Cuisine as a Language

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	Human Language	Animal Language
Duality of Patterning	**Distinctive sounds**, called **phonemes**, are arbitrary and have no meaning. But humans can string these sounds in an infinite number of ways to create meaning via words and sentences.	Other animals do **not** communicate by arranging **arbitrary sounds**, which limits the number of messages they can create.
Creativity	**New words** can be invented easily.	Animals have to evolve in order for their signs to change.
Displacement	Humans can talk about **remote, abstract, or imaginary things** that aren't happening in their immediate environments.	Animal communication is **context driven**—they react to stimuli, or indexes.

	Human Language	Animal Language
Interchangeability	Any **gender** of human can use the same languages	**Certain animal** communications in the animal world can only be used by **one gender** of that animal.
Cultural Transmission	Humans acquire language **cultural**ly—words must be learned.	The way that animals communicate are **biological, or inborn**.
Arbitrariness	Human language is **symbolic**, using a set number of sounds (phonemes) and characters (alphabet), which allows ideas to be recorded and preserved.	Animal communication is **not symbolic**, so it can not preserve ideas of the past.

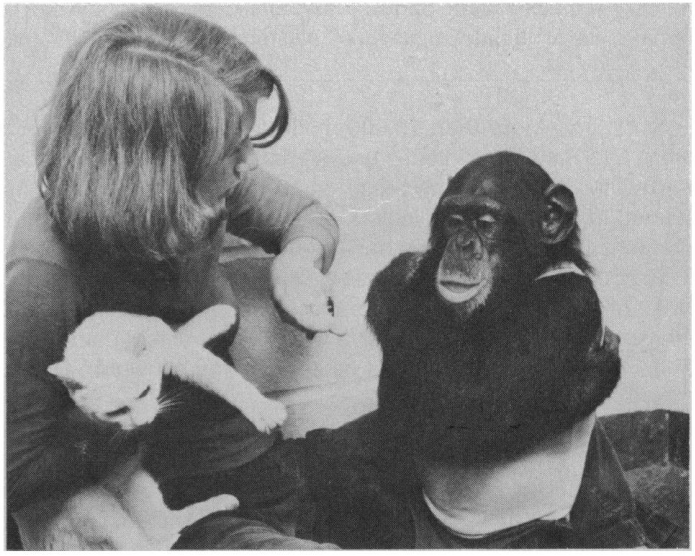
	Human Language	Animal Language
Biology	On a purely **biological level**, the human voice box and tongue are very **unique**, and are required to make the sounds we recognize as language.	Other animals have different biological structures, which impact the way they make sounds.
Ambiguity	A **word**, or sign, can have **several meanings**.	Every sign has **only one meaning**.
Variety	Human language can arrange words into an **infinite number of ideas**, sometimes referred to as discrete infinity.	Animals only have a **limited number of combinations** they can use to communicate.

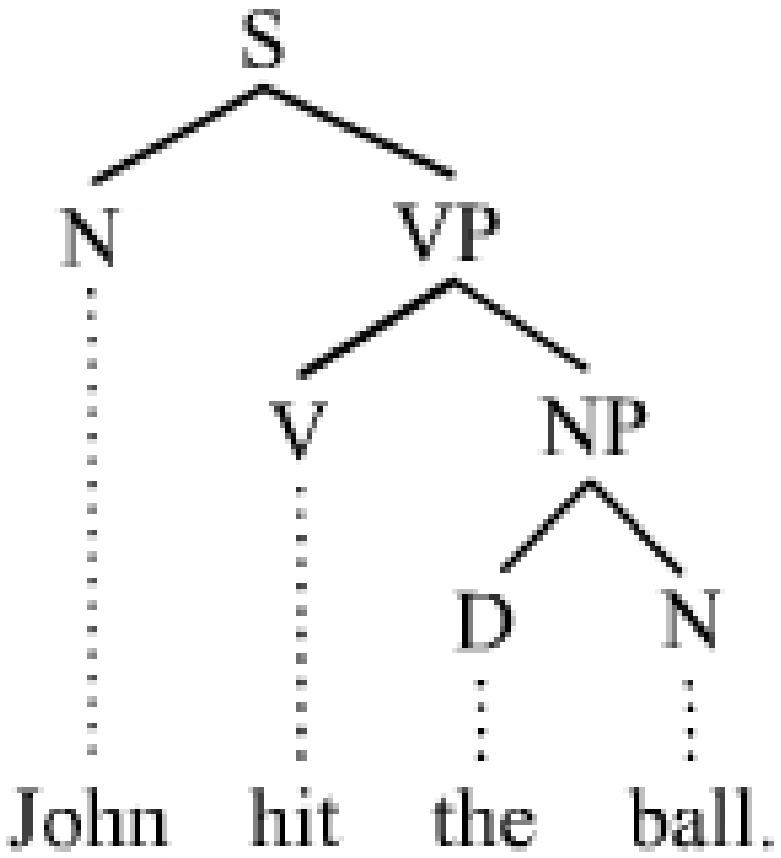
23 November 1979, Volume 206, Number 4421

SCIENCE

Can an Ape Create a Sentence?

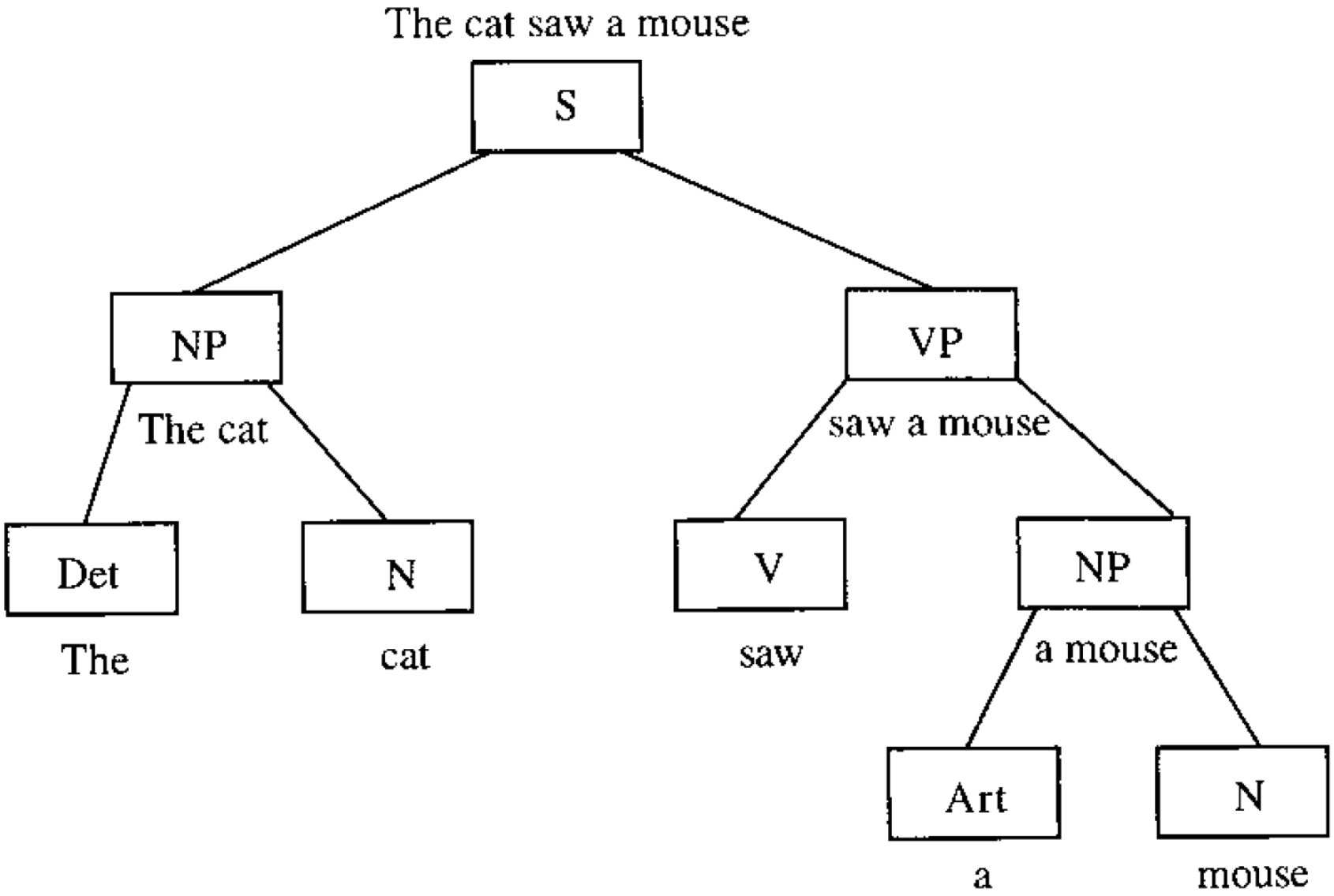
H. S. Terrace, L. A. Petitto, R. J. Sanders, T. G. Bever





Constituency-based parse tree

Source: Wikipedia



'An introduction to molecular linguistics,' Patricia Bralley, Bioscience 46(2), 1996.

Cooking as a language

- A grammar framework of language suggests that **words**, the basic building blocks of language, are **combined following certain rules to yield sentences**.

- The origin of this idea goes back to **Panini**, a fifth-century BC Sanskrit grammarian.

- Such **grammar** is **a combinatorial system** in which a *small inventory of concepts can be assembled by rules into an immense set of distinct sentences*.

- Perhaps **basic building blocks of cooking**, similar to words and rules of a language, **are 'culinary concepts' that are put together to create 'culinary sentences.'**

Spicy Potatoes

Ingredients

4 Potatoes
2 Tablespoons Oil
¼ Teaspoon Chilli Flake, Crushed
¼ Teaspoon Black Pepper
¼ Teaspoon Cumin Seed
¼ Teaspoon Mustard Seed

Cooking Instructions

1. Preheat the oven to 220 C/425 F.

2. Cut the potatoes into 2-3cm/1inch squared cubes. Bring a pan of salted water to the boil and blanch the potatoes for 23 minutes to begin cooking. Drain well.

3. Heat the oil in a large roasting tray on the hob and add the potatoes tossing to coat in oil until browned. Season well.

4. Roast in the oven for 40-50 minutes until crisp and golden and cooked through.

5. Once roasted, add the spices to the oil.

6. Toss potatoes in the tempered spices and serve.

Cubits—the basic building blocks of cooking

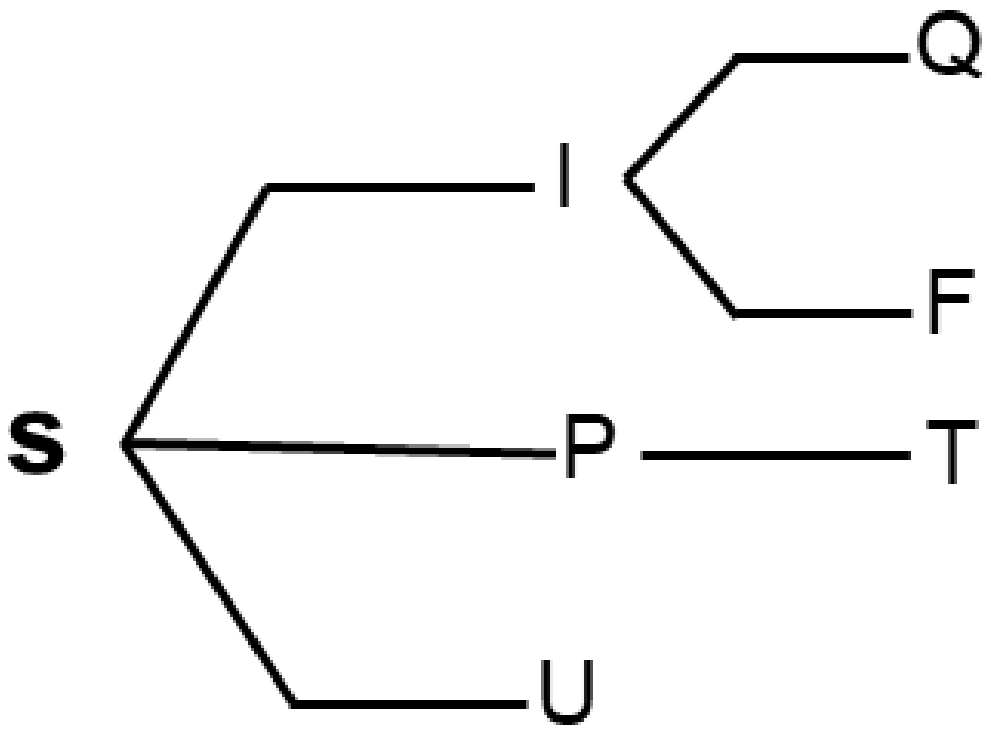
- Perhaps basic building blocks of cooking, similar to words and rules of a language, are **'culinary concepts' that are put together to create 'culinary sentences.'**

- Subsequently, **these 'sentences' coalesce to form richer structures—recipes**.

- Let's name these 'culinary concepts' as '**cubits**' (culinary bits)—the culinary equivalent of an information-theoretic bit.

- Analogous to words that relate to parts of speech, cubits are parts of cooking: **ingredient name (I)**, **quantity-and-unit (Q)**, **form (F)**, **processing action (P)**, **description of processing action (T)**, and **utensil (U)**.

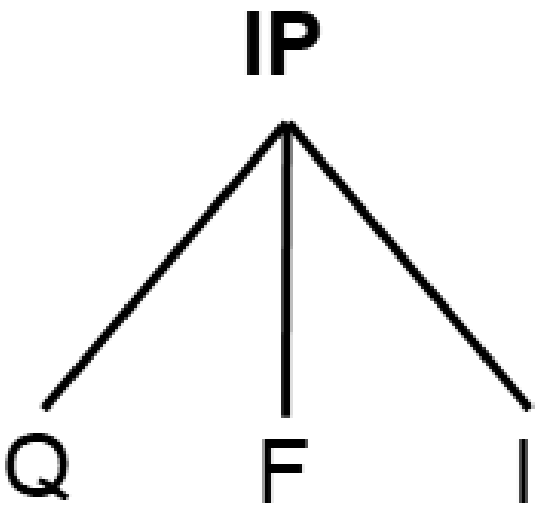
- While some of these are comparable to their linguistic counterparts (noun, determiner, adjective, verb), the others are not.



Parts of Cooking (PoC)

S: Culinary Sentence
I : Ingredient Name
P: Processing Action
U: Utensil
Q: Quantity and Unit
F : Form
T : Describes ‘P’

Rule 1



- The **first rule** generates ‘ingredient phrases’ such as those listed in a recipe’s ‘ingredients’ section.
- An **ingredient phrase (IP)** may be composed of the **cubits** **quantity-and-unit (Q)**, **form (F)**, and the name of the **ingredient (I)**.

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2 Tablespoons Oil
¼ Teaspoon Chilli Flake, Crushed
¼ Teaspoon Black Pepper
¼ Teaspoon Cumin Seed
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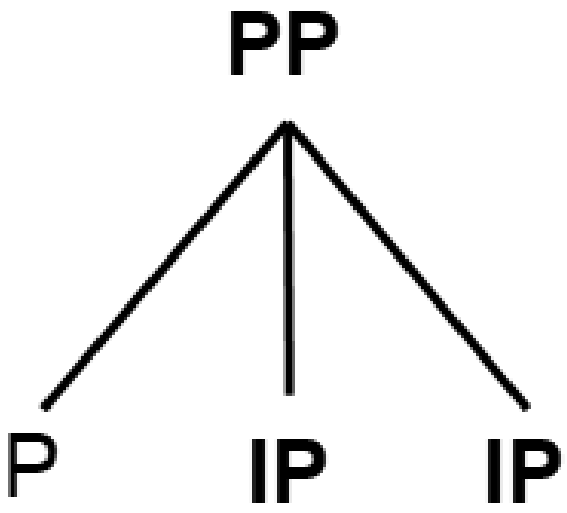
Rule 2



- The **second rule** refers to the ‘processing actions (P)’ that produce chemical transformations in ingredients (I), profoundly changing flavor profiles.
- A **processing phrase (PP)** may consist of a **process (P)** cubit followed by its direct object(s), **one or many ingredient phrases**.

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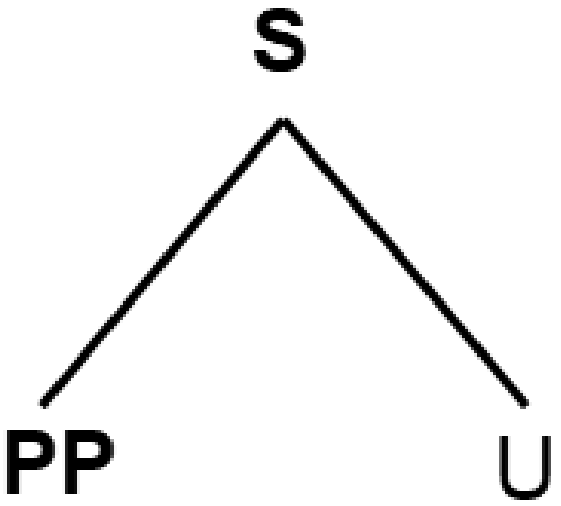
Rule 3



- Finally, the **third rule** yields **gastronomically meaningful 'sentences.'**
- A **sentence in 'recipe instructions'** may be composed of **a processing phrase (PP)** and a **utensil (U)** cubit.

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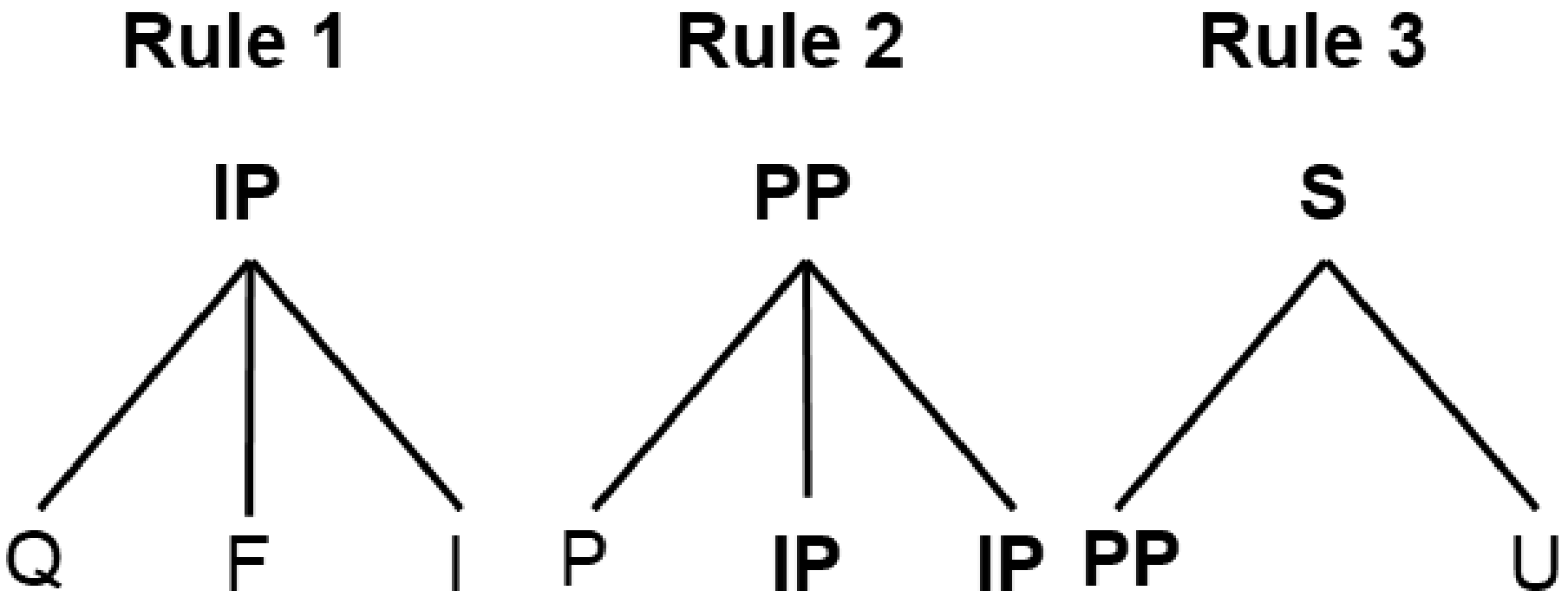
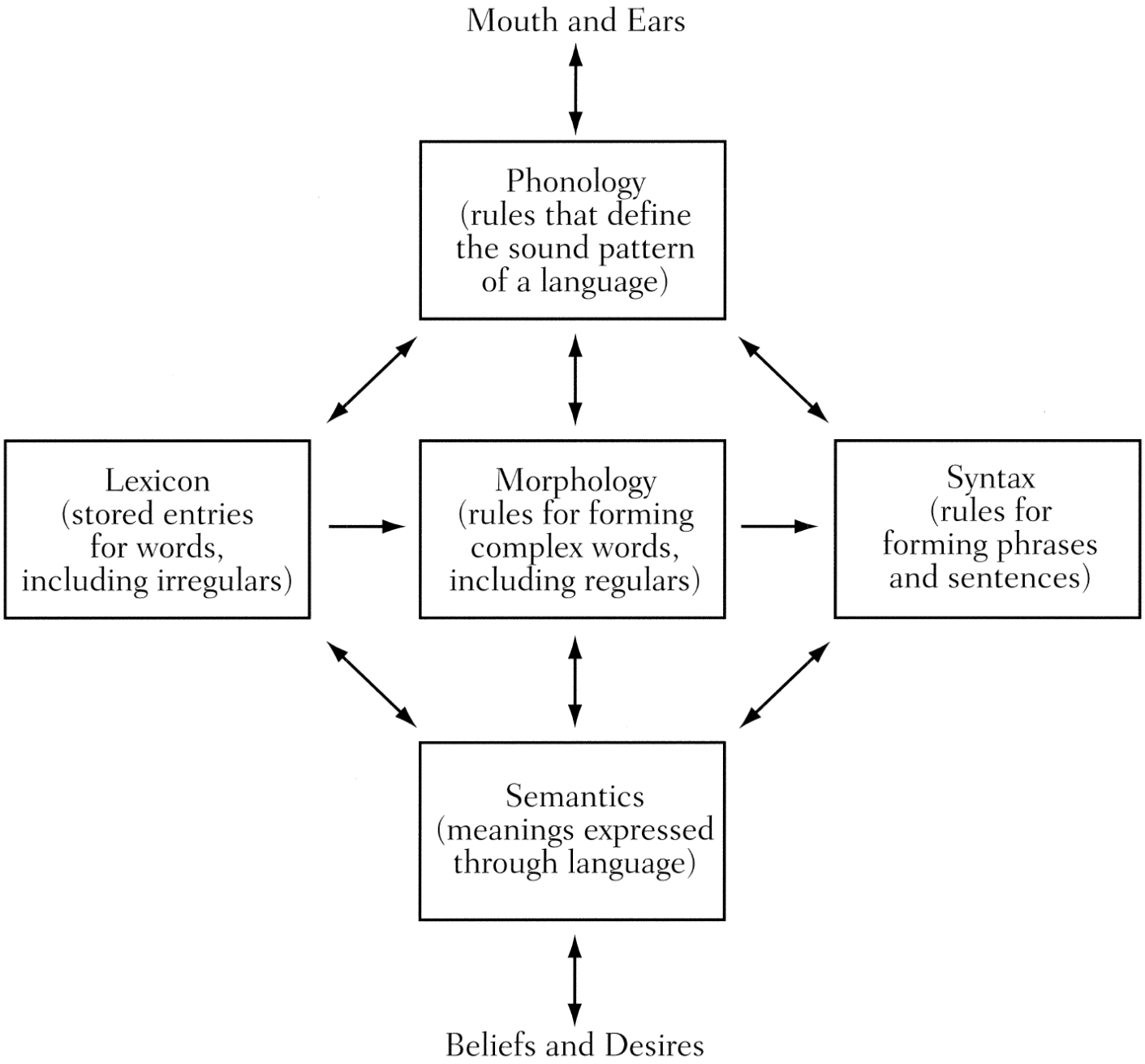
These rules, analogous to their linguistic parallels, are productive, abstract, and combinatorial.

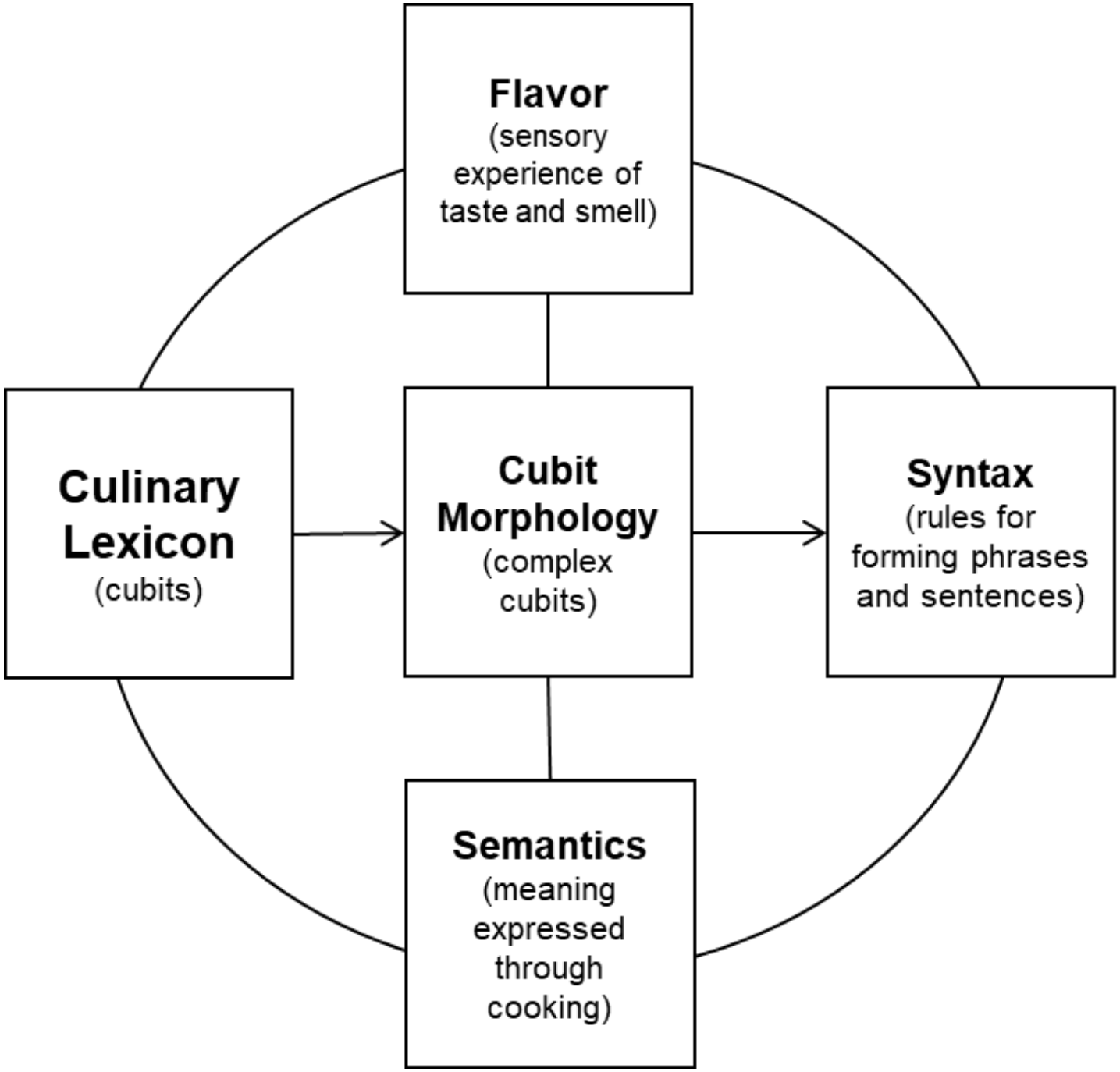
By assembling culinary concepts into phrases (according to the parts of cooking terms), this view of culinary structure gives an **insight into the use and understanding of cooking**.

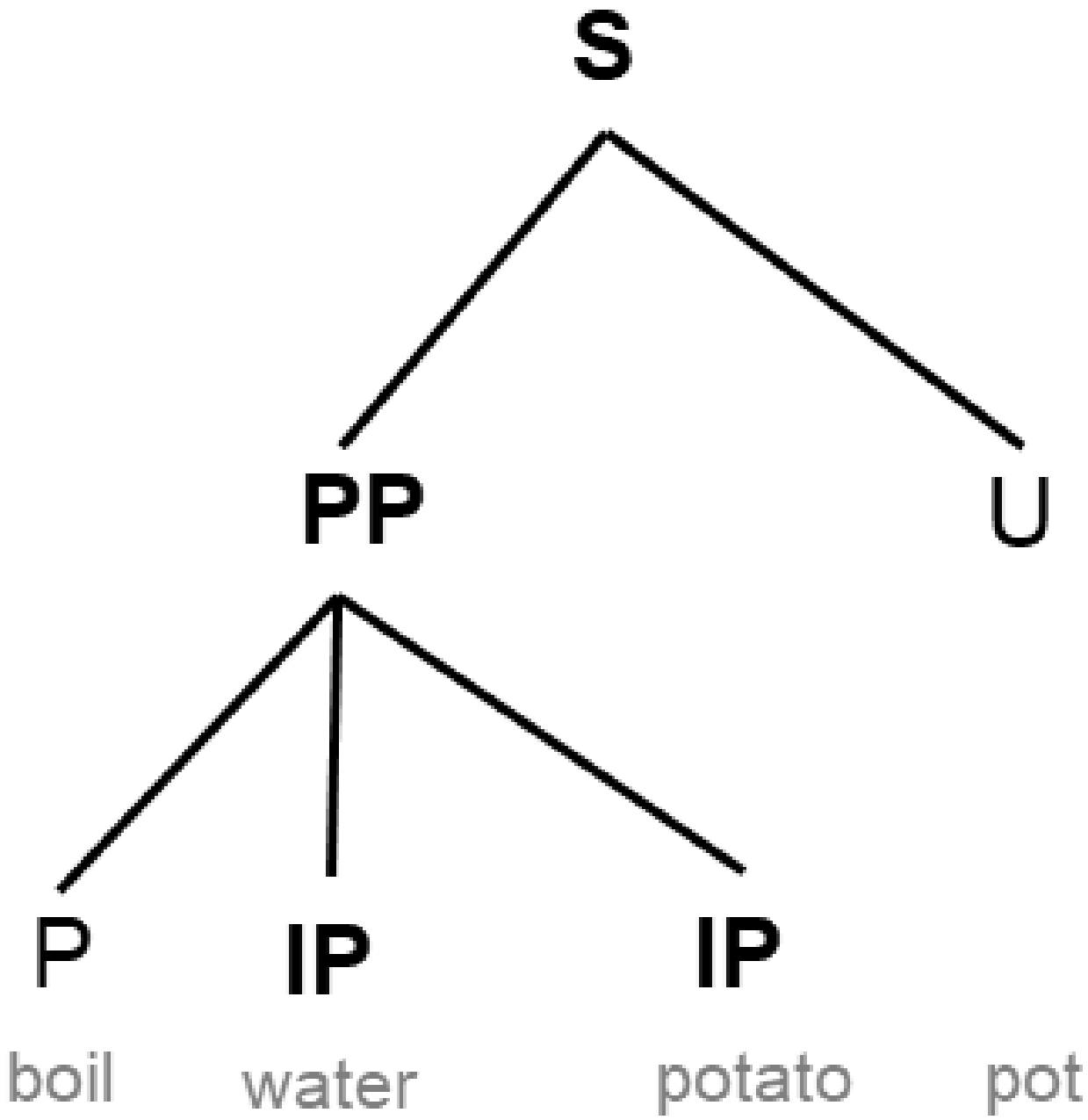
The proposed grammar materially simplifies cooking by introducing a ‘culinary phrase structure’ description.





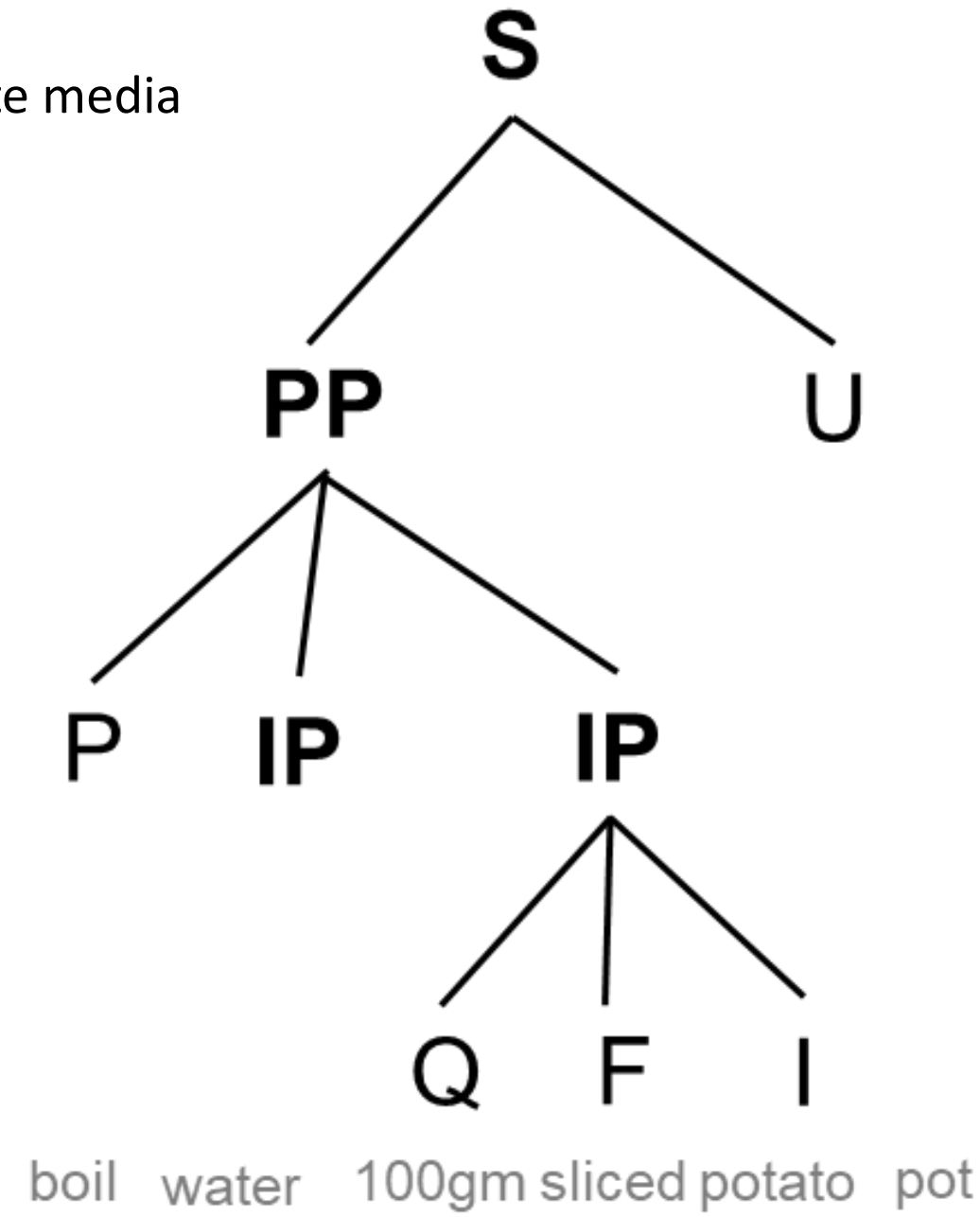
'Words and Rules,' Steven Pinker,, 2015.

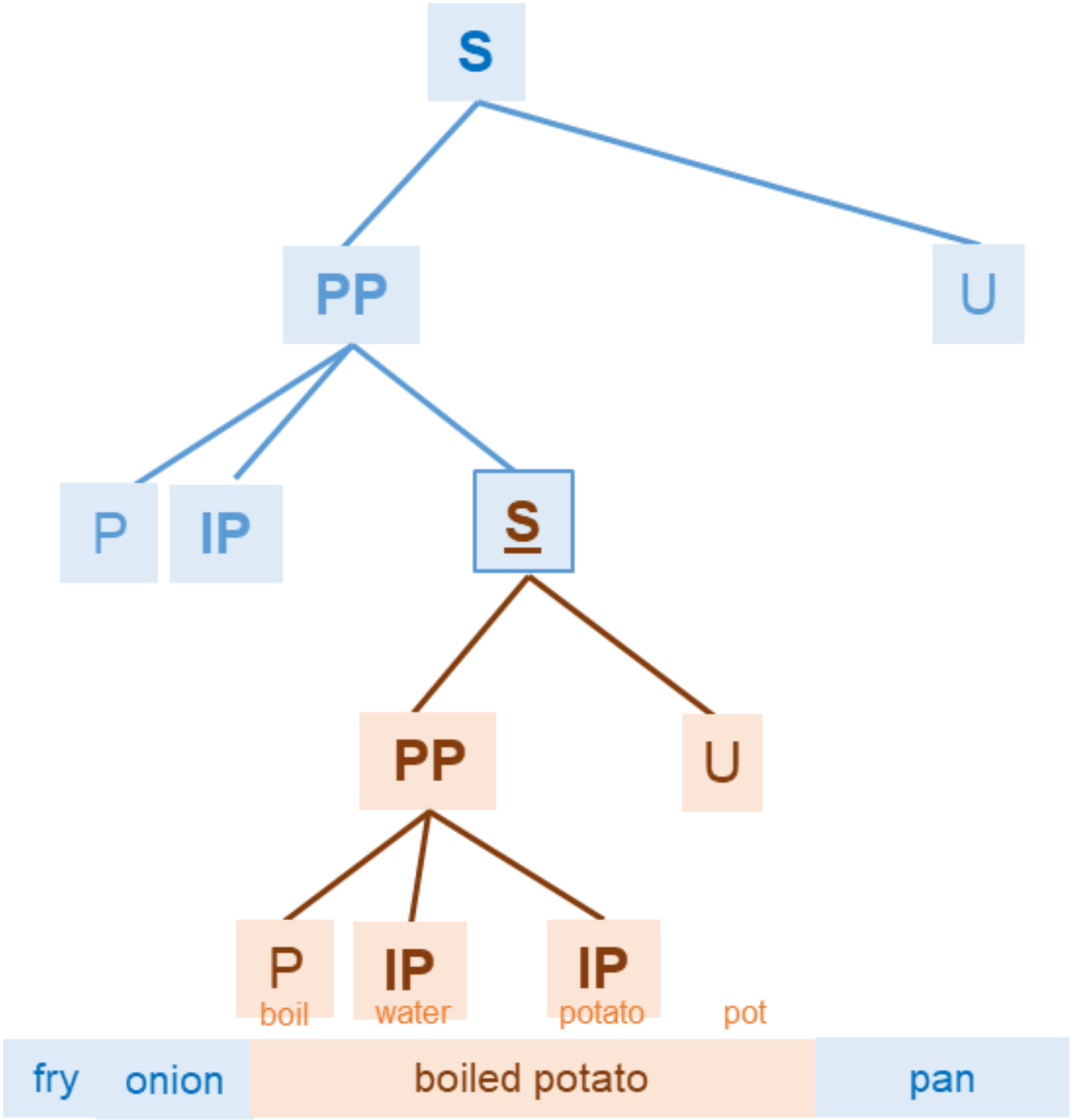

Flavor
(sensory experience of taste and smell)
Culinary Lexicon
(cubits)
Cubit Morphology
(complex cubits)
Syntax
(rules for forming phrases and sentences)
Semantics
(meaning expressed through cooking)

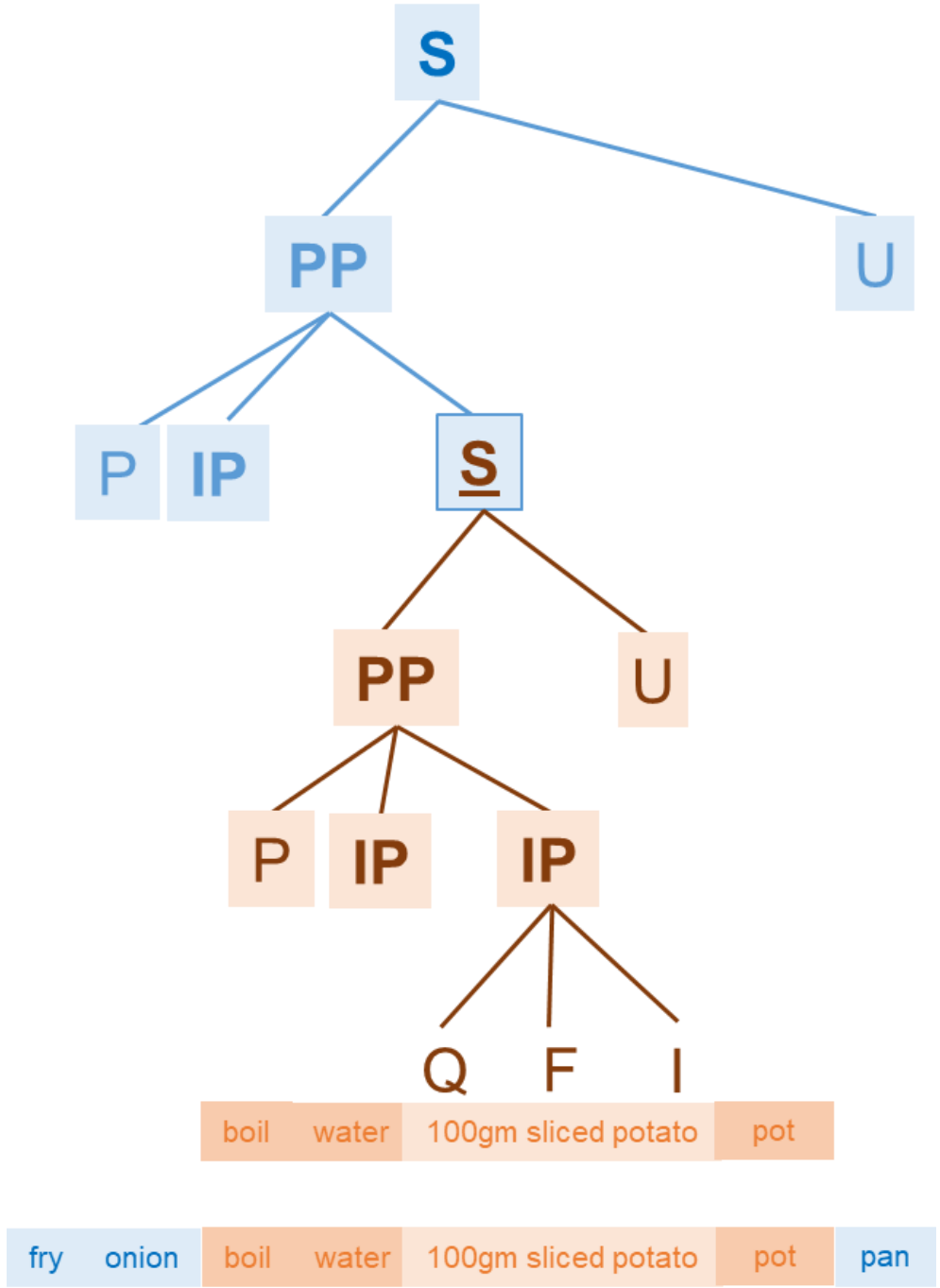

S
PP
U
P
IP
IP
boil
water
potato
pot

The Power of Recursion

Infinite material from finite media




S
PP
U
P
IP
S
PP
U
P
boil
IP
water
IP
potato
pot
fry
onion
boiled potato
pan


S
PP
U
P
IP
S
PP
U
P
IP
IP
Q
F
I
boil
water
100gm sliced potato
pot
fry
onion
boil
water
100gm sliced potato
pot
pan

Italian Potato Salad

Ingredients

IP_1. 5 Potato, peeled, chopped
IP_2. 2 Garlic cloves, minced
IP_3. 2-3 Cup Extra Virgin Olive Oil
IP_4. ½ Cup White Wine Vinegar
IP_5. ½ Cup Parsley, chopped
IP_6. 1 Spoon Salt
IP_7. 500 ml Water

Cooking Instructions

S_1. In a pot, add salt to the water.
S_2. Boil water.
S_3. Add potatoes.
S_4. Cook [until tender].
S_5. Drain.
S_6. Chop.
S_7. In a bowl, mix the garlic, olive oil, vinegar, and parsley.
S_8. Add potatoes.

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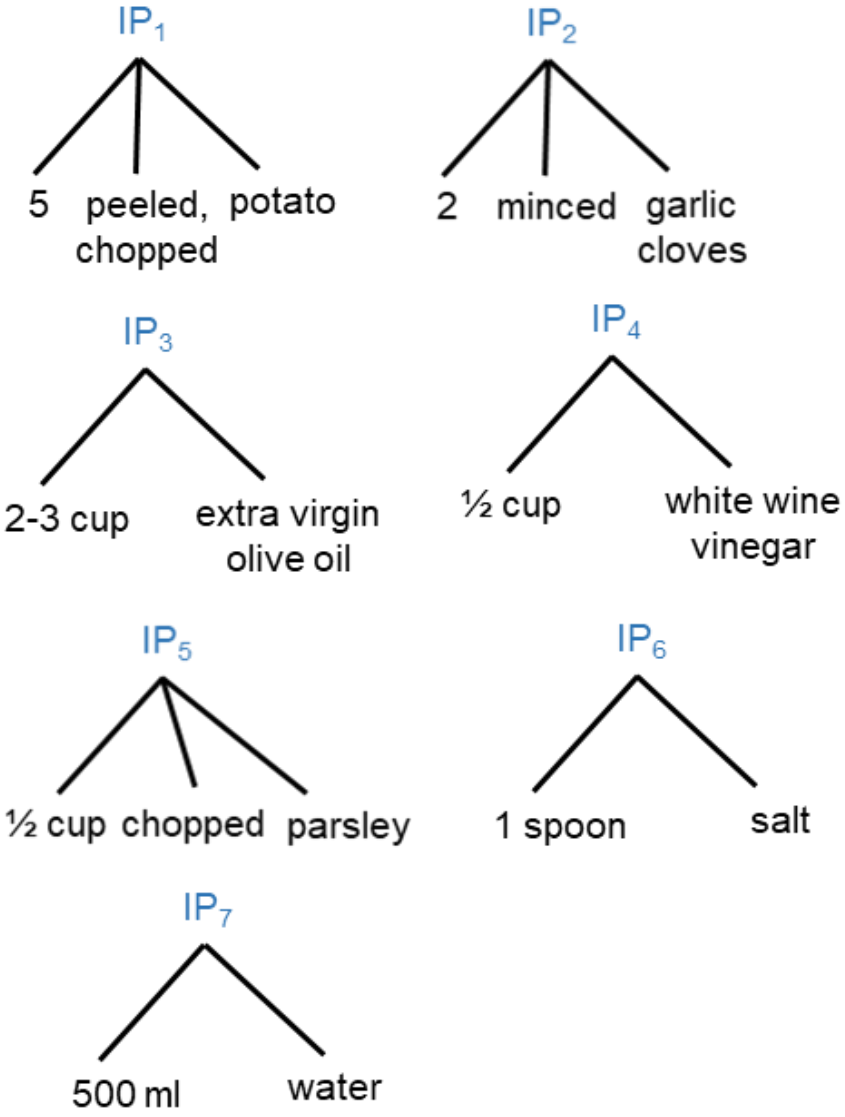

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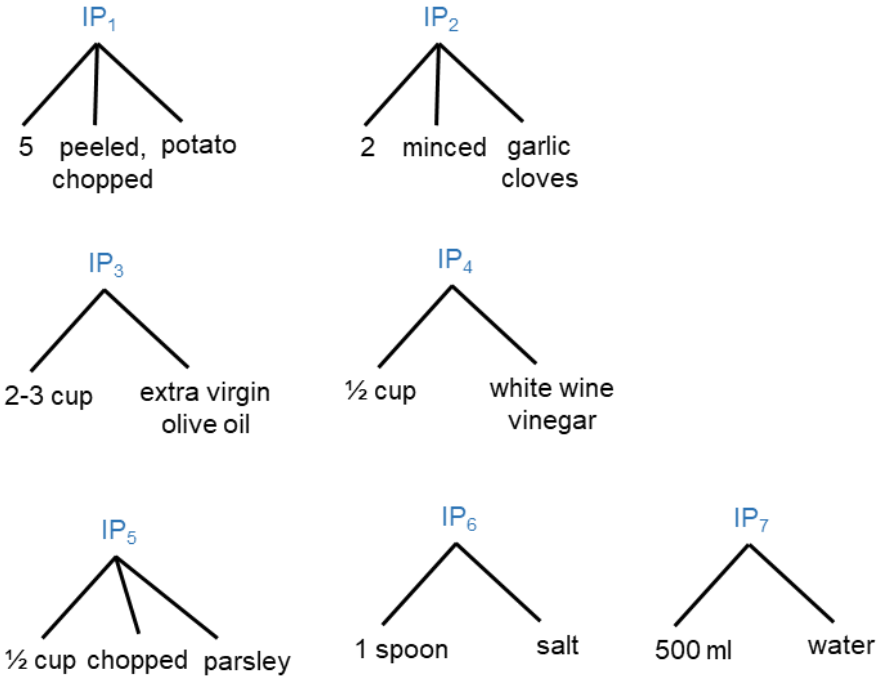

Italian Potato Salad

Mini-Project Discussions

Overview Data Code Discussion Leaderboard Rules Team Host Submissions **Submit Predictions** ...

Overview Edit

Description

Evaluation

+ Add Page

A cuisine is characterized by the distinct use of ingredient combinations and processing techniques in its recipes associated with a specific culture or geographic region. The ability to accurately classify a recipe into a cuisine would be valuable for a variety of culinary purposes including fusion recipe creation.

In this challenge

You will apply your machine learning skills to predict the cuisine category of a recipe. You will leverage a world-class dataset to build a machine learning model that gives the maximum accuracy with respect to the test set (visible and hidden). You are free to explore any technique to create the most powerful model, from creating features to using the data more organically within a model.

Acknowledgements

This dataset is part of the Complex Systems Laboratory's (IIIT-Delhi) Computational Gastronomy repository. URL: https://cosylab.iiitd.edu.in/

https://www.kaggle.com/competitions/cuisine-classification-challenge

✔ Save successful.

Overview Edit

Description

Evaluation

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Diet is a major contributor to many lifestyle disorders such as obesity, type-II diabetes, and cardiovascular disorders. Keeping a track of one's dietary intake is critical to control the nutritional intake. A tool that can correctly detect a dish from the picture of a platter taken via a mobile device, for example, will enable automating food logging, central to many diet-coach digital solutions. An algorithm that detects the dish in a picture, thus, can be used for estimating the nutritional value of the dish.

In this challenge

You will apply your machine learning skills to identify the food item present in the given image. You will leverage a world-class dataset to build a machine learning model that gives the maximum accuracy with respect to the test set (visible and hidden). You're free to explore any technique to create the most powerful model, from creating features to using the data more organically within a model.

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https://www.kaggle.com/competitions/what-indian-dish-is-that

	Human Language	Animal Language
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