Semantic composition motivates first conjunct agreement

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1 Introduction

- First conjunct[1] agreement (FCA) has been observed in a number of typologically diverse languages, including:
  - Lebanese, Moroccan, and Standard Arabic (Aoun et al. 1994, Munn 1999)
  - Czech, German (Johannessen 1996)
  - Irish (McCloskey 1986)
  - Oneida (Barrie 2005)
  - Swahili (Marten 2005)
  - Welsh (Sadler 2003)
- FCA has typically been observed in cases where a predicate agrees with the first conjunct of a following nominal coordination, rather than with the coordinated nominal as a whole (*resolved agreement*):

(1) **Welsh**
Daethost ti a Siôn.
came.2S 2S and S.
You and Siôn came. (Sadler 2003: 87, (3c))

(2) **Lebanese Arabic**
Raaħ Kariim w Marwaan.
left.3MS K. and M.
Kareem and Marwaan left. (Aoun et al. 1994: 207, (24b))

- "First conjunct agreement" is a slightly misleading term, since in some languages it is the second conjunct that agrees (e.g., Hopi, Latin, Qafar, Swahili; Johannessen 1996: 667–668):

(3) **Swahili** (Bokamba 1985, cited in Johannessen 1996: 668, 23)
Mguu wa meza na kiti kimevunjika.
3.leg of table and 7.chair 7.be.broken
The leg of the table and the chair are broken.

⇒ ***Single conjunct agreement*** (SCA) (Sadler 2003)

[1] I will use the term *conjunct* in reference to coordinated elements, even if the coordination as a whole is not a conjunction. The term is thus not intended to necessarily imply logical conjunction.

Questions of interest to previous work

1. Does SCA follow from the same principles that govern resolved agreement?
2. What does SCA reveal about the syntactic structure of coordination?
3. What does the typologically robust restriction that SCA involves the *nearest* conjunct reveal about the domain of agreement?
4. What is the syntactic mechanism involved in SCA?
5. What is the relationship between SCA and general word order properties of the language?

⇒ SCA treated as an anomalous phenomenon: SCA languages are exceptional.

Question of interest here

Why should SCA occur?

The proposal

- **Observation**:
  SCA has the effect of distinguishing a particular conjunct through agreement.
- **General proposal**:
  This morphologically distinguished conjunct plays an important role in semantic composition of its coordination.

  ⇒ Morpho-syntactic signalling of semantic composition (Chung and Ladusaw 2003)
- **Background:**
  The theory of coordination of Asudeh and Crouch (2002):
  - Semantic composition treats one conjunct in a coordination as a *seed conjunct*.
  - The seed conjunct is successively modified by each of the remaining conjuncts.

    Result: meaning for the entire coordination
- **Specific proposal**:
  SCA reduces to morphological signalling of the seed conjunct. Seed conjuncts form the basis for a fully general theory of the semantic composition of coordination.

  Consequences:

  ⇒ Seed conjuncts are fundamental components of universal grammar.
  ⇒ Languages that exhibit SCA differ from languages that do not only in an aspect of lexically controlled morphological exponence.
  ⇒ SCA is not an anomalous phenomenon:
  SCA languages are not exceptional at an underlying level.

1.1 Outline of the talk

1. Further description of single conjunct agreement
2. Background:

   Glue Semantics
   → Seed conjunct coordination

3. Explanation of SCA: morpho-syntactic signalling of seed conjunct

2 Single conjunct agreement

2.1 Welsh

- General Welsh agreement facts (Sadler 2003):
  - Agreement marking on: finite verbs, non-finite verbs, nominals, prepositions
  - Agreement with **pronominals** only
  - Pronominal agreement optionally strengthened by overt/doubling pronoun
  - Default/3S agreement with non-pronominals

(4) a. Daeth y dynion.
came.3S the men
The men came. (Sadler 2003: (1))

b. Daethan (nhw).
came.3P (3P)
They came. (Sadler 2003: (2))

(5) a. brawd Siôn
brother S.
Siôn's brother (Sadler 2003: (5a))

b. dy frawd (ti)
2S brother 2S
your brother (Sadler 2003: (5b))

(6) a. Roedd Wyn yn siarad am Siôn.
was.3S W. PROG speak about S.
Wyn was talking about Siôn. (Dalrymple and Sadler 2004: (52))

b. Roedd Wyn yn siarad amdanat (ti).
was.3S W. PROG speak about.2S (2S)
Wyn was talking about you. (Dalrymple and Sadler 2004: (51))

- Coordination: agreement with first conjunct, provided it is pronominal

  ⇒ Same agreement pattern as in general agreement, but confined to first conjunct
  - Pronominal obligatorily strengthened

(7) a. Daeth Siôn ac Efyn.
came.3S S. and E
Siôn and Efyn came. (Sadler 2003: (3a))

b. Daeth Siôn a minnau.
came.3S S. and 1S
Siôn and I came. (Sadler 2003: (3b))

c. Daethost ti a minnau/Siôn.
came.2S 2S and 1S/S.
You and I/Siôn came. (Sadler 2003: (3c))

(8) a. brawd Siôn a Mair
brother S. and M.
Siôn and Mair's brother (Sadler 2003: (6a))

b. dy frawd ti a Mair
2S brother 2S and M
your and Mair's brother (Sadler 2003: (6b))

(9) a. Roedd Wyn yn siarad am Siôn a thithau.
was.3S W. PROG speak about S. and 2S
Wyn was talking about Siôn and you. (Sadler 2003: (7b))

b. Roedd Wyn yn siarad amdanat ti a Siôn.
was.3S W. PROG speak about.2S 2S and S.
Wyn was talking about you and Siôn. (Sadler 2003: (7a))

c. Roedd Wyn yn siarad amdanom ni a nhw.
was.3S W. PROG speak about.1P 1P and 3P
Wyn was talking about us and them. (Sadler 2003: (7c))

(10) * Daethost a Siôn.
came.2S and S.

2.2 Irish

- General Irish agreement facts (McCloskey and Hale 1984, McCloskey 1986, Andrews 1990):
  - Agreement marking on: finite verbs, non-finite verbs, nominals, prepositions
  - Synthetic verb forms: incorporated/null pronominal, cannot occur with overt pronominal
  - Pronominal agreement optionally strengthened through suffixation
  - Analytic verb forms: non-pronominal arguments, pronominals with no corresponding synthetic

(11) a. chuirfinn
put.COND.1S
I would put (McCloskey and Hale 1984)

b. * chuirfinn mé
put.COND.1S 1S

c. chuirfeadh siad
put.COND 3P

(12) Chuireadar isteach ar an bpost.
put.PAST.3P in on the job
They applied for the job. (McCloskey 1986: (1))

(13) Labhair mé leofa.
speak.PAST I with.3P
I spoke to them. (McCloskey 1986: (2))

(14) mo dheartháir
1S brother.1S
my brother (McCloskey 1986: (3))

- Coordination: agreement with first conjunct

  ⇒ Same agreement pattern as in general agreement, but confined to first conjunct
  - Pronominal obligatorily strengthened

(15) Bhíos féin agus Eoghan i láthair.
be.PAST.1S EMPH and Owen present
Owen and I were present. (McCloskey 1986: (21a))

(16) liom féin agus Eoghan
with.1S EMPH and Owen
with me and Owen (McCloskey 1986: (21b))

(17) mo ghabháltas féin agus mo mháthar
1S holding EMPH and my mother.GEN
my own and my mother's holding (McCloskey 1986: (21c))

(18) * Bhíos agus Eoghan i láthair.
be.PAST.1S and Owen present

(19) * Bhíos Eoghan agus féin i láthair. (McCloskey 1986: (22a))
be.PAST.1S Owen and EMPH present

(20) Bhí Eoghan agus me féin i láthair. (McCloskey 1986: (23a))
be.PAST Owen and 1S EMPH present

(21) * Bhíos me féin agus Eoghan i láthair.
be.PAST.1S 1S EMPH and Owen present

2.3 Arabic

- General Standard Arabic agreement facts (Aoun et al. 1994):
  - SV: full agreement
  - VS: full agreement with pronominal, only gender agreement with non-pronominal

(22) a. Naama l-ʔawlaad-u
slept.3MS the-children-NOM
The children slept. (Aoun et al. 1994: (5a))

b. * ʔall-ʔawlaad-u Naama (Aoun et al. 1994: (5d))
the-children-NOM slept.3MS

(23) a. ʔal-ʔawlaad-u naamuu
the-children-NOM slept.3MP
The children slept. (Aoun et al. 1994: (5b))

b. * Naamuu l-ʔawlaad-u (Aoun et al. 1994: (5c))
slept.3MP the-children-NOM

(24) a. Naamuu hum.
slept.3MP they
They slept. (Aoun et al. 1994: (21a))

b. * Naama hum. (Aoun et al. 1994: (21b))
slept.3MS they

- Coordination: option of agreement with just first conjunct in VS order
  - Full agreement with pronominal first conjunct
  - Only gender agreement with non-pronominal first conjunct

(25) Qaraʔa ʕumar wa ʕaliyaaʔ l-qiṣṣa.
read.3MS Omar and Alia the-story
Omar and Alia read the story. (Aoun et al. 1994: (25a))

(26) Qaraʔat ʕaliyaaʔ wa ʕumar l-qiṣṣa.
read.3FS Alia and Omar the-story
Alia and Omar read the story. (Aoun et al. 1994: (25b))

2.4 SCA and resolution

- Single conjunct agreement is head agreement:
  Other agreement processes in the clause target the resolved agreement of the conjunction.
  - Pronominal-antecedent agreement (Welsh)

(27) Fe a fi, aetho ni ddim yno.
Him and me, went.1P we not there
Him and me, we did not go there. (Sadler 2003: (8a))

- Resolved agreement with a coordination can co-occur with single conjunct agreement.
  - SCA and pronominal-antecedent agreement (Welsh)

(28) Dw i a Gwenllian heb gael ein talu.
be.1S 1S and G. without get 1P pay
Gwenllian and I have not been paid. (Sadler 2003: (12))

2.5 Three key generalizations

1. Agreement with a single conjunct obeys the same restrictions as general/full agreement with a corresponding non-coordinated argument.
2. Single conjunct agreement is head agreement.
3. Within a structure that exhibits single conjunct agreement with a head, other agreement relations can target the resolved agreement of the coordination as a whole.

3 Background

3.1 Glue Semantics

- Glue Semantics (Glue): general theory of the syntax–semantics interface and semantic composition
- Semantic composition:
  - *Meaning constructors* obtained from lexical items instantiated in syntactic parse
  - Each constructor has the form $\mathcal{M} : G$, where
    - $\mathcal{M}$ is a term from some meaning language
    - G is a term of *linear logic* (Girard 1987)
  - Composition consists of linear logic proof on meaning constructors
- Linear Logic is a substructural logic that lacks the rules of *weakening* and *contraction*:
  1. Weakening: Premises can be *freely added*
  2. Contraction: Additional occurrences of a premise can be *freely discarded*

$\Rightarrow$ Linear logic premises must each be used *exactly* once: no reuse or deletion of premises

(29)

Premise reuse Classical/Intuitionistic Logic	 Linear Logic
$A,\ \ A \rightarrow B \vdash B$ $A,\ \ A \rightarrow B \vdash B \wedge A$ Premise A reused, conjoined with conclusion B	$A,\ \ A \multimap B \vdash B$ $A,\ \ A \multimap B \nvdash B \otimes A$ Premise A is consumed to produce conclusion B, no longer available for conjunction with B

(30)

Premise nonuse Classical/Intuitionistic Logic	 Linear Logic
$A, B \vdash A$ Can ignore premise B	$A, B \nvdash A$ Cannot ignore premise B

Note: $\multimap$ is linear implication, $\otimes$ is linear conjunction

- Linear logic (LL) is *resource sensitive*: premises (resources) are used up in proving conclusions
  1. **Computation**: Reduces space of possible proofs
  2. **Proof theory**: Proofs as formal objects
- Glue Semantics (via LL):
  1. LL proofs as a formalization of the syntax–semantics interface
  2. Models resource sensitivity of natural language (Asudeh 2004)
  3. Semantic ambiguity as alternative proofs from same set of premises
- Set of proof rules for the linear logic connectives:

(31) Natural deduction rule for implication elimination (modus ponens)

$$\frac{A \qquad A \multimap B}{B} \multimap_{\mathcal{E}}$$

- Curry-Howard Isomorphism relates linear logic operations to meaning language operations:

(32) Implication elimination corresponds to functional application

$$\frac{a : A \qquad f : A \multimap B}{f(a) : B} \multimap_{\mathcal{E}}$$

3.2 Seed conjuncts

3.2.1 Background and motivation

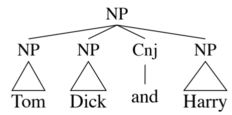
- Implemented in the Constraint-Based Semantics Project, Xerox PARC
  - LFG parse instantiates lexical items from a semantic lexicon (meaning constructors)
- Issues raised by LFG treatment of coordination:
  1. Flat coordination structure:

     (33) $\text{X} \longrightarrow \text{X}^{+}\ \text{Cnj}\ \text{X}$

     (a) **General issue**: How to get boolean/binary coordination from flat coordination?

     (b) **Computational issue**: Recursive procedure/algorithm required for collecting/dealing with unbounded number of conjuncts
  2. Surface-true syntax: single coordinating element (Cnj)

     (34) C(onstituent)-structure



     (a) **General issue**: How to distribute the single coordination from the syntax properly in the semantics for boolean/binary coordination?

     (b) **Computational issue**: Procedure/algorithm required for distributing coordination

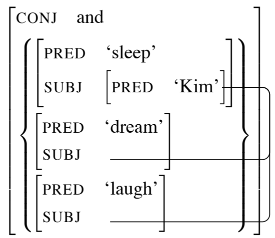
       i. Recursive distribution of single coordination (Asudeh and Crouch 2002)

       ii. Duplication of single coordination (Kehler et al. 1999)

     (c) **Resource accounting issue**: Single syntactic coordination contributes single semantic resource, but apparent reuse of resource required for semantic composition
  3. Structure sharing in syntax: shared syntactic arguments of conjuncts (token equality)

     (35) Kim slept, dreamt and laughed.

     (36) F(unctional)-structure



     (a) **General issue**: How to handle multiple requirements of composition with single argument?

     (b) **Computational issue**: Procedure/algorithm required for distributing shared arguments correctly in the semantics

     (c) **Resource accounting issue**: single shared syntactic element contributes single resource, but apparent reuse of resource required for semantic composition

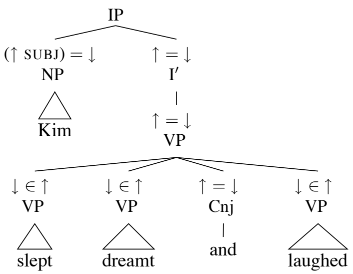
3.3 Two possible solutions

- Kehler et al. (1999):
  1. Treat *paths* as resources (single shared argument, but multiple paths).
  2. Duplicate coordination using linear logic !-modality (*of course*/*bang*): allows controlled relaxation of resource accounting for a particular premise (reusable, nonuseable).
- Asudeh and Crouch (2002):
  1. Recursively distribute shared arguments by letting the coordination consume the multiple dependencies on the shared argument, yielding a single dependency on the shared argument: The coordination is the only actual consumer of the shared resource.
  2. Recursively distribute single coordination: single use of the resource, multiple instantiations in meaning language
  - Sketch of procedure:
    1. Identify one conjunct as seed conjunct.
    2. Consume seed conjunct meaning to yield seed meaning for coordination.
    3. For each remaining conjunct:
       (a) Consume conjunct meaning.
       (b) Modify seed meaning with conjunct meaning to yield new seed meaning.

3.3.1 Seed conjunct coordination: A simplified example

(37) Kim slept, dreamt and laughed.

(38)



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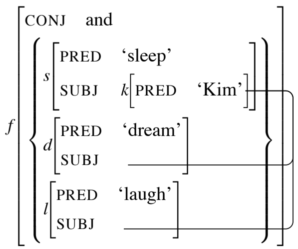


(40) **Target semantics**:
$sleep(kim) \wedge dream(kim) \wedge laugh(kim)$

(41)

Kim	$kim : k$
slept	$sleep : k \multimap s$
dreamt	$dream : k \multimap d$
laughed	$laugh : k \multimap l$

$\lambda P.P : (k \multimap s) \multimap (k \multimap f)$	**Seed**
$\lambda P, Q, x.Q(x) \wedge P(x) : (k \multimap d) \multimap (k \multimap f) \multimap (k \multimap f)$	**Seed modifier**
$\lambda P, Q, x.Q(x) \wedge P(x) : (k \multimap l) \multimap (k \multimap f) \multimap (k \multimap f)$	**Seed modifier**

(42)

$$\frac{sleep : k \multimap s \qquad \lambda P.P : (k \multimap s) \multimap (k \multimap f)}{sleep : k \multimap f}$$

$$\frac{dream : k \multimap d \qquad \lambda P, Q, x.[Q(x) \wedge P(x)] : (k \multimap d) \multimap (k \multimap f) \multimap (k \multimap f)}{\lambda Q, x.[Q(x) \wedge dream(x)] : (k \multimap f) \multimap (k \multimap f)}$$

$$\frac{sleep : k \multimap f \qquad \lambda Q, x.[Q(x) \wedge dream(x)] : (k \multimap f) \multimap (k \multimap f)}{\lambda x.[sleep(x) \wedge dream(x)] : k \multimap f}$$

$$\frac{laugh : k \multimap l \qquad \lambda P, Q, x.[Q(x) \wedge P(x)] : (k \multimap l) \multimap (k \multimap f) \multimap (k \multimap f)}{\lambda Q \lambda x.[Q(x) \wedge laugh(x)] : (k \multimap f) \multimap (k \multimap f)}$$

$$\frac{\lambda x.[sleep(x) \wedge dream(x)] : k \multimap f \qquad \lambda Q \lambda x.[Q(x) \wedge laugh(x)] : (k \multimap f) \multimap (k \multimap f)}{\lambda x.[(\lambda x.[sleep(x) \wedge dream(x)])(x) \wedge laugh(x)] : k \multimap f}$$

$$\frac{\lambda x.[(\lambda x.[sleep(x) \wedge dream(x)])(x) \wedge laugh(x)] : k \multimap f}{\lambda x.[[sleep(x) \wedge dream(x)] \wedge laugh(x)] : k \multimap f}$$

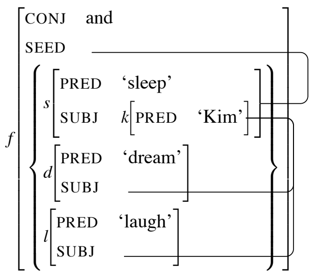
$$\frac{\lambda x.[[sleep(x) \wedge dream(x)] \wedge laugh(x)] : k \multimap f \qquad kim : k}{[[sleep(kim) \wedge dream(kim)] \wedge laugh(kim)] : f}$$

3.3.2 Generalized seed conjunct coordination

VP coordination: structure sharing

(43) Kim slept, dreamt and laughed.

(44)



(45) $and_{\langle e,t \rangle}$: Cnj $(\uparrow \text{CONJ}) = \text{and}$

$(\uparrow \text{SEED}) = (\uparrow \in)$

$\neg\, [(\uparrow \in) <_f (\uparrow \text{SEED})]$

$and : (\uparrow_\sigma \text{COORDINATION-RELATION})$

$\lambda P, C.P : [(\uparrow \text{SEED SUBJ})_\sigma \multimap (\uparrow \text{SEED})_\sigma] \multimap (\uparrow_\sigma \text{CREL}) \multimap (\uparrow \text{SEED SUBJ})_\sigma \multimap \uparrow_\sigma$

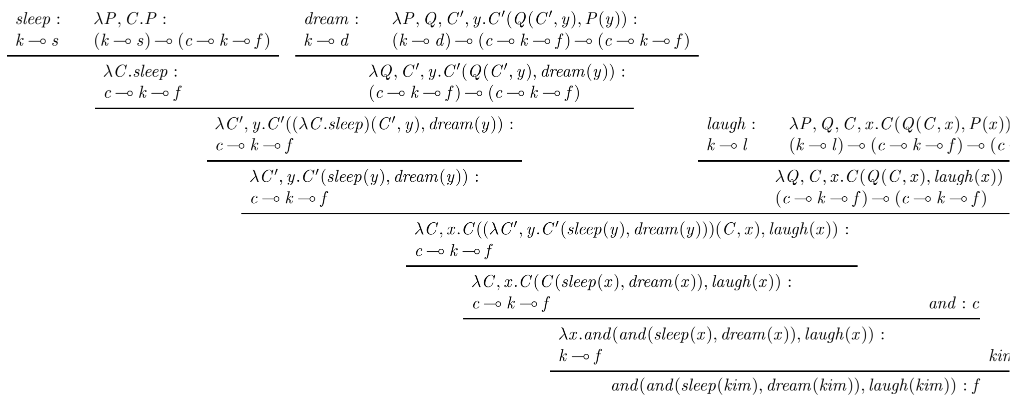
(46) **F-precedence**: (Kaplan and Zaenen 1989)
f f-precedes g ($f <_f g$) if and only if for all $n_1 \in \phi^{-1}(f)$ and for all $n_2 \in \phi^{-1}(g)$, n_1 precedes n_2.

(47)

Kim	$kim : k$
slept	$sleep : k \multimap s$
dreamt	$dream : k \multimap d$
and	$and : c$
laughed	$laugh : k \multimap l$

$\lambda P, C.P : (k \multimap s) \multimap (c \multimap k \multimap f)$	**Seed**
$\lambda P, Q, C', y.C'(Q(C', y), P(y)) :$ $(k \multimap d) \multimap (c \multimap k \multimap f) \multimap (c \multimap k \multimap f)$	**Seed modifier**
$\lambda P, Q, C, x.C(Q(C, x), P(x)) :$ $(k \multimap l) \multimap (c \multimap k \multimap f) \multimap (c \multimap k \multimap f)$	**Seed modifier**

:8)



ote: $and(and(sleep(kim), dream(kim)), laugh(kim))$
$\equiv [[sleep(kim) \wedge dream(kim)] \wedge laugh(kim)]$

4 Single conjunct agreement as a morpho-syntactic signal of composition

Proposal: Single conjunct agreement serves to morphologically distinguish the seed conjunct.

- **Semantics**:
  The seed conjunct serves a special role in the semantics by forming the base of the recursive modification that constitutes semantic composition of coordination.
- **Syntax**:
  The seed conjunct is structurally prominent/distinguished with respect to the other conjuncts. (Munn 1999, Sadler 2003)

⇒ The seed conjunct is accessible to agreement.

NP coordination: no structure sharing

(49) Kim, Sandy and Robin laughed.

(50)

$$l\begin{bmatrix} \text{PRED} & \text{`laughed}\langle(\text{SUBJ})\rangle\text{'} \\ \text{SUBJ} & f\begin{bmatrix} \text{CONJ} & \text{and} \\ \text{PERS} & 3 \\ \text{NUM} & \text{pl} \\ \text{SEED} & \boxed{k} \\ & \left\{ k\begin{bmatrix} \text{PRED} & \text{`Kim'} \\ \text{PERS} & 3 \\ \text{NUM} & \text{sg} \end{bmatrix} \; s\begin{bmatrix} \text{PRED} & \text{`Sandy'} \\ \text{PERS} & 3 \\ \text{NUM} & \text{sg} \end{bmatrix} \; r\begin{bmatrix} \text{PRED} & \text{`Robin'} \\ \text{PERS} & 3 \\ \text{NUM} & \text{sg} \end{bmatrix} \right\} \end{bmatrix} \end{bmatrix}$$

(51) and_e: Cnj

$(\uparrow \text{CONJ}) = \text{and}$

$(\uparrow \text{SEED}) = (\uparrow \in)$

$\neg\,[(\uparrow \in) <_f (\uparrow \text{SEED})]$

$and : (\uparrow_\sigma \text{COORDINATION-RELATION})$

$\lambda x, C.x : (\uparrow \text{SEED})_\sigma \multimap (\uparrow_\sigma \text{CREL}) \multimap \uparrow_\sigma$

(52)

Kim	$kim : k$
Sandy	$sandy : s$
and	$and : c$
Robin	$robin : r$
laughed	$laugh : f \multimap l$

$\lambda x, C.x : k \multimap (c \multimap f)$ **Seed**

$\lambda y, Q, C'.C'(Q(C'), y) : s \multimap (c \multimap f) \multimap (c \multimap f)$ **Seed modifier**

$\lambda z, Q, C.C(Q(C), z) : r \multimap (c \multimap f) \multimap (c \multimap f)$ **Seed modifier**

(53)

$$\dfrac{\dfrac{\dfrac{\dfrac{\dfrac{kim : k \quad \lambda x, C.x : k \multimap (c \multimap f)}{\lambda C.kim : c \multimap f} \quad \dfrac{sandy : s \quad \lambda y, Q, C'.C'(Q(C'), y) : s \multimap (c \multimap f) \multimap (c \multimap f)}{\lambda Q, C'.C'(Q(C'), sandy) : (c \multimap f) \multimap (c \multimap f)}}{\lambda C'.C'((\lambda C.kim)(C'), sandy) : c \multimap f}}{\lambda C'.C'(kim, sandy) : c \multimap f} \quad \dfrac{robin : r \quad \lambda z, Q, C.C(Q(C), z) : r \multimap (c \multimap f) \multimap (c \multimap f)}{\lambda Q, C.C(Q(C), robin) : (c \multimap f) \multimap (c \multimap f)}}{\dfrac{\lambda C.C((\lambda C'.C'(kim, sandy)(C), robin) : c \multimap f}{\lambda C.C(C(kim, sandy), robin) : c \multimap f}} \quad and : c}{and(and(kim, sandy), robin) : f}$$

4.1 Example: Welsh

4.1.1 Regular Welsh agreement and pronominal incorporation (null pronominals)

(54) a. Daethan (nhw).
came.3P (3P)
They came.

b. Daeth y dynion.
came.3S the men
The men came.

(55) *daethan*: (↑ PRED) = ‘come⟨(↑ SUBJ)⟩’
(↑ SUBJ) = ↓
(↓ PERS) = 3
(↓ NUM) = pl
(↓ PRED FN) = pro
((↓ PRED) = ‘pro’)

(56) *daeth*: (↑ PRED) = ‘come⟨(↑ SUBJ)⟩’
(↑ SUBJ) = ↓
(↓ PERS) = 3
{ (↓ NUM) = sg | (↓ PRED FN) ≠ pro }
((↓ PRED) = ‘pro’)

4.1.2 Capturing single conjunct agreement

- Capturing single conjunct agreement requires only a slight modification of lexical entries to refer appropriately to the seed conjunct.

(57) a. Daeth Siôn ac Efyn.
came.3S S. and E
Siôn and Efyn came.

b. Daeth Siôn a minnau.
came.3S S. and 1S
Siôn and I came.

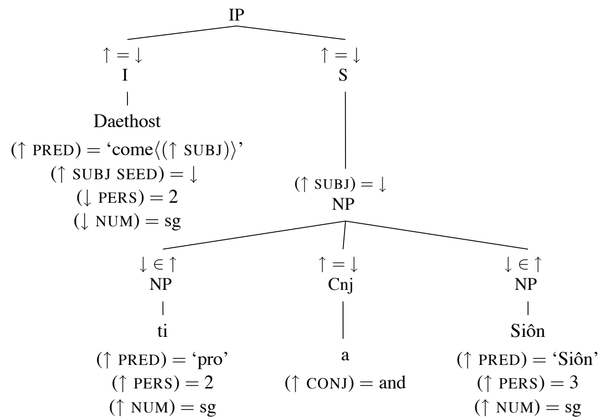
c. Daethost ti a minnau/Siôn.
came.2S 2S and 1S/S.
You and I/Siôn came.

(58) *daethan*: (↑ PRED) = ‘come⟨(↑ SUBJ)⟩’
{ (↑ SUBJ SEED) = ↓ | (↑ SUBJ) = ↓
¬ (↑ SUBJ SEED) }
(↓ PERS) = 3
(↓ NUM) = pl
(↓ PRED FN) = pro
((↓ PRED) = ‘pro’)

(59) *daeth*: (↑ PRED) = ‘come⟨(↑ SUBJ)⟩’
{ (↑ SUBJ SEED) = ↓ | (↑ SUBJ) = ↓
¬ (↑ SUBJ SEED) }
(↓ PERS) = 3
{ (↓ NUM) = sg | (↓ PRED FN) ≠ pro }
((↓ PRED) = ‘pro’)

(60) Daethost ti a Siôn.
came.2S 2S and 1S/S.
You and Siôn came.

(61)



(62)
PRED ‘come⟨(SUBJ)⟩’
SUBJ [CONJ and
PERS 2
NUM pl
SEED [1]
{ [1][PRED ‘pro’, PERS 2, NUM sg]
[PRED ‘Siôn’, PERS 3, NUM sg] }]

4.2 Example: Irish

(63) Bhíos féin agus Eoghan i láthair.
be.PAST.1S EMPH and Owen present
Owen and I were present. (McCloskey 1986: (21a))

(64) * Bhíos me féin agus Eoghan i láthair.
be.PAST.1S 1S EMPH and Owen present

- The synthetic verb form cannot co-occur with an overt pronoun, also in SCA.
- Apply the treatment of Welsh to Irish, except that the Irish synthetic verb forms obligatorily provide pronominal information (PRED), whereas the Welsh forms only optionally did so.

(65) *Bhíos*: $(\uparrow \text{PRED}) = \text{`come}\langle(\uparrow \text{SUBJ})\rangle\text{'}$
$\left\{ \begin{array}{l|l} (\uparrow \text{SUBJ SEED}) = \downarrow & (\uparrow \text{SUBJ}) = \downarrow \\ & \neg (\uparrow \text{SUBJ SEED}) \end{array} \right\}$
$(\downarrow \text{PERS}) = 1$
$(\downarrow \text{NUM}) = \text{sg}$
$(\downarrow \text{PRED}) = \text{`pro'}$

- Independent principle required to ensure that in both Irish and Welsh the emphatic form is used in coordination (McCloskey 1986: 248, fn.3).
Welsh: Overt pronoun obligatory
Irish: Strengthening particle obligatory

5 Implications and predictions

- Seed conjuncts form the basis for a general theory of coordination.
- They can therefore be considered fundamental components of universal grammar.
- Single conjunct agreement is morpho-syntactic signalling of the seed conjunct.
  1. Syntax/semantics of SCA universal.
  2. Languages that exhibit SCA differ from those that do not only in an aspect of lexically controlled morphological exponence; i.e. SCA languages exhibit morphological exponence of the seed conjunct.
  3. SCA is not an anomalous phenomenon: SCA languages are not underlyingly exceptional.
- The three key generalizations accounted for:
  1. Agreement with a single conjunct obeys the same restrictions as general/full agreement with a corresponding non-coordinated argument.
     – Agreement with single conjunct works exactly the same as general agreement (unification).
  2. Single conjunct agreement is head agreement.
     – The head identifies the seed through a functional equality.
  3. Within a structure that exhibits single conjunct agreement with a head, other agreement relations can target the resolved agreement of the coordination as a whole.
     – The coordinate structure has its own resolved agreement features separate from the seed.

6 Conclusion

- An explanation for SCA has been offered in terms of semantic composition:
  – SCA is morpho-syntactic signalling of a seed conjunct.
  – SCA is thus morphological exponence of a universal property.
- Important questions remain:
  – A number of the questions at the top of page 2 about the syntactic structures and mechanisms involved in SCA.
  – **Particularly important**: Why does SCA typically occur in only head-initial word order? Marten (2005): a recent proposal in terms of dynamic syntax

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References

Andrews, Avery. 1990. Unification and morphological blocking. *Natural Language and Linguistic Theory* 8: 507–557.

Aoun, Joseph, Elabbas Benmamoun, and Dominique Sportiche. 1994. Agreement, word order, and conjunction in some varieties of Arabic. *Linguistic Inquiry* 25: 195–220.

Asudeh, Ash. 2004. Resumption as Resource Management. Ph.D. thesis, Stanford University.

Asudeh, Ash, and Richard Crouch. 2002. Coordination and Parallelism in Glue Semantics: Integrating Discourse Cohesion and the Element Constraint. In Miriam Butt and Tracy Holloway King, eds., *Proceedings of the LFG02 Conference*, 19–39. Stanford, CA: CSLI Publications.

Barrie, Michael. 2005. Noun Incorporation, Coordination and Second Conjunct Agreeement: Towards a Solution. Talk given at the LSA Annual Meeting 2005 (January 7). Oakland, CA.

Chung, Sandra, and William A. Ladusaw. 2003. *Restriction and Saturation*. Cambridge, MA: MIT Press.

Dalrymple, Mary, and Louisa Sadler. 2004. Agreement. Course taught at the Winter School in Lexical Functional Grammar and Computational Linguistics (July 5–8). Christchurch, New Zealand.

Girard, Jean-Yves. 1987. Linear Logic. *Theoretical Computer Science* 50: 1–102.

Johannessen, Janne Bondi. 1996. Partial agreement and coordination. *Linguistic Inquiry* 27: 661–676.

Kaplan, Ronald M., and Annie Zaenen. 1989. Long-distance dependencies, constituent structure, and functional uncertainty. In Mark Baltin and Anthony Kroch, eds., *Alternative Conceptions of Phrase Structure*, 17–42. Chicago: University of Chicago Press.

Kehler, Andrew, Mary Dalrymple, John Lamping, and Vijay Saraswat. 1999. Resource Sharing in Glue Language Semantics. In Mary Dalrymple, ed., *Semantics and Syntax in Lexical Functional Grammar: The Resource Logic Approach*, 191–208. Cambridge, MA: MIT Press.

Marten, Lutz. 2005. The Dynamics of Agreement and Conjunction. *Lingua* 115: 527–547.

McCloskey, James. 1986. Inflection and Conjunction in Modern Irish. *Natural Language and Linguistic Theory* 4: 245–281.

McCloskey, James, and Kenneth Hale. 1984. On the Syntax of Person-Number Inflection in Modern Irish. *Natural Language and Linguistic Theory* 1: 487–533.

Munn, Alan. 1999. First Conjunct Agreement: Against a Clausal Analysis. *Linguistic Inquiry* 30: 643–668.

Sadler, Louisa. 2003. Coordination and Asymmetric Agreement in Welsh. In Miriam Butt and Tracy Holloway King, eds., *Nominals: Inside and Out*, 85–117. Stanford, CA: CSLI Publications.