

## Representing the Continuum between Arguments and Adjuncts within Predicate-Frames

Pierre Marchal, Thierry Poibeau, Yves Lepage

► **To cite this version:**

Pierre Marchal, Thierry Poibeau, Yves Lepage. Representing the Continuum between Arguments and Adjuncts within Predicate-Frames. NINJAL International Symposium on "Valency Classes and Alternations in Japanese", Aug 2012, Tokyo, Japan. <hal-00783722>

**HAL Id: hal-00783722**

**<https://hal.archives-ouvertes.fr/hal-00783722>**

Submitted on 1 Feb 2013

**HAL** is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

# Representing the Continuum between Arguments and Adjuncts within Predicate-Frames

Pierre Marchal<sup>1,2</sup>, Thierry Poibeau<sup>3</sup>, Yves Lepage<sup>2</sup>

<sup>1</sup> ER-TIM, INaLCO, Paris, France

<sup>2</sup> IPS, Waseda University, Kitakyûshû, Japan

<sup>3</sup> LaTTiCe, CNRS – ENS – Université Paris III, Montrouge, France

pierre.marchal@inalco.fr, thierry.poibeau@ens.fr,  
yves.lepage@waseda.jp



## Introduction

In the context of an automated task of acquisition of predicate-frames in Japanese, we introduce a method to observe and evaluate distinction criteria between arguments and adjuncts on a large scale. Rather than a binary classification, we are interested in a representation of the continuum between arguments and adjuncts.

complements = arguments U adjuncts

## Method and resources

We aim at modeling the two extremes of the continuum between arguments and adjuncts.

**Prototypical argument:** a type of complement which appears in every predicate-frame (*i.e.* usage) of a given verb.

**Prototypical adjunct:** a type of complement which never appears in any predicate-frame of a given verb.

Here, the goal is to build two list of verbs, one list to retrieve prototypical arguments, one another to retrieve prototypical adjuncts. We rely on an existing resource: 動詞項構造シソーラス. We consider two case markers: *wo* (prototypical argument), and *de* (prototypical adjunct).

	Verbs	Predicate-frames
<i>wo</i> -list of verbs	2,560 49 %	4,761 46 %
<i>de</i> -list of verbs	4,954 95 %	9,416 91 %
動詞項構造シソーラス	5,190 100 %	10,364 100 %

**Table 1.** Comparison of the two lists of verbs with 動詞項構造シソーラス

For each list of verbs we retrieve instances of predicate-frames. We process about 1.9M sentences from the BCCWJ with a dependency parser to build examples as in figure 1.

[...] とてうれしそうな顔で私を見下ろしています。 [...] he is looking down at me with such a happy face.
↓
見下ろす デ格:顔 ヲ格:私 アスペクト:テイル 101728176

**Figure 1.** Instance of a predicate-frame

We build two lists of examples. In the *wo*-list, every complement marked with the particle *wo* is considered as an argument. In the *de*-list, every complement marked with the particle *de* is considered as an adjunct.

	Count	Arguments / adjuncts
<i>wo</i> -list of examples	1,041,818	504,391 ( <i>wo</i> )
<i>de</i> -list of examples	1,890,151	144,481 ( <i>de</i> )

**Table 2.** The two lists of examples

## Experiment

We apply two existing argument/adjunct distinction criteria to our lists of examples to compute a measure of autonomy expressing the placement of complements along the

continuum. The autonomy measure ranges from 0 to 1. 0 corresponds to an argument. 1 corresponds to an adjunct.

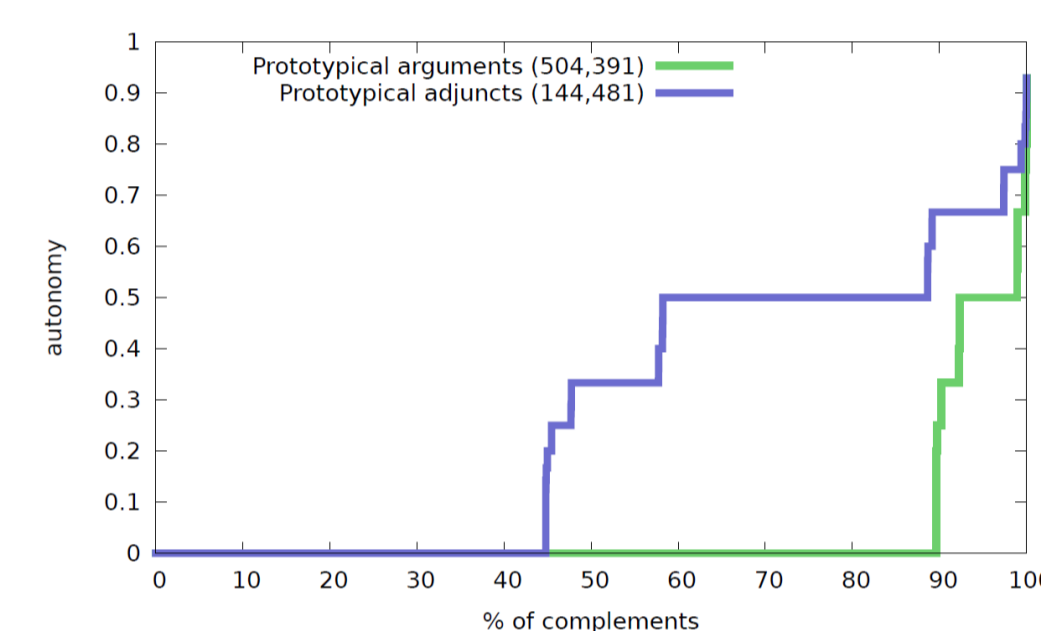
**Ordering:** arguments tend to be closer to the verb than adjunct.

$$autonomy_{ordering}(c) = \frac{distance(c)}{number\ of\ complements}$$

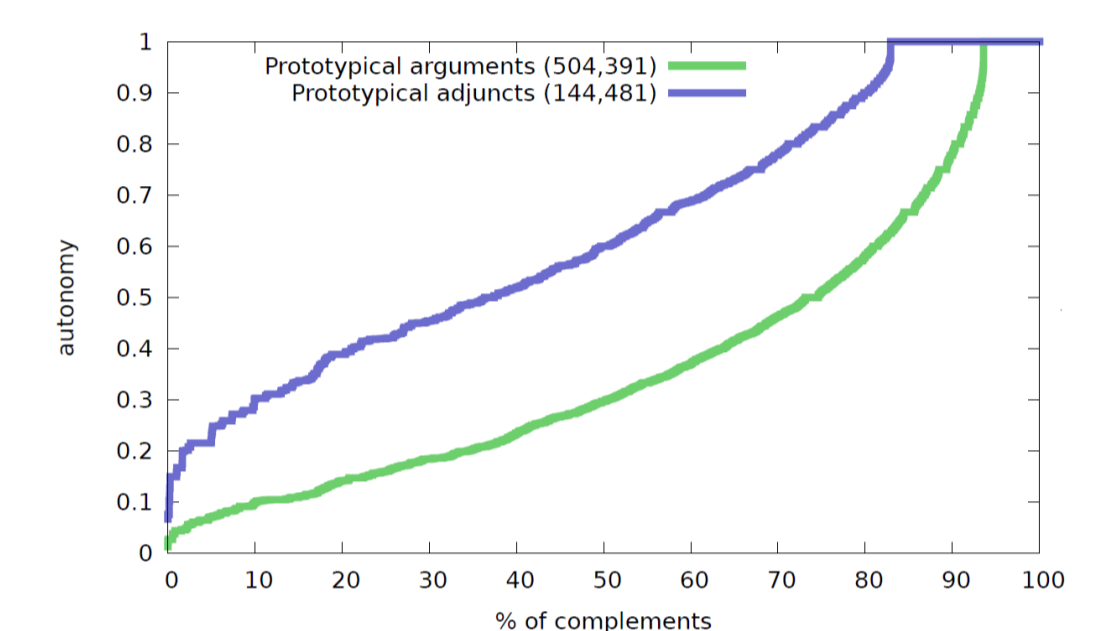
**Head dependence:** arguments tend to cooccur with a narrower range of verbs than adjuncts.

$$autonomy_{head\_dependence}(c) = \frac{productivity(c)}{count(c)}$$

Complements are sorted according to their degree of autonomy toward the verb.



**Figure 2.** Ordering



**Figure 3.** Head dependence

With both criteria it appears that prototypical arguments tend to have a lower autonomy than prototypical adjuncts.

## Evaluation

We evaluate distinction criteria on 31,531 examples, all containing at least one complement marked with the *wo* particle and one complement marked with the *de* particle.

We add an extra criterion which is the combination of ordering and head dependence (*i.e.* the product of their degree of autonomy).

Our evaluation method rely on the idea of a continuum between arguments and adjuncts. For a criterion to be relevant to this task, it needs to order properly the complements along the continuum. That is, even if a criterion assigns a low autonomy to an adjunct it can still be accurate if it assigns – in the same context – an even lower autonomy to an argument (as shown in table 3).

	ヲ格 ( <i>wo</i> )	デ格 ( <i>de</i> )
Ordering (C1)	0	0.5
Head dependence (C2)	0.29	0.32
C1 + C2	0	0.16

**Table 3.** Evaluation on the example of figure 1

It appears that accuracy can be slightly improved by combining different criteria.

	Accuracy
Ordering (C1)	81.40
Head dependence (C2)	75.07
C1 + C2	<b>81.72</b>

**Table 4.** Results of the evaluation