them do not combine with temporal dependents,
- 1.8% (70) do not combine with locative dependents,
- probably many more with manner, instrument, etc. – **where to put the boundary?**

Intuitions and tests 4

Specificity: adjuncts may occur with all verbs, arguments are specific to certain classes of verbs.

Problem: counterexamples easy to find, e.g. (McConnell-Ginet 1982):

- *Annie weighs 120 pounds {heavily, beautifully, quickly, elegantly}.
- *Annie weighs 120 pounds {for her mother, with a fork, in an hour, toward Detroit}.

Koenig *et al.* 2003:

- manual examination of **3909 English verbs** (by two independent examiners),
- 0.2% (8) of them do not combine with temporal dependents,
- 1.8% (70) do not combine with locative dependents,
- probably many more with manner, instrument, etc. – **where to put the boundary?**

Intuitions and tests 4

Specificity: adjuncts may occur with all verbs, arguments are specific to certain classes of verbs.

Problem: counterexamples easy to find, e.g. (McConnell-Ginet 1982):

- *Annie weighs 120 pounds {heavily, beautifully, quickly, elegantly}.
- *Annie weighs 120 pounds {for her mother, with a fork, in an hour, toward Detroit}.

Koenig *et al.* 2003:

- manual examination of **3909 English verbs** (by two independent examiners),
- 0.2% (8) of them do not combine with temporal dependents,
- 1.8% (70) do not combine with locative dependents,
- probably many more with manner, instrument, etc. – **where to put the boundary?**

Intuitions and tests 4

Specificity: adjuncts may occur with all verbs, arguments are specific to certain classes of verbs.

Problem: counterexamples easy to find, e.g. (McConnell-Ginet 1982):

- *Annie weighs 120 pounds {heavily, beautifully, quickly, elegantly}.
- *Annie weighs 120 pounds {for her mother, with a fork, in an hour, toward Detroit}.

Koenig *et al.* 2003:

- manual examination of **3909 English verbs** (by two independent examiners),
- 0.2% (8) of them do not combine with temporal dependents,
- 1.8% (70) do not combine with locative dependents,
- probably many more with manner, instrument, etc. – **where to put the boundary**?

Intuitions and tests 5

Do so test: verbal proforms such as *do so* must refer to a verb with **all its arguments** (apart from subject) and optionally some adjuncts:

- John ate a banana yesterday, and Geraldine *did so* today.
- John ate a banana yesterday, and Geraldine *did so*, too.
- *John ate a banana, and Geraldine *did so* an apple.

Problem: known cases where the reference of verbal proforms may omit some arguments (Miller 1992, Culicover and Jackendoff 2005):

- Robin broke the window with a hammer and Mary *did the same* to the vase.
- John turned the hot dog down flat, but he wouldn't have *done so* with filet mignon.

Intuitions and tests 5

Do so test: verbal proforms such as *do so* must refer to a verb with **all its arguments** (apart from subject) and optionally some adjuncts:

- John ate a banana yesterday, and Geraldine *did so* today.
- John ate a banana yesterday, and Geraldine *did so*, too.
- *John ate a banana, and Geraldine *did so* an apple.

Problem: known cases where the reference of verbal proforms may omit some arguments (Miller 1992, Culicover and Jackendoff 2005):

- Robin broke the window with a hammer and Mary *did the same* to the vase.
- John turned the hot dog down flat, but he wouldn't have *done so* with filet mignon.

Intuitions and tests 5

Do so test: verbal proforms such as *do so* must refer to a verb with **all its arguments** (apart from subject) and optionally some adjuncts:

- John ate a banana yesterday, and Geraldine *did so* today.
- John ate a banana yesterday, and Geraldine *did so*, too.
- *John ate a banana, and Geraldine *did so* an apple.

Problem: known cases where the reference of verbal proforms may omit some arguments (Miller 1992, Culicover and Jackendoff 2005):

- Robin broke the window with a hammer and Mary *did the same* to the vase.
- John turned the hot dog down flat, but he wouldn't have *done so* with filet mignon.

Intuitions and tests 5

Do so test: verbal proforms such as *do so* must refer to a verb with **all its arguments** (apart from subject) and optionally some adjuncts:

- John ate a banana yesterday, and Geraldine *did so* today.
- John ate a banana yesterday, and Geraldine *did so*, too.
- *John ate a banana, and Geraldine *did so* an apple.

Problem: known cases where the reference of verbal proforms may omit some arguments (Miller 1992, Culicover and Jackendoff 2005):

- Robin broke the window with a hammer and Mary *did the same* to the vase.
- John turned the hot dog down flat, but he wouldn't have *done so* with filet mignon.

Intuitions and tests 5

Do so test: verbal proforms such as *do so* must refer to a verb with **all its arguments** (apart from subject) and optionally some adjuncts:

- John ate a banana yesterday, and Geraldine *did so* today.
- John ate a banana yesterday, and Geraldine *did so*, too.
- *John ate a banana, and Geraldine *did so* an apple.

Problem: known cases where the reference of verbal proforms may omit some arguments (Miller 1992, Culicover and Jackendoff 2005):

- Robin broke the window with a hammer and Mary *did the same* to the vase.
- John turned the hot dog down flat, but he wouldn't have *done so* with filet mignon.

Intuitions and tests 5

Do so test: verbal proforms such as *do so* must refer to a verb with **all its arguments** (apart from subject) and optionally some adjuncts:

- John ate a banana yesterday, and Geraldine *did so* today.
- John ate a banana yesterday, and Geraldine *did so*, too.
- *John ate a banana, and Geraldine *did so* an apple.

Problem: known cases where the reference of verbal proforms may omit some arguments (Miller 1992, Culicover and Jackendoff 2005):

- Robin broke the window with a hammer and Mary *did the same* to the vase.
- John turned the hot dog down flat, but he wouldn't have *done so* with filet mignon.

Intuitions and tests 5

Do so test: verbal proforms such as *do so* must refer to a verb with **all its arguments** (apart from subject) and optionally some adjuncts:

- John ate a banana yesterday, and Geraldine *did so* today.
- John ate a banana yesterday, and Geraldine *did so*, too.
- *John ate a banana, and Geraldine *did so* an apple.

Problem: known cases where the reference of verbal proforms may omit some arguments (Miller 1992, Culicover and Jackendoff 2005):

- Robin broke the window with a hammer and Mary *did the same* to the vase.
- John turned the hot dog down flat, but he wouldn't have *done so* with filet mignon.

Intuitions and tests 5

Do so test: verbal proforms such as *do so* must refer to a verb with **all its arguments** (apart from subject) and optionally some adjuncts:

- John ate a banana yesterday, and Geraldine *did so* today.
- John ate a banana yesterday, and Geraldine *did so*, too.
- *John ate a banana, and Geraldine *did so* an apple.

Problem: known cases where the reference of verbal proforms may omit some arguments (Miller 1992, Culicover and Jackendoff 2005):

- Robin broke the window with a hammer and Mary *did the same* to the vase.
- John turned the hot dog down flat, but he wouldn't have *done so* with filet mignon.

Intuitions and tests 5

Do so test: verbal proforms such as *do so* must refer to a verb with **all its arguments** (apart from subject) and optionally some adjuncts:

- John ate a banana yesterday, and Geraldine *did so* today.
- John ate a banana yesterday, and Geraldine *did so*, too.
- *John ate a banana, and Geraldine *did so* an apple.

Problem: known cases where the reference of verbal proforms may omit some arguments (Miller 1992, Culicover and Jackendoff 2005):

- Robin broke the window with a hammer and Mary *did the same* to the vase.
- John turned the hot dog down flat, but he wouldn't have *done so* with filet mignon.

Intuitions and tests 5

Do so test: verbal proforms such as *do so* must refer to a verb with **all its arguments** (apart from subject) and optionally some adjuncts:

- John ate a banana yesterday, and Geraldine *did so* today.
- John ate a banana yesterday, and Geraldine *did so*, too.
- *John ate a banana, and Geraldine *did so* an apple.

Problem: known cases where the reference of verbal proforms may omit some arguments (Miller 1992, Culicover and Jackendoff 2005):

- Robin broke the window with a hammer and Mary *did the same* to the vase.
- John turned the hot dog down flat, but he wouldn't have *done so* with filet mignon.

Intuitions and tests 5

Do so test: verbal proforms such as *do so* must refer to a verb with **all its arguments** (apart from subject) and optionally some adjuncts:

- John ate a banana yesterday, and Geraldine *did so* today.
- John ate a banana yesterday, and Geraldine *did so*, too.
- *John ate a banana, and Geraldine *did so* an apple.

Problem: known cases where the reference of verbal proforms may omit some arguments (Miller 1992, Culicover and Jackendoff 2005):

- Robin broke the window with a hammer and Mary *did the same* to the vase.
- John turned the hot dog down flat, but he wouldn't have *done so* with filet mignon.

Intuitions and tests 5

Do so test: verbal proforms such as *do so* must refer to a verb with **all its arguments** (apart from subject) and optionally some adjuncts:

- John ate a banana yesterday, and Geraldine *did so* today.
- John ate a banana yesterday, and Geraldine *did so*, too.
- *John ate a banana, and Geraldine *did so* an apple.

Problem: known cases where the reference of verbal proforms may omit some arguments (Miller 1992, Culicover and Jackendoff 2005):

- Robin broke the window with a hammer and Mary *did the same* to the vase.
- John turned the hot dog down flat, but he wouldn't have *done so* with filet mignon.

Intuitions and tests 5

Do so test: verbal proforms such as *do so* must refer to a verb with **all its arguments** (apart from subject) and optionally some adjuncts:

- John ate a banana yesterday, and Geraldine *did so* today.
- John ate a banana yesterday, and Geraldine *did so*, too.
- *John ate a banana, and Geraldine *did so* an apple.

Problem: known cases where the reference of verbal proforms may omit some arguments (Miller 1992, Culicover and Jackendoff 2005):

- Robin broke the window with a hammer and Mary *did the same* to the vase.
- John turned the hot dog down flat, but he wouldn't have *done so* with filet mignon.

Intuitions and tests 5

Do so test: verbal proforms such as *do so* must refer to a verb with **all its arguments** (apart from subject) and optionally some adjuncts:

- John ate a banana yesterday, and Geraldine *did so* today.
- John ate a banana yesterday, and Geraldine *did so*, too.
- *John ate a banana, and Geraldine *did so* an apple.

Problem: known cases where the reference of verbal proforms may omit some arguments (Miller 1992, Culicover and Jackendoff 2005):

- Robin broke the window with a hammer and Mary *did the same* to the vase.
- John turned the hot dog down flat, but he wouldn't have *done so* with filet mignon.

Escape strategies

Tutunjian and Boland 2008: 633: "the sheer number of these tests underlines the fact that **no single test is entirely satisfactory**. Furthermore, when the tests are applied as a group, phrases often yield **contradictory results**, patterning as arguments on some tests and adjuncts on others."

Common reactions:

- the distinction is there, we just **haven't found good tests yet** (after over 50 years of intensive research, at least since Tesnière 1959 and Chomsky 1965),
- it's **an n-way distinction**; commonly, $n = 3$, but $n = 6$ in Somers 1984, etc. (i.e. replace 1 ill-defined distinction with $n - 1$ ill-defined distinctions).

Escape strategies

Tutunjian and Boland 2008: 633: "the sheer number of these tests underlines the fact that **no single test is entirely satisfactory**. Furthermore, when the tests are applied as a group, phrases often yield **contradictory results**, patterning as arguments on some tests and adjuncts on others."

Common reactions:

- the distinction is there, we just **haven't found good tests yet** (after over 50 years of intensive research, at least since Tesnière 1959 and Chomsky 1965),
- it's **an *n*-way distinction**; commonly, $n = 3$, but $n = 6$ in Somers 1984, etc. (i.e. replace 1 ill-defined distinction with $n - 1$ ill-defined distinctions).

Escape strategies

Tutunjian and Boland 2008: 633: "the sheer number of these tests underlines the fact that **no single test is entirely satisfactory**. Furthermore, when the tests are applied as a group, phrases often yield **contradictory results**, patterning as arguments on some tests and adjuncts on others."

Common reactions:

- the distinction is there, we just **haven't found good tests yet** (after over 50 years of intensive research, at least since Tesnière 1959 and Chomsky 1965),
- it's **an n-way distinction**; commonly, $n = 3$, but $n = 6$ in Somers 1984, etc. (i.e. replace 1 ill-defined distinction with $n - 1$ ill-defined distinctions).

Escape strategies

Tutunjian and Boland 2008: 633: "the sheer number of these tests underlines the fact that **no single test is entirely satisfactory**. Furthermore, when the tests are applied as a group, phrases often yield **contradictory results**, patterning as arguments on some tests and adjuncts on others."

Common reactions:

- the distinction is there, we just **haven't found good tests yet** (after over 50 years of intensive research, at least since Tesnière 1959 and Chomsky 1965),
- it's **an n-way distinction**; commonly, $n = 3$, but $n = 6$ in Somers 1984, etc. (i.e. replace 1 ill-defined distinction with $n - 1$ ill-defined distinctions).

Escape strategies

Tutunjian and Boland 2008: 633: "the sheer number of these tests underlines the fact that **no single test is entirely satisfactory**. Furthermore, when the tests are applied as a group, phrases often yield **contradictory results**, patterning as arguments on some tests and adjuncts on others."

Common reactions:

- the distinction is there, we just **haven't found good tests yet** (after over 50 years of intensive research, at least since Tesnière 1959 and Chomsky 1965),
- it's **an n-way distinction**; commonly, $n = 3$, but $n = 6$ in Somers 1984, etc. (i.e. replace 1 ill-defined distinction with $n - 1$ ill-defined distinctions).

AAD in syntactic representations

John waited for the book on the chair on Monday.

No distinction at c-structure (e.g. Kaplan and Bresnan 1982: 217):

$$\text{VP} \longrightarrow \text{V} \quad \underset{(\uparrow \text{OBJ}) = \downarrow}{(\text{NP})} \quad \underset{(\uparrow \text{OBJ}_\theta) = \downarrow}{(\text{NP})} \quad \underset{\substack{\{(\uparrow (\downarrow \text{PCASE}) = \downarrow) \mid \\ \downarrow \in (\uparrow \text{ADJUNCTS})\}}}{\text{PP*}} \quad \ldots$$

Conspicuous distinction at f-structure:

$$\begin{bmatrix} \text{PRED} & \text{`WAIT}\langle \boxed{1}, \boxed{2} \rangle\text{'} \\ \text{SUBJ} & \boxed{1}\begin{bmatrix} \text{PRED} & \text{`JOHN'} \end{bmatrix} \\ \text{OBL} & \boxed{2}\begin{bmatrix} \text{PRED} & \text{`BOOK'} \end{bmatrix} \\ \text{ADJ} & \left\{ \begin{bmatrix} \text{PRED} & \text{`ON}\langle \boxed{3} \rangle\text{'} \\ \text{OBJ} & \boxed{3}\begin{bmatrix} \text{PRED} & \text{`CHAIR'} \end{bmatrix} \end{bmatrix}, \begin{bmatrix} \text{PRED} & \text{`ON}\langle \boxed{4} \rangle\text{'} \\ \text{OBJ} & \boxed{4}\begin{bmatrix} \text{PRED} & \text{`MONDAY'} \end{bmatrix} \end{bmatrix} \right\} \end{bmatrix}$$

AAD in syntactic representations

John waited for the book on the chair on Monday.

No distinction at c-structure (e.g. Kaplan and Bresnan 1982: 217):

$$\text{VP} \longrightarrow \text{V} \quad \underset{(\uparrow \text{OBJ}) = \downarrow}{(\text{NP})} \quad \underset{(\uparrow \text{OBJ}_\theta) = \downarrow}{(\text{NP})} \quad \underset{\{(\uparrow (\downarrow \text{PCASE}) = \downarrow) \mid \downarrow \in (\uparrow \text{ADJUNCTS})\}}{\text{PP*}} \quad \ldots$$

Conspicuous distinction at f-structure:

$$\begin{bmatrix} \text{PRED} & \text{'WAIT}\langle \boxed{1}, \boxed{2} \rangle\text{'} \\ \text{SUBJ} & \boxed{1}\begin{bmatrix} \text{PRED} & \text{'JOHN'} \end{bmatrix} \\ \text{OBL} & \boxed{2}\begin{bmatrix} \text{PRED} & \text{'BOOK'} \end{bmatrix} \\ \text{ADJ} & \left\{ \begin{bmatrix} \text{PRED} & \text{'ON}\langle \boxed{3} \rangle\text{'} \\ \text{OBJ} & \boxed{3}\begin{bmatrix} \text{PRED} & \text{'CHAIR'} \end{bmatrix} \end{bmatrix}, \begin{bmatrix} \text{PRED} & \text{'ON}\langle \boxed{4} \rangle\text{'} \\ \text{OBJ} & \boxed{4}\begin{bmatrix} \text{PRED} & \text{'MONDAY'} \end{bmatrix} \end{bmatrix} \right\} \end{bmatrix}$$

AAD in syntactic representations

John waited for the book on the chair on Monday.

No distinction at c-structure (e.g. Kaplan and Bresnan 1982: 217):

$$\text{VP} \longrightarrow \text{V} \quad \underset{(\uparrow \text{OBJ}) = \downarrow}{(\text{NP})} \quad \underset{(\uparrow \text{OBJ}_\theta) = \downarrow}{(\text{NP})} \quad \underset{\{(\uparrow (\downarrow \text{PCASE}) = \downarrow) \mid \downarrow \in (\uparrow \text{ADJUNCTS})\}}{\text{PP*}} \quad \ldots$$

Conspicuous distinction at f-structure:

$$\begin{bmatrix} \text{PRED} & \text{`WAIT}\langle \boxed{1}, \boxed{2} \rangle\text{'} \\ \text{SUBJ} & \boxed{1}\begin{bmatrix} \text{PRED} & \text{`JOHN'} \end{bmatrix} \\ \text{OBL} & \boxed{2}\begin{bmatrix} \text{PRED} & \text{`BOOK'} \end{bmatrix} \\ \text{ADJ} & \left\{ \begin{bmatrix} \text{PRED} & \text{`ON}\langle \boxed{3} \rangle\text{'} \\ \text{OBJ} & \boxed{3}\begin{bmatrix} \text{PRED} & \text{`CHAIR'} \end{bmatrix} \end{bmatrix}, \begin{bmatrix} \text{PRED} & \text{`ON}\langle \boxed{4} \rangle\text{'} \\ \text{OBJ} & \boxed{4}\begin{bmatrix} \text{PRED} & \text{`MONDAY'} \end{bmatrix} \end{bmatrix} \right\} \end{bmatrix}$$

AAD in syntactic representations

John waited for the book on the chair on Monday.

No distinction at c-structure (e.g. Kaplan and Bresnan 1982: 217):

$$\begin{array}{lllll} \text{VP} \longrightarrow & \text{V} & \begin{array}{c}(\\ (\uparrow \text{OBJ}) = \downarrow\end{array} \begin{array}{c}\text{NP}\\ \end{array} \begin{array}{c})\\ \end{array} & \begin{array}{c}(\\ (\uparrow \text{OBJ}_\theta) = \downarrow\end{array} \begin{array}{c}\text{NP}\\ \end{array} \begin{array}{c})\\ \end{array} & \begin{array}{c}\text{PP*}\\ \{(\uparrow (\downarrow \text{PCASE}) = \downarrow) \mid \\ \downarrow \in (\uparrow \text{ADJUNCTS})\}\end{array} \quad \ldots \end{array}$$

Conspicuous distinction at f-structure:

$$\begin{bmatrix} \text{PRED} & \text{`WAIT}\langle \boxed{1}, \boxed{2} \rangle\text{'} \\ \text{SUBJ} & \boxed{1} \begin{bmatrix} \text{PRED} & \text{`JOHN'} \end{bmatrix} \\ \text{OBL} & \boxed{2} \begin{bmatrix} \text{PRED} & \text{`BOOK'} \end{bmatrix} \\ \text{ADJ} & \left\{ \begin{bmatrix} \text{PRED} & \text{`ON}\langle \boxed{3} \rangle\text{'} \\ \text{OBJ} & \boxed{3} \begin{bmatrix} \text{PRED} & \text{`CHAIR'} \end{bmatrix} \end{bmatrix}, \begin{bmatrix} \text{PRED} & \text{`ON}\langle \boxed{4} \rangle\text{'} \\ \text{OBJ} & \boxed{4} \begin{bmatrix} \text{PRED} & \text{`MONDAY'} \end{bmatrix} \end{bmatrix} \right\} \end{bmatrix}$$

AAD in syntactic representations

John waited for the book on the chair on Monday.

No distinction at c-structure (e.g. Kaplan and Bresnan 1982: 217):

$$\text{VP} \longrightarrow \text{V} \quad \underset{(\uparrow \text{OBJ}) = \downarrow}{(\text{NP})} \quad \underset{(\uparrow \text{OBJ}_\theta) = \downarrow}{(\text{NP})} \quad \underset{\{(\uparrow (\downarrow \text{PCASE}) = \downarrow) \mid \downarrow \in (\uparrow \text{ADJUNCTS})\}}{\text{PP*}} \quad \ldots$$

Conspicuous distinction at f-structure:

$$\begin{bmatrix} \text{PRED} & \text{`WAIT}\langle \boxed{1}, \boxed{2} \rangle\text{'} \\ \text{SUBJ} & \boxed{1}\begin{bmatrix} \text{PRED} & \text{`JOHN'} \end{bmatrix} \\ \text{OBL} & \boxed{2}\begin{bmatrix} \text{PRED} & \text{`BOOK'} \end{bmatrix} \\ \text{ADJ} & \left\{ \begin{bmatrix} \text{PRED} & \text{`ON}\langle \boxed{3} \rangle\text{'} \\ \text{OBJ} & \boxed{3}\begin{bmatrix} \text{PRED} & \text{`CHAIR'} \end{bmatrix} \end{bmatrix}, \begin{bmatrix} \text{PRED} & \text{`ON}\langle \boxed{4} \rangle\text{'} \\ \text{OBJ} & \boxed{4}\begin{bmatrix} \text{PRED} & \text{`MONDAY'} \end{bmatrix} \end{bmatrix} \right\} \end{bmatrix}$$

AAD in semantic representations 1

No distinction at s-structure.

In some **recent LFG work** (e.g. Asudeh *et al.* 2014):

- s-level attributes $\textsc{arg}_1$, ..., $\textsc{arg}_4$ represent **a subset of arguments** (those in the scope of the Lexical Mapping Theory),
- **other arguments – as well as adjuncts** – have dedicated s-level attributes BENEFICIARY, INSTRUMENT, etc.

AAD in semantic representations 1

No distinction **at s-structure**.

In some **recent LFG work** (e.g. Asudeh *et al.* 2014):

- s-level attributes $\textsc{arg}_1$, ..., $\textsc{arg}_4$ represent **a subset of arguments** (those in the scope of the Lexical Mapping Theory),
- **other arguments – as well as adjuncts** – have dedicated s-level attributes BENEFICIARY, INSTRUMENT, etc.

AAD in semantic representations 1

No distinction **at s-structure**.

In some **recent LFG work** (e.g. Asudeh *et al.* 2014):

- s-level attributes $\textsc{arg}_1$, ..., $\textsc{arg}_4$ represent **a subset of arguments** (those in the scope of the Lexical Mapping Theory),
- **other arguments – as well as adjuncts** – have dedicated s-level attributes BENEFICIARY, INSTRUMENT, etc.

AAD in semantic representations 1

No distinction at s-structure.

In some **recent LFG work** (e.g. Asudeh *et al.* 2014):

- s-level attributes $\textsc{arg}_1, \ldots, \textsc{arg}_4$ represent **a subset of arguments** (those in the scope of the Lexical Mapping Theory),
- **other arguments – as well as adjuncts** – have dedicated s-level attributes BENEFICIARY, INSTRUMENT, etc.

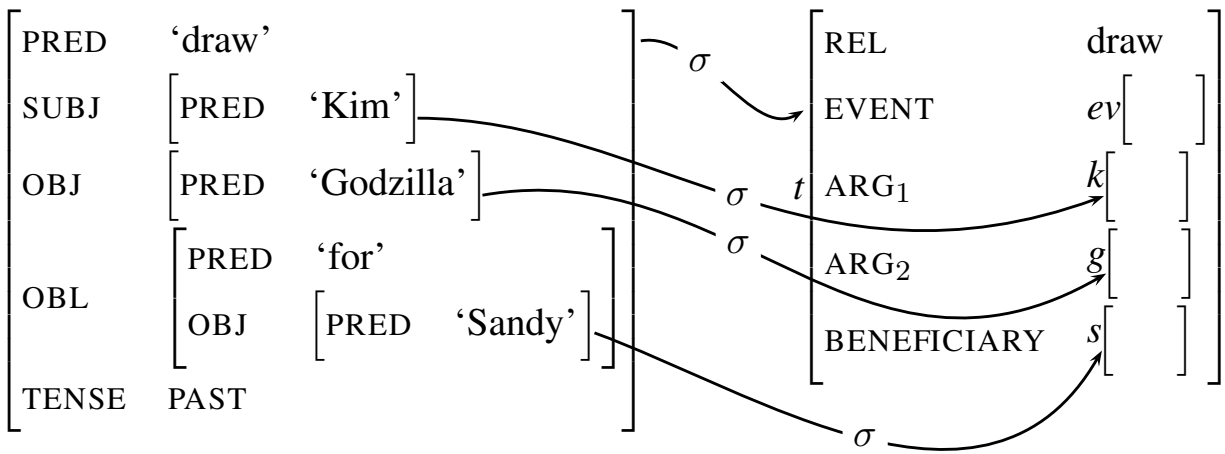

Figure 5: Relevant structures and correspondences for *Kim drew Godzilla for Sandy.*

AAD in semantic representations 2

No distinction in final semantic representations, as they commonly use the neo-Davidsonian approach (Davidson 1967, Parsons 1990).

For **example** (Maienborn and Schäfer 2011:1400):

- Peter opened the box with a knife in the garage.
- $\exists e.[open(e) \wedge agent(e, peter) \wedge patient(e, the\ box) \wedge location(e, the\ garage) \wedge instr(e, a\ knife)]$

No distinction:

- Peter sleeps in the garage.
- $\exists e.[sleep(e) \wedge agent(e, peter) \wedge location(e, the\ garage)]$
- Peter resides in the garage.
- $\exists e.[reside(e) \wedge agent(e, peter) \wedge location(e, the\ garage)]$

AAD in semantic representations 2

No distinction in final semantic representations, as they commonly use the neo-Davidsonian approach (Davidson 1967, Parsons 1990).

For **example** (Maienborn and Schäfer 2011:1400):

- Peter opened the box with a knife in the garage.
- $\exists e.[open(e) \wedge agent(e, peter) \wedge patient(e, the\ box) \wedge location(e, the\ garage) \wedge instr(e, a\ knife)]$

No distinction:

- Peter sleeps in the garage.
- $\exists e.[sleep(e) \wedge agent(e, peter) \wedge location(e, the\ garage)]$
- Peter resides in the garage.
- $\exists e.[reside(e) \wedge agent(e, peter) \wedge location(e, the\ garage)]$

AAD in semantic representations 2

No distinction in final semantic representations, as they commonly use the neo-Davidsonian approach (Davidson 1967, Parsons 1990).

For **example** (Maienborn and Schäfer 2011:1400):

- Peter opened the box with a knife in the garage.
- $\exists e.[open(e) \wedge agent(e, peter) \wedge patient(e, the\ box) \wedge location(e, the\ garage) \wedge instr(e, a\ knife)]$

No distinction:

- Peter sleeps in the garage.
- $\exists e.[sleep(e) \wedge agent(e, peter) \wedge location(e, the\ garage)]$
- Peter resides in the garage.
- $\exists e.[reside(e) \wedge agent(e, peter) \wedge location(e, the\ garage)]$

AAD in semantic representations 2

No distinction in final semantic representations, as they commonly use the neo-Davidsonian approach (Davidson 1967, Parsons 1990).

For **example** (Maienborn and Schäfer 2011:1400):

- Peter opened the box with a knife in the garage.
- $\exists e.[open(e) \wedge agent(e, peter) \wedge patient(e, the\ box) \wedge location(e, the\ garage) \wedge instr(e, a\ knife)]$

No distinction:

- Peter sleeps in the garage.
- $\exists e.[sleep(e) \wedge agent(e, peter) \wedge location(e, the\ garage)]$
- Peter resides in the garage.
- $\exists e.[reside(e) \wedge agent(e, peter) \wedge location(e, the\ garage)]$

AAD in semantic representations 2

No distinction in final semantic representations, as they commonly use the neo-Davidsonian approach (Davidson 1967, Parsons 1990).

For **example** (Maienborn and Schäfer 2011:1400):

- Peter opened the box with a knife in the garage.
- $\exists e.[open(e) \wedge agent(e, peter) \wedge patient(e, the\ box) \wedge location(e, the\ garage) \wedge instr(e, a\ knife)]$

No distinction:

- Peter sleeps in the garage.
- $\exists e.[sleep(e) \wedge agent(e, peter) \wedge location(e, the\ garage)]$
- Peter resides in the garage.
- $\exists e.[reside(e) \wedge agent(e, peter) \wedge location(e, the\ garage)]$

AAD in the grammar 1

John waited for the book on the chair on Monday.

Traditionally in LFG:

- **arguments** specified:
  - always in lexical entries (of items governing them),
  - also in grammatical rules,
- **adjuncts** only specified in grammatical rules.

For **example**:

WAIT V $(\uparrow \text{PRED}) = \text{`WAIT}\langle\text{SUBJ, OBL}\rangle\text{'}$

$$\text{S} \longrightarrow \underset{(\uparrow \text{SUBJ}) = \downarrow}{\text{NP}} \quad \text{VP}$$

$$\text{VP} \longrightarrow \text{V} \quad \underset{(\uparrow \text{OBJ}) = \downarrow}{(\text{NP})} \quad \underset{(\uparrow \text{OBJ}_\theta) = \downarrow}{(\text{NP})} \quad \underset{\{(\uparrow (\downarrow \text{PCASE}) = \downarrow) \mid \downarrow \in (\uparrow \text{ADJUNCTS})\}}{\text{PP*}} \quad \ldots$$

AAD in the grammar 1

John waited for the book on the chair on Monday.

Traditionally in LFG:

- **arguments** specified:
  - always in lexical entries (of items governing them),
  - also in grammatical rules,
- **adjuncts** only specified in grammatical rules.

For **example**:

WAIT V $(\uparrow \text{PRED}) = \text{'WAIT}\langle \text{SUBJ, OBL} \rangle\text{'}$

$$\text{S} \longrightarrow \underset{(\uparrow \text{SUBJ}) = \downarrow}{\text{NP}} \quad \text{VP}$$

$$\text{VP} \longrightarrow \text{V} \quad \underset{(\uparrow \text{OBJ}) = \downarrow}{(\text{NP})} \quad \underset{(\uparrow \text{OBJ}_\theta) = \downarrow}{(\text{NP})} \quad \underset{\{(\uparrow (\downarrow \text{PCASE}) = \downarrow) \mid \downarrow \in (\uparrow \text{ADJUNCTS})\}}{\text{PP*}} \quad \ldots$$

AAD in the grammar 1

John waited for the book on the chair on Monday.

Traditionally in LFG:

- **arguments** specified:
  - always in lexical entries (of items governing them),
  - also in grammatical rules,
- **adjuncts** only specified in grammatical rules.

For **example**:

WAIT V $(\uparrow \text{PRED}) = \text{'WAIT}\langle \text{SUBJ, OBL} \rangle\text{'}$

$$\underset{\text{S}}{} \longrightarrow \underset{(\uparrow \text{SUBJ}) = \downarrow}{\text{NP}} \quad \underset{}{\text{VP}}$$

$$\underset{\text{VP}}{} \longrightarrow \underset{}{\text{V}} \quad \underset{(\uparrow \text{OBJ}) = \downarrow}{(\text{NP})} \quad \underset{(\uparrow \text{OBJ}_\theta) = \downarrow}{(\text{NP})} \quad \underset{\{(\uparrow (\downarrow \text{PCASE}) = \downarrow) \mid \downarrow \in (\uparrow \text{ADJUNCTS})\}}{\text{PP*}} \quad \ldots$$

AAD in the grammar 1

John waited for the book on the chair on Monday.

Traditionally in LFG:

- **arguments** specified:
  - always in lexical entries (of items governing them),
  - also in grammatical rules,
- **adjuncts** only specified in grammatical rules.

For **example**:

WAIT V $(\uparrow \text{PRED}) = \text{'WAIT}\langle\text{SUBJ, OBL}\rangle\text{'}$

$$\text{S} \longrightarrow \underset{(\uparrow \text{SUBJ}) = \downarrow}{\text{NP}} \quad \text{VP}$$

$$\text{VP} \longrightarrow \text{V} \quad \underset{(\uparrow \text{OBJ}) = \downarrow}{(\text{NP})} \quad \underset{(\uparrow \text{OBJ}_\theta) = \downarrow}{(\text{NP})} \quad \underset{\{(\uparrow (\downarrow \text{PCASE}) = \downarrow) \mid \downarrow \in (\uparrow \text{ADJUNCTS})\}}{\text{PP*}} \quad \ldots$$

AAD in the grammar 2

Sarah elbowed her way through the crowd.

Recent LFG work (e.g. Asudeh *et al.* 2008, 2013) – **arguments** are added via general templates, e.g.:

- TRANSITIVE-OBLIQUE(PFN) := (↑ PRED) = 'PFN⟨(↑ SUBJ), (↑ OBJ), (↑ OBL)⟩'
- ENGLISH-WAY(PFN) := @TRANSITIVE-OBLIQUE(PFN) ...
- SWEDISH-DMC(PFN) := @TRANSITIVE-OBLIQUE(PFN) ...

English:

WAY N (↑ PRED) = 'WAY'
@ENGLISH-WAY((OBJ ↑)PRED FN)
...

Swedish:

V′ ⟶ (V⁰) NP PP
(↑ OBJ) =↓ (↑ OBL) =↓
@SWEDISH-DMC(↑ PRED FN)
...

AAD in the grammar 2

Sarah elbowed her way through the crowd.

Recent LFG work (e.g. Asudeh *et al.* 2008, 2013) – **arguments** are added via general templates, e.g.:

- TRANSITIVE-OBLIQUE(PFN) := (↑ PRED) = 'PFN⟨(↑ SUBJ), (↑ OBJ), (↑ OBL)⟩'
- ENGLISH-WAY(PFN) := @TRANSITIVE-OBLIQUE(PFN) ...
- SWEDISH-DMC(PFN) := @TRANSITIVE-OBLIQUE(PFN) ...

English:

WAY N (↑ PRED) = 'WAY'
@ENGLISH-WAY((OBJ ↑)PRED FN)
...

Swedish:

V′ ⟶ (V⁰) NP PP
(↑ OBJ) =↓ (↑ OBL) =↓
@SWEDISH-DMC(↑ PRED FN)
...

AAD in the grammar 2

Sarah elbowed her way through the crowd.

Recent LFG work (e.g. Asudeh *et al.* 2008, 2013) – **arguments** are added via general templates, e.g.:

- TRANSITIVE-OBLIQUE(PFN) := (↑ PRED) = 'PFN⟨(↑ SUBJ), (↑ OBJ), (↑ OBL)⟩'
- ENGLISH-WAY(PFN) := @TRANSITIVE-OBLIQUE(PFN) ...
- SWEDISH-DMC(PFN) := @TRANSITIVE-OBLIQUE(PFN) ...

English:

WAY N (↑ PRED) = 'WAY'
@ENGLISH-WAY((OBJ ↑)PRED FN)
...

Swedish:

$V' \longrightarrow (V^0)$ NP PP
(↑ OBJ) =↓ (↑ OBL) =↓
@SWEDISH-DMC(↑ PRED FN)
...

AAD in the grammar 2

Sarah elbowed her way through the crowd.

Recent LFG work (e.g. Asudeh *et al.* 2008, 2013) – **arguments** are added via general templates, e.g.:

- TRANSITIVE-OBLIQUE(PFN) := (↑ PRED) = 'PFN⟨(↑ SUBJ), (↑ OBJ), (↑ OBL)⟩'
- ENGLISH-WAY(PFN) := @TRANSITIVE-OBLIQUE(PFN) ...
- SWEDISH-DMC(PFN) := @TRANSITIVE-OBLIQUE(PFN) ...

English:

WAY N (↑ PRED) = 'WAY'
@ENGLISH-WAY((OBJ ↑)PRED FN)
...

Swedish:

$V' \longrightarrow (V^0)$ NP PP
(↑ OBJ) =↓ (↑ OBL) =↓
@SWEDISH-DMC(↑ PRED FN)
...

AAD in the grammar 3

Even **more recent LFG work** (e.g. Asudeh and Giorgolo 2012, Findlay 2014, Asudeh *et al.* 2014):

- Glue makes **PRED largely superfluous** (Dalrymple *et al.* 1993),
- **PRED** is retained only to indicate the **main predicate function**.

The only trace of AAD **in contemporary LFG** is in the **f-structure feature geometry**: ADJ vs. other grammatical functions.

$$\begin{bmatrix} \text{PRED} & \text{'WAIT'} \\ \text{SUBJ} & \begin{bmatrix} \text{PRED} & \text{'JOHN'} \end{bmatrix} \\ \text{OBL} & \begin{bmatrix} \text{PRED} & \text{'BOOK'} \end{bmatrix} \\ \text{ADJ} & \left\{ \begin{bmatrix} \text{PRED} & \text{'ON'} \\ \text{OBJ} & \begin{bmatrix} \text{PRED} & \text{'CHAIR'} \end{bmatrix} \end{bmatrix}, \begin{bmatrix} \text{PRED} & \text{'ON'} \\ \text{OBJ} & \begin{bmatrix} \text{PRED} & \text{'MONDAY'} \end{bmatrix} \end{bmatrix} \right\} \end{bmatrix}$$

AAD in the grammar 3

Even **more recent LFG work** (e.g. Asudeh and Giorgolo 2012, Findlay 2014, Asudeh *et al.* 2014):

- Glue makes **PRED largely superfluous** (Dalrymple *et al.* 1993),
- PRED is retained only to indicate the **main predicate function**.

The only trace of AAD **in contemporary LFG** is in the **f-structure feature geometry**: ADJ vs. other grammatical functions.

$$\begin{bmatrix} \text{PRED} & \text{'WAIT'} \\ \text{SUBJ} & \begin{bmatrix} \text{PRED} & \text{'JOHN'} \end{bmatrix} \\ \text{OBL} & \begin{bmatrix} \text{PRED} & \text{'BOOK'} \end{bmatrix} \\ \text{ADJ} & \left\{ \begin{bmatrix} \text{PRED} & \text{'ON'} \\ \text{OBJ} & \begin{bmatrix} \text{PRED} & \text{'CHAIR'} \end{bmatrix} \end{bmatrix}, \begin{bmatrix} \text{PRED} & \text{'ON'} \\ \text{OBJ} & \begin{bmatrix} \text{PRED} & \text{'MONDAY'} \end{bmatrix} \end{bmatrix} \right\} \end{bmatrix}$$

AAD in the grammar 3

Even **more recent LFG work** (e.g. Asudeh and Giorgolo 2012, Findlay 2014, Asudeh *et al.* 2014):

- Glue makes **PRED largely superfluous** (Dalrymple *et al.* 1993),
- **PRED** is retained only to indicate the **main predicate function**.

The only trace of AAD **in contemporary LFG** is in the **f-structure feature geometry**: ADJ vs. other grammatical functions.

$$\begin{bmatrix} \text{PRED} & \text{'WAIT'} \\ \text{SUBJ} & \begin{bmatrix} \text{PRED} & \text{'JOHN'} \end{bmatrix} \\ \text{OBL} & \begin{bmatrix} \text{PRED} & \text{'BOOK'} \end{bmatrix} \\ \text{ADJ} & \left\{ \begin{bmatrix} \text{PRED} & \text{'ON'} \\ \text{OBJ} & \begin{bmatrix} \text{PRED} & \text{'CHAIR'} \end{bmatrix} \end{bmatrix}, \begin{bmatrix} \text{PRED} & \text{'ON'} \\ \text{OBJ} & \begin{bmatrix} \text{PRED} & \text{'MONDAY'} \end{bmatrix} \end{bmatrix} \right\} \end{bmatrix}$$

AAD in the grammar 3

Even **more recent LFG work** (e.g. Asudeh and Giorgolo 2012, Findlay 2014, Asudeh *et al.* 2014):

- Glue makes **PRED largely superfluous** (Dalrymple *et al.* 1993),
- **PRED** is retained only to indicate the **main predicate function**.

The only trace of AAD **in contemporary LFG** is in the **f-structure feature geometry**: ADJ vs. other grammatical functions.

$$\begin{bmatrix} \text{PRED} & \text{'WAIT'} \\ \text{SUBJ} & \begin{bmatrix} \text{PRED} & \text{'JOHN'} \end{bmatrix} \\ \text{OBL} & \begin{bmatrix} \text{PRED} & \text{'BOOK'} \end{bmatrix} \\ \text{ADJ} & \left\{ \begin{bmatrix} \text{PRED} & \text{'ON'} \\ \text{OBJ} & \begin{bmatrix} \text{PRED} & \text{'CHAIR'} \end{bmatrix} \end{bmatrix}, \begin{bmatrix} \text{PRED} & \text{'ON'} \\ \text{OBJ} & \begin{bmatrix} \text{PRED} & \text{'MONDAY'} \end{bmatrix} \end{bmatrix} \right\} \end{bmatrix}$$

AAD in the grammar 3

Even **more recent LFG work** (e.g. Asudeh and Giorgolo 2012, Findlay 2014, Asudeh *et al.* 2014):

- Glue makes **PRED largely superfluous** (Dalrymple *et al.* 1993),
- **PRED** is retained only to indicate the **main predicate function**.

The only trace of AAD **in contemporary LFG** is in the **f-structure feature geometry**: ADJ vs. other grammatical functions.

$$\begin{bmatrix} \text{PRED} & \text{'WAIT'} \\ \text{SUBJ} & \begin{bmatrix} \text{PRED} & \text{'JOHN'} \end{bmatrix} \\ \text{OBL} & \begin{bmatrix} \text{PRED} & \text{'BOOK'} \end{bmatrix} \\ \text{ADJ} & \left\{ \begin{bmatrix} \text{PRED} & \text{'ON'} \\ \text{OBJ} & \begin{bmatrix} \text{PRED} & \text{'CHAIR'} \end{bmatrix} \end{bmatrix}, \begin{bmatrix} \text{PRED} & \text{'ON'} \\ \text{OBJ} & \begin{bmatrix} \text{PRED} & \text{'MONDAY'} \end{bmatrix} \end{bmatrix} \right\} \end{bmatrix}$$

Outline of the proposal

Outline:

- **instead** of SUBJ, OBL, COMP, etc., **vs.** ADJ,
- **a single list**-valued DEPS (dependents),
- extending HPSG's DEPS (Bouma *et al.* 2001) to **all dependents of the predicate**,
- at least those **relating to the event** introduced by the predicate (as opposed e.g. to speaker-oriented *honestly*, *maybe*, etc.).

Something like DEPS **needed** in LFG **anyway**:

- encodes the **functional hierarchy** (not the same as *thematic hierarchy*),
- which is referred to **in analyses of** (Dalrymple 2001, Bresnan *et al.* 2015):
  - **control**,
  - pronominal and anaphoric **binding**,
  - ***wh*-movement**, etc.

Outline of the proposal

Outline:

- **instead** of SUBJ, OBL, COMP, etc., **vs.** ADJ,
- **a single list**-valued DEPS (dependents),
- extending HPSG's DEPS (Bouma *et al.* 2001) to **all dependents of the predicate**,
- at least those **relating to the event** introduced by the predicate (as opposed e.g. to speaker-oriented *honestly*, *maybe*, etc.).

Something like DEPS **needed** in LFG **anyway**:

- encodes the **functional hierarchy** (not the same as *thematic hierarchy*),
- which is referred to **in analyses of** (Dalrymple 2001, Bresnan *et al.* 2015):
  - **control**,
  - pronominal and anaphoric **binding**,
  - ***wh*-movement**, etc.

Outline of the proposal

Outline:

- **instead** of SUBJ, OBL, COMP, etc., **vs.** ADJ,
- **a single list**-valued DEPS (dependents),
- extending HPSG's DEPS (Bouma *et al.* 2001) to **all dependents of the predicate**,
- at least those **relating to the event** introduced by the predicate (as opposed e.g. to speaker-oriented *honestly*, *maybe*, etc.).

Something like DEPS **needed** in LFG **anyway**:

- encodes the **functional hierarchy** (not the same as *thematic hierarchy*),
- which is referred to **in analyses of** (Dalrymple 2001, Bresnan *et al.* 2015):
  - **control**,
  - pronominal and anaphoric **binding**,
  - ***wh*-movement**, etc.

Outline of the proposal

Outline:

- **instead** of SUBJ, OBL, COMP, etc., **vs.** ADJ,
- **a single list**-valued DEPS (dependents),
- extending HPSG's DEPS (Bouma *et al.* 2001) to **all dependents of the predicate**,
- at least those **relating to the event** introduced by the predicate (as opposed e.g. to speaker-oriented *honestly*, *maybe*, etc.).

Something like DEPS **needed** in LFG **anyway**:

- encodes the **functional hierarchy** (not the same as *thematic hierarchy*),
- which is referred to **in analyses of** (Dalrymple 2001, Bresnan *et al.* 2015):
  - **control**,
  - pronominal and anaphoric **binding**,
  - ***wh*-movement**, etc.

Outline of the proposal

Outline:

- **instead** of SUBJ, OBL, COMP, etc., **vs.** ADJ,
- **a single list**-valued DEPS (dependents),
- extending HPSG's DEPS (Bouma *et al.* 2001) to **all dependents of the predicate**,
- at least those **relating to the event** introduced by the predicate (as opposed e.g. to speaker-oriented *honestly*, *maybe*, etc.).

Something like DEPS **needed** in LFG **anyway**:

- encodes the **functional hierarchy** (not the same as *thematic hierarchy*),
- which is referred to **in analyses of** (Dalrymple 2001, Bresnan *et al.* 2015):
  - **control**,
  - pronominal and anaphoric **binding**,
  - ***wh*-movement**, etc.

Outline of the proposal

Outline:

- **instead** of SUBJ, OBL, COMP, etc., **vs.** ADJ,
- **a single list**-valued DEPS (dependents),
- extending HPSG's DEPS (Bouma *et al.* 2001) to **all dependents of the predicate**,
- at least those **relating to the event** introduced by the predicate (as opposed e.g. to speaker-oriented *honestly*, *maybe*, etc.).

Something like DEPS **needed** in LFG **anyway**:

- encodes the **functional hierarchy** (not the same as *thematic hierarchy*),
- which is referred to **in analyses of** (Dalrymple 2001, Bresnan *et al.* 2015):
  - **control**,
  - pronominal and anaphoric **binding**,
  - ***wh*-movement**, etc.

Outline of the proposal

Outline:

- **instead** of SUBJ, OBL, COMP, etc., **vs.** ADJ,
- **a single list**-valued DEPS (dependents),
- extending HPSG's DEPS (Bouma *et al.* 2001) to **all dependents of the predicate**,
- at least those **relating to the event** introduced by the predicate (as opposed e.g. to speaker-oriented *honestly*, *maybe*, etc.).

Something like DEPS **needed** in LFG **anyway**:

- encodes the **functional hierarchy** (not the same as *thematic hierarchy*),
- which is referred to **in analyses of** (Dalrymple 2001, Bresnan *et al.* 2015):
  - **control**,
  - pronominal and anaphoric **binding**,
  - ***wh*-movement**, etc.

Example

John waited for the book on the chair on Monday.

$$\left[\begin{array}{ll} \textsc{pred} & \text{`wait'} \\ \\ \textsc{deps} & \left\langle \left[\textsc{pred} \quad \text{`John'}\right], \left[\textsc{pred} \quad \text{`book'}\right], \right. \\ & \left[\begin{array}{ll} \textsc{pred} & \text{`on'} \\ \textsc{deps} & \left\langle \left[\textsc{pred} \quad \text{`chair'}\right] \right\rangle \end{array}\right], \left[\begin{array}{ll} \textsc{pred} & \text{`on'} \\ \textsc{deps} & \left\langle \left[\textsc{pred} \quad \text{`Monday'}\right] \right\rangle \end{array}\right] \left.\right\rangle \end{array}\right]$$

As before, **some dependents may be singled-out**.

Example

John waited for the book on the chair on Monday.

$$\left[\begin{array}{ll}\textsc{pred} & \text{`WAIT'} \\ \textsc{subj} & \boxed{1} \\ \textsc{deps} & \left\langle \boxed{1}\left[\textsc{pred} \quad \text{`John'}\right], \left[\textsc{pred} \quad \text{`book'}\right], \right. \\ & \left. \left[\begin{array}{ll}\textsc{pred} & \text{`on'} \\ \textsc{deps} & \left\langle\left[\textsc{pred} \quad \text{`chair'}\right]\right\rangle\end{array}\right], \left[\begin{array}{ll}\textsc{pred} & \text{`on'} \\ \textsc{deps} & \left\langle\left[\textsc{pred} \quad \text{`Monday'}\right]\right\rangle\end{array}\right] \right\rangle\end{array}\right]$$

As before, **some dependents may be singled-out**.

A more conservative variant

A more conservative variant – **all dependents are named**:

$$\left[\begin{array}{ll}\textsc{pred} & \text{`wait'} \\ \textsc{deps} & \left\langle \textsc{subj}:\left[\textsc{pred} \quad \text{`John'}\right], \right. \\ & \quad \textsc{obl}:\left[\textsc{pred} \quad \text{`book'}\right], \\ & \quad \textsc{loc}:\left[\begin{array}{ll}\textsc{pred} & \text{`on'} \\ \textsc{deps} & \left\langle \left[\textsc{pred} \quad \text{`chair'}\right] \right\rangle \end{array}\right], \\ & \quad \left. \textsc{temp}:\left[\begin{array}{ll}\textsc{pred} & \text{`on'} \\ \textsc{deps} & \left\langle \left[\textsc{pred} \quad \text{`Monday'}\right] \right\rangle \end{array}\right] \right\rangle \end{array}\right]$$

(Cf. functors in Functional Generative Description; Sgall *et al.* 1986.)

A more conservative variant

A more conservative variant – **all dependents are named**:

$$\left[\begin{array}{ll}\textsc{pred} & \text{`wait'} \\ \textsc{deps} & \left\langle \begin{array}{ll}\textsc{subj}: \left[\textsc{pred} \quad \text{`John'}\right], \\ \textsc{obl}: \left[\textsc{pred} \quad \text{`book'}\right], \\ \textsc{loc}: \left[\begin{array}{ll}\textsc{pred} & \text{`on'} \\ \textsc{deps} & \left\langle \left[\textsc{pred} \quad \text{`chair'}\right] \right\rangle\end{array}\right], \\ \textsc{temp}: \left[\begin{array}{ll}\textsc{pred} & \text{`on'} \\ \textsc{deps} & \left\langle \left[\textsc{pred} \quad \text{`Monday'}\right] \right\rangle\end{array}\right]\end{array} \right\rangle\end{array}\right]$$

(Cf. functors in Functional Generative Description; Sgall *et al.* 1986.)

A more conservative variant

A more conservative variant – **all dependents are named**:

$$\left[\begin{array}{ll}\textsc{pred} & \text{`wait'} \\ \textsc{deps} & \left\langle \textsc{subj}: \left[\textsc{pred} \quad \text{`John'}\right], \right. \\ & \quad \textsc{obl}: \left[\textsc{pred} \quad \text{`book'}\right], \\ & \quad \textsc{loc}: \left[\begin{array}{ll}\textsc{pred} & \text{`on'} \\ \textsc{deps} & \left\langle \left[\textsc{pred} \quad \text{`chair'}\right] \right\rangle\end{array}\right], \\ & \quad \left. \textsc{temp}: \left[\begin{array}{ll}\textsc{pred} & \text{`on'} \\ \textsc{deps} & \left\langle \left[\textsc{pred} \quad \text{`Monday'}\right] \right\rangle\end{array}\right] \right\rangle\end{array}\right]$$

(Cf. functors in Functional Generative Description; Sgall *et al.* 1986.)

A more conservative variant – technically

Technically, use specific attributes instead of FIRST (or HEAD) in the standard FIRST / REST (or HEAD / TAIL) list encoding:

$$\begin{bmatrix}\text{PRED} & \text{'WAIT'} \\ \text{DEPS} & \begin{bmatrix}\text{FIRST} & \begin{bmatrix}\text{PRED} & \text{'JOHN'}\end{bmatrix} \\ \text{REST} & \begin{bmatrix}\text{FIRST} & \begin{bmatrix}\text{PRED} & \text{'BOOK'}\end{bmatrix} \\ \text{REST} & \begin{bmatrix}\text{FIRST} & \begin{bmatrix}\text{PRED} & \text{'ON'} \\ \text{DEPS FIRST} & \begin{bmatrix}\text{PRED} & \text{'CHAIR'}\end{bmatrix}\end{bmatrix} \\ \text{REST} & \begin{bmatrix}\text{FIRST} & \begin{bmatrix}\text{PRED} & \text{'ON'} \\ \text{DEPS FIRST} & \begin{bmatrix}\text{PRED} & \text{'MONDAY'}\end{bmatrix}\end{bmatrix} \\ \text{REST} & \end{bmatrix}\end{bmatrix}\end{bmatrix}\end{bmatrix}\end{bmatrix}$$

A more conservative variant – technically

Technically, use specific attributes instead of FIRST (or HEAD) in the standard FIRST / REST (or HEAD / TAIL) list encoding:

$$\begin{bmatrix} \text{PRED} & \text{'WAIT'} \\ \text{DEPS} & \begin{bmatrix} \text{SUBJ} & \begin{bmatrix} \text{PRED} & \text{'JOHN'} \end{bmatrix} \\ \text{REST} & \begin{bmatrix} \text{OBL} & \begin{bmatrix} \text{PRED} & \text{'BOOK'} \end{bmatrix} \\ \text{REST} & \begin{bmatrix} \text{LOC} & \begin{bmatrix} \text{PRED} & \text{'ON'} \\ \text{DEPS OBJ} & \begin{bmatrix} \text{PRED} & \text{'CHAIR'} \end{bmatrix} \end{bmatrix} \\ \text{REST} & \begin{bmatrix} \text{TEMP} & \begin{bmatrix} \text{PRED} & \text{'ON'} \\ \text{DEPS OBJ} & \begin{bmatrix} \text{PRED} & \text{'MONDAY'} \end{bmatrix} \end{bmatrix} \end{bmatrix} \end{bmatrix} \end{bmatrix} \end{bmatrix} \end{bmatrix}$$

No AAD in the more conservative variant

Peter sleeps in the garage.
Peter resides in the garage.

$$\begin{bmatrix} \textsc{pred} & \text{`SLEEP'} \\ \textsc{deps} & \left\langle \textsc{subj}: \begin{bmatrix} \textsc{pred} & \text{`PETER'} \end{bmatrix}, \ \textsc{loc}: \begin{bmatrix} \textsc{pred} & \text{`IN'} \\ \textsc{deps} & \left\langle \begin{bmatrix} \textsc{pred} & \text{`GARAGE'} \end{bmatrix} \right\rangle \end{bmatrix} \right\rangle \end{bmatrix}$$

$$\begin{bmatrix} \textsc{pred} & \text{`RESIDE'} \\ \textsc{deps} & \left\langle \textsc{subj}: \begin{bmatrix} \textsc{pred} & \text{`PETER'} \end{bmatrix}, \ \textsc{loc}: \begin{bmatrix} \textsc{pred} & \text{`IN'} \\ \textsc{deps} & \left\langle \begin{bmatrix} \textsc{pred} & \text{`GARAGE'} \end{bmatrix} \right\rangle \end{bmatrix} \right\rangle \end{bmatrix}$$

The **only** other **difference** between lexical entries of SLEEP and RESIDE:

- $(\uparrow \textsc{deps rest}^{*} \textsc{loc})$ (in the entry for RESIDE)
- (a similar constraint absent in the case of the object of EAT, etc.).

No AAD in the more conservative variant

Peter sleeps in the garage.
Peter resides in the garage.

$$\begin{bmatrix} \textsc{pred} & \text{`SLEEP'} \\ \textsc{deps} & \left\langle \textsc{subj}: \begin{bmatrix} \textsc{pred} & \text{`PETER'} \end{bmatrix}, \ \textsc{loc}: \begin{bmatrix} \textsc{pred} & \text{`IN'} \\ \textsc{deps} & \left\langle \begin{bmatrix} \textsc{pred} & \text{`GARAGE'} \end{bmatrix} \right\rangle \end{bmatrix} \right\rangle \end{bmatrix}$$

$$\begin{bmatrix} \textsc{pred} & \text{`RESIDE'} \\ \textsc{deps} & \left\langle \textsc{subj}: \begin{bmatrix} \textsc{pred} & \text{`PETER'} \end{bmatrix}, \ \textsc{loc}: \begin{bmatrix} \textsc{pred} & \text{`IN'} \\ \textsc{deps} & \left\langle \begin{bmatrix} \textsc{pred} & \text{`GARAGE'} \end{bmatrix} \right\rangle \end{bmatrix} \right\rangle \end{bmatrix}$$

The **only** other **difference** between lexical entries of SLEEP and RESIDE:

- $(\uparrow \textsc{deps rest}^* \textsc{loc})$ (in the entry for RESIDE)
- (a similar constraint absent in the case of the object of EAT, etc.).

No AAD in the more conservative variant

Peter sleeps in the garage.
Peter resides in the garage.

$$\begin{bmatrix} \text{PRED} & \text{'SLEEP'} \\ \text{DEPS} & \left\langle \text{SUBJ:} \begin{bmatrix} \text{PRED} & \text{'PETER'} \end{bmatrix}, \text{LOC:} \begin{bmatrix} \text{PRED} & \text{'IN'} \\ \text{DEPS} & \left\langle \begin{bmatrix} \text{PRED} & \text{'GARAGE'} \end{bmatrix} \right\rangle \end{bmatrix} \right\rangle \end{bmatrix}$$

$$\begin{bmatrix} \text{PRED} & \text{'RESIDE'} \\ \text{DEPS} & \left\langle \text{SUBJ:} \begin{bmatrix} \text{PRED} & \text{'PETER'} \end{bmatrix}, \text{LOC:} \begin{bmatrix} \text{PRED} & \text{'IN'} \\ \text{DEPS} & \left\langle \begin{bmatrix} \text{PRED} & \text{'GARAGE'} \end{bmatrix} \right\rangle \end{bmatrix} \right\rangle \end{bmatrix}$$

The **only** other **difference** between lexical entries of SLEEP and RESIDE:

- $(\uparrow \text{DEPS REST}^* \text{LOC})$ (in the entry for RESIDE)
- (a similar constraint absent in the case of the object of EAT, etc.).

No AAD in the more conservative variant

Peter sleeps in the garage.
Peter resides in the garage.

$$\begin{bmatrix} \textsc{pred} & \text{'SLEEP'} \\ \textsc{deps} & \left\langle \textsc{subj}: \begin{bmatrix} \textsc{pred} & \text{'PETER'} \end{bmatrix}, \ \textsc{loc}: \begin{bmatrix} \textsc{pred} & \text{'IN'} \\ \textsc{deps} & \left\langle \begin{bmatrix} \textsc{pred} & \text{'GARAGE'} \end{bmatrix} \right\rangle \end{bmatrix} \right\rangle \end{bmatrix}$$

$$\begin{bmatrix} \textsc{pred} & \text{'RESIDE'} \\ \textsc{deps} & \left\langle \textsc{subj}: \begin{bmatrix} \textsc{pred} & \text{'PETER'} \end{bmatrix}, \ \textsc{loc}: \begin{bmatrix} \textsc{pred} & \text{'IN'} \\ \textsc{deps} & \left\langle \begin{bmatrix} \textsc{pred} & \text{'GARAGE'} \end{bmatrix} \right\rangle \end{bmatrix} \right\rangle \end{bmatrix}$$

The **only** other **difference** between lexical entries of SLEEP and RESIDE:

- $(\uparrow \ \textsc{deps} \ \textsc{rest}^* \ \textsc{loc})$ (in the entry for RESIDE)
- (a similar constraint absent in the case of the object of EAT, etc.).

No AAD in the more conservative variant

Peter sleeps in the garage.
Peter resides in the garage.

$$\begin{bmatrix} \textsc{pred} & \text{`SLEEP'} \\ \textsc{deps} & \left\langle \textsc{subj}: \begin{bmatrix} \textsc{pred} & \text{`PETER'} \end{bmatrix}, \ \textsc{loc}: \begin{bmatrix} \textsc{pred} & \text{`IN'} \\ \textsc{deps} & \left\langle \begin{bmatrix} \textsc{pred} & \text{`GARAGE'} \end{bmatrix} \right\rangle \end{bmatrix} \right\rangle \end{bmatrix}$$

$$\begin{bmatrix} \textsc{pred} & \text{`RESIDE'} \\ \textsc{deps} & \left\langle \textsc{subj}: \begin{bmatrix} \textsc{pred} & \text{`PETER'} \end{bmatrix}, \ \textsc{loc}: \begin{bmatrix} \textsc{pred} & \text{`IN'} \\ \textsc{deps} & \left\langle \begin{bmatrix} \textsc{pred} & \text{`GARAGE'} \end{bmatrix} \right\rangle \end{bmatrix} \right\rangle \end{bmatrix}$$

The **only** other **difference** between lexical entries of SLEEP and RESIDE:

- $(\uparrow \ \textsc{deps} \ \textsc{rest}^* \ \textsc{loc})$ (in the entry for RESIDE)
- (a similar constraint absent in the case of the object of EAT, etc.).

A worked example 1

Worked example:

- John resided in France for two years, in a small village called Saint-Couat-d'Aude.

Additional assumption:

- **dependent types** are generally **iterable** (i.e., sets).

Simplifying assumptions for this worked example:

- NPs have no internal structure,
- they contribute semantic constants:
  - *j* in case of *John*,
  - *f* in case of *France*,
  - *ty* in case of *two years* and
  - *asv* in case of *a small village*...

A worked example 1

Worked example:

- John resided in France for two years, in a small village called Saint-Couat-d'Aude.

Additional assumption:

- **dependent types** are generally **iterable** (i.e., sets).

Simplifying assumptions for this worked example:

- NPs have no internal structure,
- they contribute semantic constants:
  - *j* in case of *John*,
  - *f* in case of *France*,
  - *ty* in case of *two years* and
  - *asv* in case of *a small village*...

A worked example 1

Worked example:

- John resided in France for two years, in a small village called Saint-Couat-d'Aude.

Additional assumption:

- **dependent types** are generally **iterable** (i.e., sets).

Simplifying assumptions for this worked example:

- NPs have no internal structure,
- they contribute semantic constants:
  - *j* in case of *John*,
  - *f* in case of *France*,
  - *ty* in case of *two years* and
  - *asv* in case of *a small village*....

A worked example 2

John resided in France for two years, in a small village...

Intended **f-structure** and **semantic representation**:

$$\left[\begin{array}{ll}
\textsc{pred} & \text{`RESIDE'} \\
\textsc{tense} & \textsc{past} \\
\textsc{deps} & \left\langle \textsc{subj}:\left\{\left[\textsc{pred} \quad \text{`JOHN'}\right]\right\}, \right. \\
& \quad \textsc{loc}:\left\{\left[\begin{array}{ll}\textsc{pred} & \text{`IN'} \\ \textsc{deps} & \left\langle \textsc{obj}:\text{“FRANCE”} \right\rangle\end{array}\right], \left[\begin{array}{ll}\textsc{pred} & \text{`IN'} \\ \textsc{deps} & \left\langle \textsc{obj}:\text{“A... VILLAGE...”} \right\rangle\end{array}\right]\right\}, \\
& \quad \left. \textsc{dur}:\left\{\left[\begin{array}{ll}\textsc{pred} & \text{`FOR'} \\ \textsc{deps} & \left\langle \textsc{obj}:\text{“TWO YEARS”} \right\rangle\end{array}\right]\right\} \right\rangle
\end{array}\right]$$

$$\exists e.[\mathit{reside}(e) \wedge \mathit{past}(e) \wedge \mathit{agent}(e, j) \wedge \mathit{duration}(e, ty) \wedge \mathit{location}(e, f) \wedge \mathit{location}(e, asv)]$$

A worked example 2

John resided in France for two years, in a small village...

Intended **f-structure** and **semantic representation**:

$$\left[\begin{array}{ll}
\textsc{pred} & \text{`RESIDE'} \\
\textsc{tense} & \textsc{past} \\
\textsc{deps} & \left\langle \textsc{subj}:\left\{\left[\textsc{pred} \quad \text{`JOHN'}\right]\right\}, \right. \\
& \quad \textsc{loc}:\left\{\left[\begin{array}{ll}\textsc{pred} & \text{`IN'} \\ \textsc{deps} & \left\langle \textsc{obj}: \text{“FRANCE”} \right\rangle\end{array}\right], \left[\begin{array}{ll}\textsc{pred} & \text{`IN'} \\ \textsc{deps} & \left\langle \textsc{obj}: \text{“A... VILLAGE...”} \right\rangle\end{array}\right]\right\}, \\
& \quad \left. \textsc{dur}:\left\{\left[\begin{array}{ll}\textsc{pred} & \text{`FOR'} \\ \textsc{deps} & \left\langle \textsc{obj}: \text{“TWO YEARS”} \right\rangle\end{array}\right]\right\}\right\rangle
\end{array}\right]$$

$$\exists e.[\mathit{reside}(e) \wedge \mathit{past}(e) \wedge \mathit{agent}(e, j) \wedge \mathit{duration}(e, ty) \wedge \mathit{location}(e, f) \wedge \mathit{location}(e, asv)]$$

A worked example 2

John resided in France for two years, in a small village...

Intended **f-structure** and **semantic representation**:

$$\left[\begin{array}{ll}
\textsc{pred} & \text{`RESIDE'} \\
\textsc{tense} & \textsc{past} \\
\textsc{deps} & \left\langle \textsc{subj}:\left\{\left[\textsc{pred} \quad \text{`JOHN'}\right]\right\},\right. \\
& \quad \textsc{loc}:\left\{\left[\begin{array}{ll}\textsc{pred} & \text{`IN'} \\ \textsc{deps} & \left\langle \textsc{obj}: \text{“FRANCE”} \right\rangle\end{array}\right], \left[\begin{array}{ll}\textsc{pred} & \text{`IN'} \\ \textsc{deps} & \left\langle \textsc{obj}: \text{“A... VILLAGE...”} \right\rangle\end{array}\right]\right\}, \\
& \quad \left.\textsc{dur}:\left\{\left[\begin{array}{ll}\textsc{pred} & \text{`FOR'} \\ \textsc{deps} & \left\langle \textsc{obj}: \text{“TWO YEARS”} \right\rangle\end{array}\right]\right\}\right\rangle
\end{array}\right]$$

$$\exists e.[\mathit{reside}(e) \wedge \mathit{past}(e) \wedge \mathit{agent}(e, j) \wedge \mathit{duration}(e, ty) \wedge \mathit{location}(e, f) \wedge \mathit{location}(e, asv)]$$

A worked example 3

Lexical entries:

- *resided* I $(\uparrow \textsc{pred}) = \text{`}\textsc{reside}\text{'}$
  $@\textsc{agent}\ @\textsc{past}$
  $\lambda e.reside(e) : (\uparrow_\sigma \textsc{event}) \multimap \uparrow_\sigma$
  $(\uparrow \textsc{deps rest}^* \textsc{loc})$
- *in* P $(\uparrow \textsc{pred}) = \text{`}\textsc{in}\text{'}$
  $\%\textsc{hd} = (\textsc{deps rest}^* \textsc{loc} \in \uparrow)$
  $\lambda x \lambda P \lambda e.[P(e) \wedge location(e, x)] :$
  $(\uparrow \textsc{deps obj} \in)_\sigma \multimap [(\%\textsc{hd}_\sigma\ \textsc{event}) \multimap \%\textsc{hd}_\sigma]$
  $\multimap (\%\textsc{hd}_\sigma\ \textsc{event}) \multimap \%\textsc{hd}_\sigma$
- *in France*: $\%\textsc{hd} = (\textsc{deps rest}^* \textsc{loc} \in \uparrow)$
  $\lambda P \lambda e.[P(e) \wedge location(e, f)] :$
  $[(\%\textsc{hd}_\sigma\ \textsc{event}) \multimap \%\textsc{hd}_\sigma] \multimap (\%\textsc{hd}_\sigma\ \textsc{event}) \multimap \%\textsc{hd}_\sigma$

A worked example 3

Lexical entries:

- *resided* I $(\uparrow \textsc{pred}) = \text{`}\textsc{reside}\text{'}$
  $@\textsc{agent}\ @\textsc{past}$
  $\lambda e.reside(e) : (\uparrow_\sigma \textsc{event}) \multimap \uparrow_\sigma$
  $(\uparrow \textsc{deps}\ \textsc{rest}^*\ \textsc{loc})$
- *in* P $(\uparrow \textsc{pred}) = \text{`}\textsc{in}\text{'}$
  $\%\textsc{hd} = (\textsc{deps}\ \textsc{rest}^*\ \textsc{loc} \in \uparrow)$
  $\lambda x \lambda P \lambda e.[P(e) \wedge location(e, x)] :$
  $(\uparrow \textsc{deps}\ \textsc{obj} \in)_\sigma \multimap [(\%\textsc{hd}_\sigma\ \textsc{event}) \multimap \%\textsc{hd}_\sigma]$
  $\multimap (\%\textsc{hd}_\sigma\ \textsc{event}) \multimap \%\textsc{hd}_\sigma$
- *in France*: $\%\textsc{hd} = (\textsc{deps}\ \textsc{rest}^*\ \textsc{loc} \in \uparrow)$
  $\lambda P \lambda e.[P(e) \wedge location(e, f)] :$
  $[(\%\textsc{hd}_\sigma\ \textsc{event}) \multimap \%\textsc{hd}_\sigma] \multimap (\%\textsc{hd}_\sigma\ \textsc{event}) \multimap \%\textsc{hd}_\sigma$

A worked example 3

Lexical entries:

- *resided* I $(\uparrow \textsc{pred}) = \text{`}\textsc{reside}\text{'}$
  $@\textsc{agent}\ @\textsc{past}$
  $\lambda e.reside(e) : (\uparrow_\sigma \textsc{event}) \multimap \uparrow_\sigma$
  $(\uparrow \textsc{deps}\ \textsc{rest}^*\ \textsc{loc})$
- *in* P $(\uparrow \textsc{pred}) = \text{`}\textsc{in}\text{'}$
  $\%\textsc{hd} = (\textsc{deps}\ \textsc{rest}^*\ \textsc{loc} \in \uparrow)$
  $\lambda x \lambda P \lambda e.[P(e) \wedge location(e, x)] :$
  $(\uparrow \textsc{deps}\ \textsc{obj} \in)_\sigma \multimap [(\%\textsc{hd}_\sigma\ \textsc{event}) \multimap \%\textsc{hd}_\sigma]$
  $\multimap (\%\textsc{hd}_\sigma\ \textsc{event}) \multimap \%\textsc{hd}_\sigma$
- *in France*: $\%\textsc{hd} = (\textsc{deps}\ \textsc{rest}^*\ \textsc{loc} \in \uparrow)$
  $\lambda P \lambda e.[P(e) \wedge location(e, f)] :$
  $[(\%\textsc{hd}_\sigma\ \textsc{event}) \multimap \%\textsc{hd}_\sigma] \multimap (\%\textsc{hd}_\sigma\ \textsc{event}) \multimap \%\textsc{hd}_\sigma$

A worked example 3

Lexical entries:

- *resided* I $(\uparrow \textsc{pred}) = \text{`}\textsc{reside}\text{'}$
  $@\textsc{agent}\ @\textsc{past}$
  $\lambda e.reside(e) : (\uparrow_\sigma \textsc{event}) \multimap \uparrow_\sigma$
  $(\uparrow \textsc{deps rest}^* \textsc{loc})$
- *in* P $(\uparrow \textsc{pred}) = \text{`}\textsc{in}\text{'}$
  $\%\textsc{hd} = (\textsc{deps rest}^* \textsc{loc} \in \uparrow)$
  $\lambda x \lambda P \lambda e.[P(e) \wedge location(e, x)] :$
  $(\uparrow \textsc{deps obj} \in)_\sigma \multimap [(\%\textsc{hd}_\sigma\ \textsc{event}) \multimap \%\textsc{hd}_\sigma]$
  $\multimap (\%\textsc{hd}_\sigma\ \textsc{event}) \multimap \%\textsc{hd}_\sigma$
- *in France*: $\%\textsc{hd} = (\textsc{deps rest}^* \textsc{loc} \in \uparrow)$
  $\lambda P \lambda e.[P(e) \wedge location(e, f)] :$
  $[(\%\textsc{hd}_\sigma\ \textsc{event}) \multimap \%\textsc{hd}_\sigma] \multimap (\%\textsc{hd}_\sigma\ \textsc{event}) \multimap \%\textsc{hd}_\sigma$

A worked example 3

Lexical entries:

- *resided* I $(\uparrow \textsc{pred}) = \text{`}\textsc{reside}\text{'}$
  $@\textsc{agent}\ @\textsc{past}$
  $\lambda e.reside(e) : (\uparrow_\sigma \textsc{event}) \multimap \uparrow_\sigma$
  $(\uparrow \textsc{deps}\ \textsc{rest}^*\ \textsc{loc})$
- *in* P $(\uparrow \textsc{pred}) = \text{`}\textsc{in}\text{'}$
  $\%\textsc{hd} = (\textsc{deps}\ \textsc{rest}^*\ \textsc{loc} \in \uparrow)$
  $\lambda x \lambda P \lambda e.[P(e) \wedge location(e, x)] :$
  $(\uparrow \textsc{deps}\ \textsc{obj} \in)_\sigma \multimap [(\%\textsc{hd}_\sigma\ \textsc{event}) \multimap \%\textsc{hd}_\sigma]$
  $\multimap (\%\textsc{hd}_\sigma\ \textsc{event}) \multimap \%\textsc{hd}_\sigma$
- *for* P $(\uparrow \textsc{pred}) = \text{`}\textsc{for}\text{'}$
  $\%\textsc{hd} = (\textsc{deps}\ \textsc{rest}^*\ \textsc{dur} \in \uparrow)$
  $\lambda x \lambda P \lambda e.[P(e) \wedge duration(e, x)] :$
  $(\uparrow \textsc{deps}\ \textsc{obj} \in)_\sigma \multimap [(\%\textsc{hd}_\sigma\ \textsc{event}) \multimap \%\textsc{hd}_\sigma]$
  $\multimap (\%\textsc{hd}_\sigma\ \textsc{event}) \multimap \%\textsc{hd}_\sigma$

A worked example 4

Macro:

- $\textsc{gf}(F) \quad := \quad \downarrow \in (\uparrow \textsc{deps rest}^* F)$ (preliminary)

Syntactic rules:

- $IP \longrightarrow \underset{@\textsc{gf}(\textsc{subj})}{NP} \quad I'$
- $I' \longrightarrow I \; (\underset{@\textsc{gf}(\textsc{obj})}{NP}) \; (\underset{@\textsc{gf}(\{\textsc{obl}_{\textsc{ben}}|\textsc{obl}_{\textsc{agent}}|\textsc{dur}|\textsc{loc}|\ldots\})}{PP})^*$

Which GF is selected depends on the meaning constructor, e.g. (repeated):

- *in* P $(\uparrow \textsc{pred}) = \text{`}\textsc{in}\text{'}$
  $\%\textsc{hd} = (\textsc{deps rest}^* \textsc{loc} \in \uparrow)$
  $\lambda x \lambda P \lambda e.[P(e) \wedge \mathit{location}(e, x)] :$
  $(\uparrow \textsc{deps obj} \in)_\sigma \multimap [(\%\textsc{hd}_\sigma \textsc{event}) \multimap \%\textsc{hd}_\sigma]$
  $\multimap (\%\textsc{hd}_\sigma \textsc{event}) \multimap \%\textsc{hd}_\sigma$

A worked example 4

Macro:

- GF(F) := $\downarrow \in (\uparrow \text{DEPS REST}^* \text{ F})$ (preliminary)

Syntactic rules:

- IP $\longrightarrow$ NP I′
  @GF(SUBJ)
- I′ $\longrightarrow$ I (NP) (PP)*
  @GF(OBJ) @GF($\{\text{OBL}_{\text{BEN}}|\text{OBL}_{\text{AGENT}}|\text{DUR}|\text{LOC}|\ldots\}$)

Which GF is selected depends on the meaning constructor, e.g. (repeated):

- *in* P $(\uparrow \text{PRED}) = \text{'IN'}$
  $\%\text{HD} = (\text{DEPS REST}^* \text{ LOC} \in \uparrow)$
  $\lambda x \lambda P \lambda e.[P(e) \wedge \mathit{location}(e, x)]$:
  $(\uparrow \text{DEPS OBJ} \in)_\sigma \multimap [(\%\text{HD}_\sigma \text{ EVENT}) \multimap \%\text{HD}_\sigma]$
  $\multimap (\%\text{HD}_\sigma \text{ EVENT}) \multimap \%\text{HD}_\sigma$

A worked example 4

Macro:

- $\textsc{gf}(F) \quad := \quad \downarrow \in (\uparrow \textsc{deps rest}^* F)$ (preliminary)

Syntactic rules:

- $\text{IP} \longrightarrow \underset{@\textsc{gf}(\textsc{subj})}{\text{NP}} \quad \text{I}'$
- $\text{I}' \longrightarrow \text{I} \quad (\underset{@\textsc{gf}(\textsc{obj})}{\text{NP}}) \quad (\underset{@\textsc{gf}(\{\textsc{obl}_{\textsc{ben}} | \textsc{obl}_{\textsc{agent}} | \textsc{dur} | \textsc{loc} | \ldots\})}{\text{PP}})^*$

Which GF is selected depends on the meaning constructor, e.g. (repeated):

- *in* P $(\uparrow \textsc{pred}) = \text{'}\textsc{in}\text{'}$
  $\%\textsc{hd} = (\textsc{deps rest}^* \textsc{loc} \in \uparrow)$
  $\lambda x \lambda P \lambda e.[P(e) \wedge \mathit{location}(e, x)] :$
  $(\uparrow \textsc{deps obj} \in)_\sigma \multimap [(\%\textsc{hd}_\sigma \textsc{event}) \multimap \%\textsc{hd}_\sigma]$
  $\multimap (\%\textsc{hd}_\sigma \textsc{event}) \multimap \%\textsc{hd}_\sigma$

A worked example 4

Macro:

- $\textsc{gf}(F) \quad := \quad \downarrow \in (\uparrow \textsc{deps rest}^* F)$ (preliminary)

Syntactic rules:

- $\text{IP} \longrightarrow \underset{@\textsc{gf}(\textsc{subj})}{\text{NP}} \quad \text{I}'$
- $\text{I}' \longrightarrow \text{I} \quad (\underset{@\textsc{gf}(\textsc{obj})}{\text{NP}}) \quad (\underset{@\textsc{gf}(\{\textsc{obl}_{\textsc{ben}}|\textsc{obl}_{\textsc{agent}}|\textsc{dur}|\textsc{loc}|\ldots\})}{\text{PP}})^*$

Which GF is selected depends on the meaning constructor, e.g. (repeated):

- *in* P $(\uparrow \textsc{pred}) = \text{'}\textsc{in}\text{'}$
  $\%\textsc{hd} = (\textsc{deps rest}^* \textsc{loc} \in \uparrow)$
  $\lambda x \lambda P \lambda e.[P(e) \wedge \mathit{location}(e, x)] :$
  $(\uparrow \textsc{deps obj} \in)_\sigma \multimap [(\%\textsc{hd}_\sigma \textsc{event}) \multimap \%\textsc{hd}_\sigma]$
  $\multimap (\%\textsc{hd}_\sigma \textsc{event}) \multimap \%\textsc{hd}_\sigma$

Functional hierarchy

Via a more **complex GF macro** (but resides in one place):

- $\textsc{hgfs-obj} \equiv \textsc{subj}$
- $\textsc{hgfs-objth} \equiv \{\textsc{hgfs-obj} | \textsc{obj}\}$
- $\textsc{hgfs-oblso} \equiv \{\textsc{hgfs-objth} | \textsc{obj}_{\textsc{theme}}\}$
- $\textsc{hgfs-oblgo} \equiv \{\textsc{hgfs-oblso} | \textsc{obl}_{\textsc{source}}\}$

  ...
- $$\begin{aligned}\textsc{gf}(F) := \{ & F =_c \textsc{subj} \wedge \downarrow \in (\uparrow \textsc{deps}\ F) \mid \\ & F =_c \textsc{obj} \wedge \downarrow \in (\uparrow \textsc{deps}\ \textsc{rest}^*\ F)\ (\leftarrow \{\textsc{hgfs-obj}\}) \mid \\ & F =_c \textsc{obj}_{\textsc{theme}} \wedge \downarrow \in (\uparrow \textsc{deps}\ \textsc{rest}^*\ F)\ (\leftarrow \{\textsc{hgfs-objth}\}) \mid \\ & F =_c \textsc{obl}_{\textsc{source}} \wedge \downarrow \in (\uparrow \textsc{deps}\ \textsc{rest}^*\ F)\ (\leftarrow \{\textsc{hgfs-oblso}\}) \mid \\ & F =_c \textsc{obl}_{\textsc{goal}} \wedge \downarrow \in (\uparrow \textsc{deps}\ \textsc{rest}^*\ F)\ (\leftarrow \{\textsc{hgfs-oblgo}\}) \mid \\ & \ldots\}\end{aligned}$$

Another example 1

Another kind of example (out of reach with AAD in place?):

- Waldrum resided and created art in New Mexico.

Outline of the analysis:

- *created* combines with its direct object ('satisfying' the @PATIENT macro of *created*),
- the result is coordinated with *resided*,
- the result of coordination combines with the locative phrase,
- constraints involving REST* are evaluated separately on each conjunct, and LOC ends up as:
  - the 2nd element of the DEPS of *resided*,
  - and the 3rd element of the DEPS of *created*,
- the subject combines with the coordinated phrase, i.e., with each conjunct ('satisfying' the @AGENT macro of each verb).

Another example 1

Another kind of example (out of reach with AAD in place?):

- Waldrum resided and created art in New Mexico.

Outline of the analysis:

- *created* combines with its direct object ('satisfying' the @PATIENT macro of *created*),
- the result is coordinated with *resided*,
- the result of coordination combines with the locative phrase,
- constraints involving REST* are evaluated separately on each conjunct, and LOC ends up as:
  - the 2nd element of the DEPS of *resided*,
  - and the 3rd element of the DEPS of *created*,
- the subject combines with the coordinated phrase, i.e., with each conjunct ('satisfying' the @AGENT macro of each verb).

Another example 1

Another kind of example (out of reach with AAD in place?):

- Waldrum resided and created art in New Mexico.

Outline of the analysis:

- *created* combines with its direct object ('satisfying' the @PATIENT macro of *created*),
- the result is coordinated with *resided*,
- the result of coordination combines with the locative phrase,
- constraints involving REST* are evaluated separately on each conjunct, and LOC ends up as:
  - the 2nd element of the DEPS of *resided*,
  - and the 3rd element of the DEPS of *created*,
- the subject combines with the coordinated phrase, i.e., with each conjunct ('satisfying' the @AGENT macro of each verb).

Another example 1

Another kind of example (out of reach with AAD in place?):

- Waldrum resided and created art in New Mexico.

Outline of the analysis:

- *created* combines with its direct object ('satisfying' the @PATIENT macro of *created*),
- the result is coordinated with *resided*,
- the result of coordination combines with the locative phrase,
- constraints involving REST* are evaluated separately on each conjunct, and LOC ends up as:
  - the 2nd element of the DEPS of *resided*,
  - and the 3rd element of the DEPS of *created*,
- the subject combines with the coordinated phrase, i.e., with each conjunct ('satisfying' the @AGENT macro of each verb).

Another example 1

Another kind of example (out of reach with AAD in place?):

- Waldrum resided and created art in New Mexico.

Outline of the analysis:

- *created* combines with its direct object ('satisfying' the @PATIENT macro of *created*),
- the result is coordinated with *resided*,
- the result of coordination combines with the locative phrase,
- constraints involving REST* are evaluated separately on each conjunct, and LOC ends up as:
  - the 2nd element of the DEPS of *resided*,
  - and the 3rd element of the DEPS of *created*,
- the subject combines with the coordinated phrase, i.e., with each conjunct ('satisfying' the @AGENT macro of each verb).

Another example 1

Another kind of example (out of reach with AAD in place?):

- Waldrum resided and created art in New Mexico.

Outline of the analysis:

- *created* combines with its direct object ('satisfying' the @PATIENT macro of *created*),
- the result is coordinated with *resided*,
- the result of coordination combines with the locative phrase,
- constraints involving REST* are evaluated separately on each conjunct, and LOC ends up as:
  - the 2nd element of the DEPS of *resided*,
  - and the 3rd element of the DEPS of *created*,
- the subject combines with the coordinated phrase, i.e., with each conjunct ('satisfying' the @AGENT macro of each verb).

Another example 1

Another kind of example (out of reach with AAD in place?):

- Waldrum resided and created art in New Mexico.

Outline of the analysis:

- *created* combines with its direct object ('satisfying' the @PATIENT macro of *created*),
- the result is coordinated with *resided*,
- the result of coordination combines with the locative phrase,
- constraints involving REST* are evaluated separately on each conjunct, and LOC ends up as:
  - the 2nd element of the DEPS of *resided*,
  - and the 3rd element of the DEPS of *created*,
- the subject combines with the coordinated phrase, i.e., with each conjunct ('satisfying' the @AGENT macro of each verb).

Another example 2

Waldrum resided and created art in New Mexico.

$$\left[\begin{array}{l}\left\{\begin{array}{l}\left[\begin{array}{ll}\textsc{pred} & \text{`RESIDE'}\\ \textsc{tense} & \textsc{past}\\ \textsc{deps} & \left\langle \textsc{subj}: \boxed{1}\left[\begin{array}{ll}\textsc{pred} & \text{`WALDRUM'}\\ \textsc{case} & \textsc{nom}\end{array}\right], \textsc{loc}: \boxed{2}\left[\begin{array}{ll}\textsc{pred} & \text{`IN'}\\ \textsc{deps} & \left\langle \textsc{loc}:\left[\textsc{pred} \quad \text{`NM'}\right]\right\rangle\end{array}\right]\right\rangle\end{array}\right],\\ \left[\begin{array}{ll}\textsc{pred} & \text{`CREATE'}\\ \textsc{tense} & \textsc{past}\\ \textsc{deps} & \left\langle \textsc{subj}: \boxed{1}, \textsc{obj}:\left[\begin{array}{ll}\textsc{pred} & \text{`ART'}\\ \textsc{case} & \textsc{acc}\end{array}\right], \textsc{loc}: \boxed{2}\right\rangle\end{array}\right]\end{array}\right\}\\ \textsc{coord-form} \quad \textsc{and}\end{array}\right]$$

Another example 2

Waldrum resided and created art in New Mexico.

$$\left[\begin{array}{l}\left\{\begin{array}{l}\left[\begin{array}{ll}\text{PRED} & \text{‘RESIDE’}\\ \text{TENSE} & \text{PAST}\\ \text{DEPS} & \left\langle \text{SUBJ:}\ \boxed{1}\left[\begin{array}{ll}\text{PRED} & \text{‘WALDRUM’}\\ \text{CASE} & \text{NOM}\end{array}\right], \text{LOC:}\ \boxed{2}\left[\begin{array}{ll}\text{PRED} & \text{‘IN’}\\ \text{DEPS} & \left\langle \text{LOC:}\left[\text{PRED}\quad \text{‘NM’}\right]\right\rangle\end{array}\right]\right\rangle\end{array}\right],\\ \left[\begin{array}{ll}\text{PRED} & \text{‘CREATE’}\\ \text{TENSE} & \text{PAST}\\ \text{DEPS} & \left\langle \text{SUBJ:}\ \boxed{1}, \text{OBJ:}\left[\begin{array}{ll}\text{PRED} & \text{‘ART’}\\ \text{CASE} & \text{ACC}\end{array}\right], \text{LOC:}\ \boxed{2}\right\rangle\end{array}\right]\end{array}\right\},\\ \text{COORD-FORM}\quad \text{AND}\end{array}\right]$$

Conclusions

Conclusions:

- **AAD is ill-founded** (at least not operational),
- probably **not needed** in LFG (are there any analyses *relying* on it?),
- creates unnecessary problems for some analyses (should I treat the agentive *by*-phrase as an argument or an adjunct?, etc.),
- **in LFG** it surfaces **only in f-structure** feature geometry,
- **removing** this last vestige of AAD in LFG **is easy**, given recent developments,
- and **beneficial for LFG**:
  - **functional hierarchy** is made explicit (with DEPS a natural locus of analyses relying on this hierarchy),
  - encourages **better research** on various kinds of dependents (instead of lumping many into ADJ).

Conclusions

Conclusions:

- **AAD is ill-founded** (at least not operational),
- probably **not needed** in LFG (are there any analyses *relying* on it?),
- creates unnecessary problems for some analyses (should I treat the agentive *by*-phrase as an argument or an adjunct?, etc.),
- **in LFG** it surfaces **only in f-structure** feature geometry,
- **removing** this last vestige of AAD in LFG **is easy**, given recent developments,
- and **beneficial for LFG**:
  - **functional hierarchy** is made explicit (with DEPS a natural locus of analyses relying on this hierarchy),
  - encourages **better research** on various kinds of dependents (instead of lumping many into ADJ).

Conclusions

Conclusions:

- **AAD is ill-founded** (at least not operational),
- probably **not needed** in LFG (are there any analyses *relying* on it?),
- creates unnecessary problems for some analyses (should I treat the agentive *by*-phrase as an argument or an adjunct?, etc.),
- **in LFG** it surfaces **only in f-structure** feature geometry,
- **removing** this last vestige of AAD in LFG **is easy**, given recent developments,
- and **beneficial for LFG**:
  - **functional hierarchy** is made explicit (with DEPS a natural locus of analyses relying on this hierarchy),
  - encourages **better research** on various kinds of dependents (instead of lumping many into ADJ).

Conclusions

Conclusions:

- **AAD is ill-founded** (at least not operational),
- probably **not needed** in LFG (are there any analyses *relying* on it?),
- creates unnecessary problems for some analyses (should I treat the agentive *by*-phrase as an argument or an adjunct?, etc.),
- **in LFG** it surfaces **only in f-structure** feature geometry,
- **removing** this last vestige of AAD in LFG **is easy**, given recent developments,
- and **beneficial for LFG**:
  - **functional hierarchy** is made explicit (with DEPS a natural locus of analyses relying on this hierarchy),
  - encourages **better research** on various kinds of dependents (instead of lumping many into ADJ).

Conclusions

Conclusions:

- **AAD is ill-founded** (at least not operational),
- probably **not needed** in LFG (are there any analyses *relying* on it?),
- creates unnecessary problems for some analyses (should I treat the agentive *by*-phrase as an argument or an adjunct?, etc.),
- **in LFG** it surfaces **only in f-structure** feature geometry,
- **removing** this last vestige of AAD in LFG **is easy**, given recent developments,
- and **beneficial for LFG**:
  - **functional hierarchy** is made explicit (with DEPS a natural locus of analyses relying on this hierarchy),
  - encourages **better research** on various kinds of dependents (instead of lumping many into ADJ).

Conclusions

Conclusions:

- **AAD is ill-founded** (at least not operational),
- probably **not needed** in LFG (are there any analyses *relying* on it?),
- creates unnecessary problems for some analyses (should I treat the agentive *by*-phrase as an argument or an adjunct?, etc.),
- **in LFG** it surfaces **only in f-structure** feature geometry,
- **removing** this last vestige of AAD in LFG **is easy**, given recent developments,
- and **beneficial for LFG**:
  - **functional hierarchy** is made explicit (with DEPS a natural locus of analyses relying on this hierarchy),
  - encourages **better research** on various kinds of dependents (instead of lumping many into ADJ).

Conclusions

Conclusions:

- **AAD is ill-founded** (at least not operational),
- probably **not needed** in LFG (are there any analyses *relying* on it?),
- creates unnecessary problems for some analyses (should I treat the agentive *by*-phrase as an argument or an adjunct?, etc.),
- **in LFG** it surfaces **only in f-structure** feature geometry,
- **removing** this last vestige of AAD in LFG **is easy**, given recent developments,
- and **beneficial for LFG**:
  - **functional hierarchy** is made explicit (with DEPS a natural locus of analyses relying on this hierarchy),
  - encourages **better research** on various kinds of dependents (instead of lumping many into ADJ).

Thank you for your attention!

Asudeh, A. and Giorgolo, G. (2012). Flexible composition for optional and derived arguments. In M. Butt and T. H. King, eds., *The Proceedings of the LFG'12 Conference*, pp. 64–84, Stanford, CA. CSLI Publications.

Asudeh, A., Dalrymple, M., and Toivonen, I. (2008). Constructions with lexical integrity: Templates as the lexicon–syntax interface. In M. Butt and T. H. King, eds., *The Proceedings of the LFG'08 Conference*, pp. 68–88, University of Sydney, Australia. CSLI Publications.

Asudeh, A., Dalrymple, M., and Toivonen, I. (2013). Constructions with Lexical Integrity. *Journal of Language Modelling*, **1**(1), 1–54.

Asudeh, A., Giorgolo, G., and Toivonen, I. (2014). Meaning and valency. In M. Butt and T. H. King, eds., *The Proceedings of the LFG'14 Conference*, pp. 68–88, Stanford, CA. CSLI Publications.

Bouma, G., Malouf, R., and Sag, I. A. (2001). Satisfying constraints on extraction and adjunction. *Natural Language and Linguistic Theory*, **19**(1), 1–65.

Bresnan, J., ed. (1982a). *The Mental Representation of Grammatical Relations*. The MIT Press, Cambridge, MA.

Bresnan, J. (1982b). Polyadicity. In Bresnan (1982a), pp. 149–172.

Bresnan, J., Asudeh, A., Toivonen, I., and Wechsler, S. (2015). *Lexical-Functional Syntax*. Wiley-Blackwell, drugie edition.

Chomsky, N. (1965). *Aspects of the Theory of Syntax*. The MIT Press, Cambridge, MA.

Culicover, P. W. and Jackendoff, R. (2005). *Simpler Syntax*. Oxford University Press.

Dalrymple, M. (2001). *Lexical Functional Grammar*. Academic Press, San Diego, CA.

Dalrymple, M., Hinrichs, A., Lamping, J., and Saraswat, V. (1993). The resource logic of complex predicate interpretation. In *Proceedings of ROCLING 1993*, pp. 3–21.

Davidson, D. (1967). The logical form of action sentences. In N. Rescher, ed., *The Logic of Decision and Action*, pp. 81–95. University of Pittsburgh Press, Pittsburgh, PA.

Fillmore, C. J. (1969). Types of lexical information. In F. Kiefer, ed., *Studies in Syntax and Semantics*, pp. 109–137. Reidel, Dordrecht.

Fillmore, C. J. (1986). Pragmatically controlled zero anaphora. In *Proceedings of the Twelfth Annual Meeting of the Berkeley Linguistics Society*, pp. 95–107, Berkeley. Berkeley Linguistics Society.

Findlay, J. (2014). Mapping theory without argument structure. Maszynopis, University of Oxford.

Goldberg, A. E. (2002). Surface generalizations: An alternative to alternations. *Cognitive Linguistics*, **13**(4), 327–356.

Goldberg, A. E. and Ackerman, F. (2001). The pragmatics of obligatory adjuncts. *Language*, **77**, 798–814.

Grimshaw, J. and Vikner, S. (1993). Obligatory adjuncts and the structure of events. In E. Reuland and W. Abraham, eds., *Knowledge and Language*, pp. 143–155. Kluwer, Dordrecht.

Kaplan, R. M. and Bresnan, J. (1982). Lexical-Functional Grammar: A formal system for grammatical representation. In Bresnan (1982a), pp. 173–281.

Koenig, J.-P., Mauner, G., and Bienvenue, B. (2003). Arguments for adjuncts. *Cognition*, **89**, 67–103.

Kuhn, J. (2001). Resource sensitivity in the syntax-semantics interface: Evidence from the German Split NP construction. In D. Meurers and T. Kiss, eds., *Constraint-Based Approaches to Germanic Syntax*, pp. 177–215. CSLI Publications, Stanford, CA.

Maienborn, C. and Schäfer, M. (2011). Adverbs and adverbials. In C. Maienborn, K. von Heusinger, and P. Portner, eds., *Semantics: An International Handbook of Natural Language Meaning*, pp. 1390–1420. De Gruyter Mouton, Berlin.

McConnell-Ginet, S. (1982). Adverbs and logical form: A linguistically realistic theory. *Language*, **58**(1), 144–184.

Miller, P. H. (1992). *Clitics and Constituents in Phrase Structure Grammar*. Garland, Nowy Jork.

Panevová, J. (1974). On verbal frames in Functional Generative Description. Part 1. *The Prague Bulletin of Mathematical Linguistics*, **22**, 3–40.

Parsons, T. (1990). *Events in the Semantics of English: A Study in Subatomic Semantics*. The MIT Press, Cambridge, MA.

Sgall, P., Hajičová, E., and Panevová, J. (1986). *The Meaning of the Sentence in Its Semantic and Pragmatic Aspects*. Reidel, Dordrecht.

Somers, H. L. (1984). On the validity of the complement-adjunct distinction in valency grammar. *Linguistics*, **22**, 507–530.

Tesnière, L. (1959). *Éléments de Syntaxe Structurale*. Klincksieck, Paryż.

Tutunjian, D. and Boland, J. E. (2008). Do we need a distinction between arguments and adjuncts? Evidence from psycholinguistic studies of comprehension. *Language and Linguistics Compass*, **2**(4), 631–646.

Zaenen, A. and Crouch, D. (2009). OBLS hobble computations. In M. Butt and T. H. King, eds., *The Proceedings of the LFG'09 Conference*, pp. 644–654, Trinity College, Cambridge, UK. CSLI Publications.