

# Notes on CPG Class

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## Abstract

This notes is written for the Independent Study on Computational Paninian Grammar undertaken by us under the guidance of Prof Dipti Misra. In this, we explore concepts of the paninian framework along with the its cognitive aspects postulated by Bhartrihari. We then proceed to the concept of Vivaksha ( विवक्षा ) and propose a computational model of it.

# 1 Introduction

मेरा नाम् गन्गेश् है | Hello!

## 2 Introduction to Bhartrihari's Approach

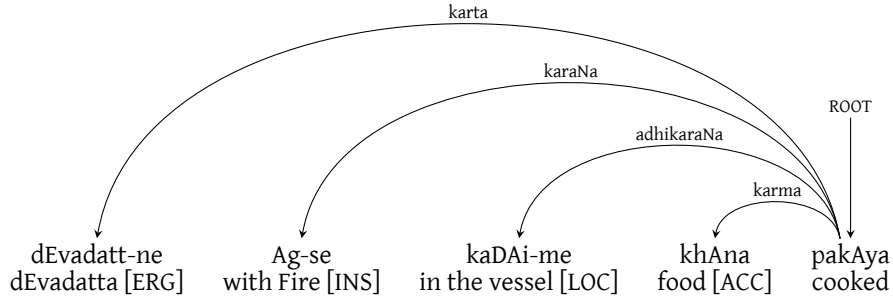
Bhartrihari introduces the notion of “power” (शक्ति.) to explain various phenomenon. According to him, every object is a bundle of powers which correspond to the ability of this object to participate and perform in various actions. We can define the object itself by describing its powers. For example, a lamp has its ability/power to illuminate, a pen has an ability to write, a book has both the ability to read from and write into.

These powers are dynamic, intertwined and complex. Every power manifests itself through a substratum, through one or many concrete objects. These powers, in the form of concrete objects aid as the means in accomplishment of the action. Because the concrete object has the ability/power to accomplish the action, it is called “साधन् (means)”. In accomplishing the action, the object lends a particular power of its own, and acts as the means. So, Bhartrihari postulates that, it is not really the object that is the means but it is its power.

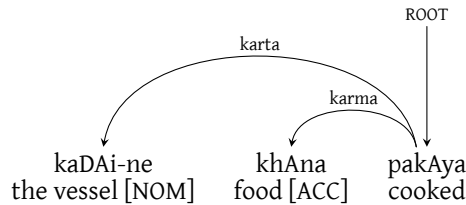
Consider the sentence, “चाबी बे ताला खोला |” which means “the keys opened the lock”. Here, the action is “opening”. There are two concrete objects which are “the keys” and the “lock”. Following Bhartrihari, the power of the “keys” is the “ability to open locks”. The power of the “lock” is the “the ability to get opened” (It also has abilities like “Guarding”, “Sealing” etc but, in the context, this applies best). When we look at the original sentence and try to map it to the real world, we will be faced with a severe problem which is, “keys are inanimate”, they cannot open the lock by themselves. But, this sentence applies well in real communication and people use it. When we look at this sentence and say instead of the objects themselves, the powers are the means of accomplishment then, the sentence can be at a vague meta level be represented as “ an object with the ability to open, opened the object which has the ability to be opened”.

This creates distinction between what Bhartrihari calls as “sabdhArtha” (Spoken meaning) and “vAsthavArtha” (Meaning in the real-world). The sentences like above are possible because the speaker of the language is not totally bound by the realities of the world. The speakers’ cognitive model is based on the powers of the objects and the resulting sentences are the output of his intention and his cognition.

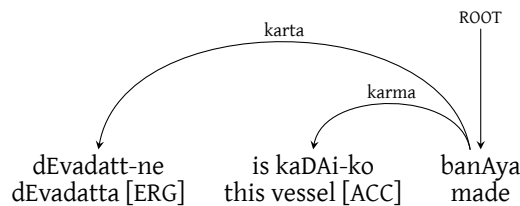
These “साधन् (means)” are embodied into the sentence as “कारक roles” which are described in the previous section. One can see, in various instances the same object being used as different “कारक ”. For example, we have



“(1) dEvadatta cooked the rice with the fire in the vessel ”



“(2) The vessel cooked the rice ”



“(3) dEvadatta made this vessel ”

We see that, in the previous three examples, the “vessel” is used as karta, karma and adhikaraNa. Considering the semantic distinction between the three “कारक roles”, any concrete object cannot probably undergo changes so dramatic that it becomes the agent once, the object once and an instrument in an other instant. So, here the speaker while shifting the concrete object through all these situations is actually placing the object in the sentence, using it as a substratum for the specific power that is there in this object which applies in the given context. In the first sentence the, speaker focuses on the “ability to hold food” hence the adhikaraNa kArakA. In the next, he elevates the vessel to a central factor in the act of cooking making it the “karta”. Finally, in the last sentence, he focuses on its “ability to be made”. This phenomenon of depicting various real world entities via different kArakAs in different contexts as the speaker intends and sees fit is called “vivaksha”.

Bhartrihari states that, for a speaker to produce an utterance, the objects in the sentence need not exist in the real world but they merely have to exist as “objects of cognition” and the sentence is but a manifestation of an “Internal Reality”.

## 3 karta

### 3.1 Introduction

## 4 karma

### 4.1 Introduction



## 5 karaNa

### 5.1 Introduction

## 6 sampradAna

### 6.1 Introduction

## 7 apAdAna

### 7.1 Introduction

## 8 adhikaraNa

### 8.1 Introduction

## 9 The other relations

### 9.1 hEtu

### 9.2 tAdarthya

### 9.3 sEsa

## 10 Pratibha

11 Vivaksha ?

## 12 Modeling Vivaksha