

Sprucing up Supersenses:

Untangling the Semantic Clusters of Accompaniment and Purpose

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Sprucing up Supersenses:

Dealing with semantic hippogriffs?

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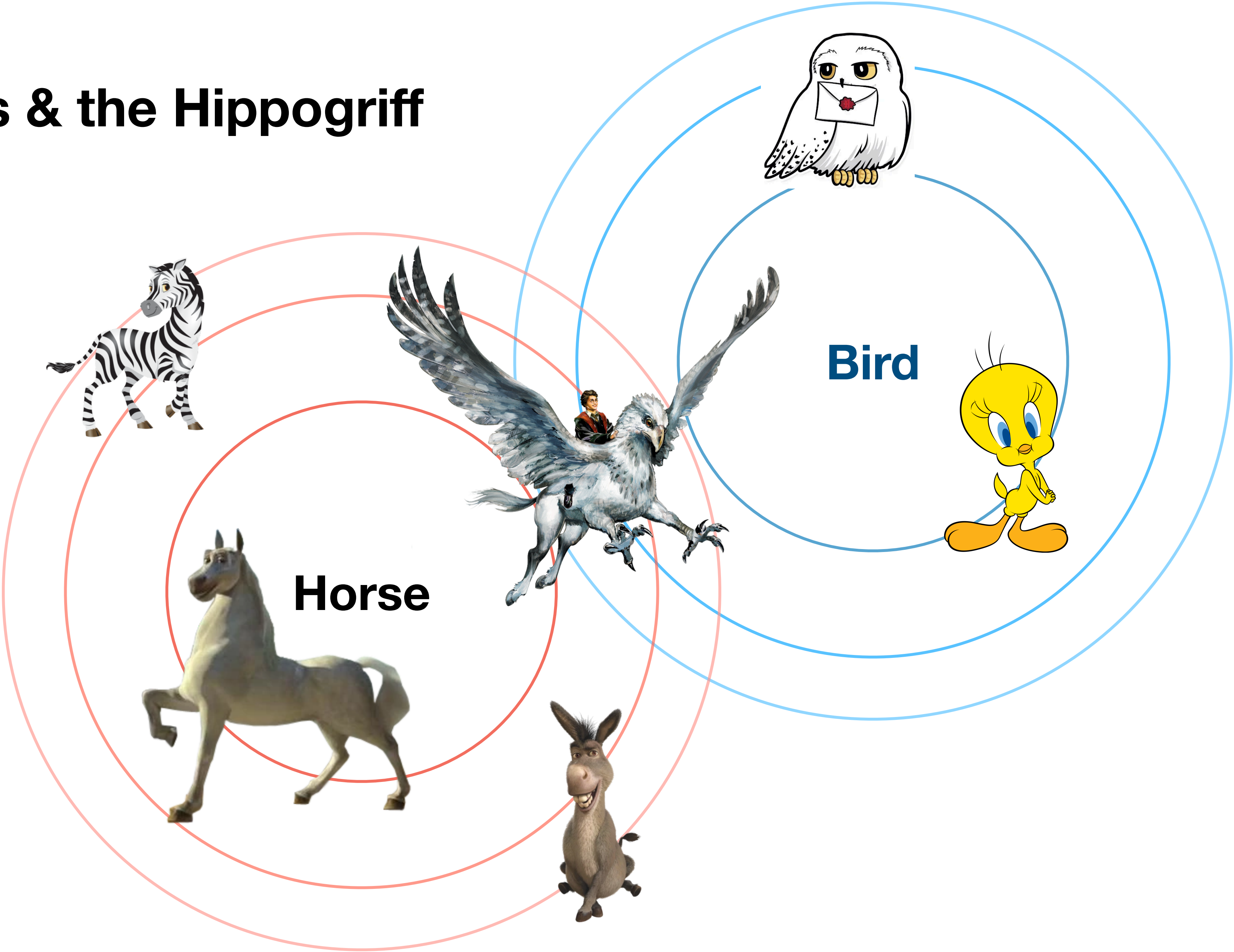


Bird?

Hippogriff?

Horse?

Prototypes & the Hippogriff



Hippogriffs of Accompaniment

Groupings

Rice and beans

Possession

People with money

They arrived **with** a pie.

Rice **with** beans

Walk **with** me!

Luna vacationed **with** her father.

Harry fought **with** Ron.
(against Voldemort)

The forks are **with** the knives

Harry fought **with** Voldemort.

Location

The folks are in the drawer

Agent

Harry and Voldemort fought.

Hippogriffs of Purpose

Point of Comparison

It is bigger than me

It is too large for groceries

A great place
for Quidditch

A shoulder
to cry on

Tools for
weeding

Minerva rose to
give a speech

Everyone cheered
for an encore

I found a
sandwich to eat

They paid for the meal

Theme

Let's wait for Steve

This talk:

- New analysis of **accompaniment** (*with, without, together*) and **purpose** (*for, infinitive to*) in English
 - Lumping? Splitting? Both?

Paper:

- Details and argumentation relative to old analysis

Guidelines:

- Adposition and Case Supersenses v2.5: Guidelines for English, <https://arxiv.org/abs/1704.02134>

Corpus:

- Annotated in STREUSLE, <https://github.com/nert-nlp/streusle>
 - Application to disambiguation (Schneider et al. 2018)

SNACS Framework

SNACS Framework

- Semantic **N**etwork of **A**dposition and **C**ase **S**upersenses
- Specifically designed for semantics of prepositions
- Broad semantic labels
- Lexically Agnostic

The cat is **on** the mat **in** the kitchen **on** a Sunday **in** the afternoon



Locus



Time

work **on** the engine, a speech **on** the economy, the light is **on**, ...

SNACS Framework

- 50 coarse-grained **supersenses** for prepositions/possessive
 - English Guidelines: <https://arxiv.org/abs/1704.02134>
- English: **STREUSLE corpus** with comprehensive gold annotations; web reviews
 - **4,000 prepositions** and **1,000 possessives** (Schneider et al. 2018; revised in this work)
- Other languages (**bold** = corpus release)

Mandarin Chinese (Peng et al., LREC 2020)

Korean (Hwang et al., DMR 2020)

Hindi (Arora and Schneider, SIGTYP 2020)

German (Prange and Schneider, in review)



Other SNACS papers being presented in
COLING 2020 workshops:

Korean corpus (DMR)

Reddit L2 English corpus (LAW)

Proxy annotation tasks (LAW)

SNACS Framework: Construal

- Construal analysis:
 - scene role: preposition's role with respect to the scene
 - function: preposition's semantic contribution

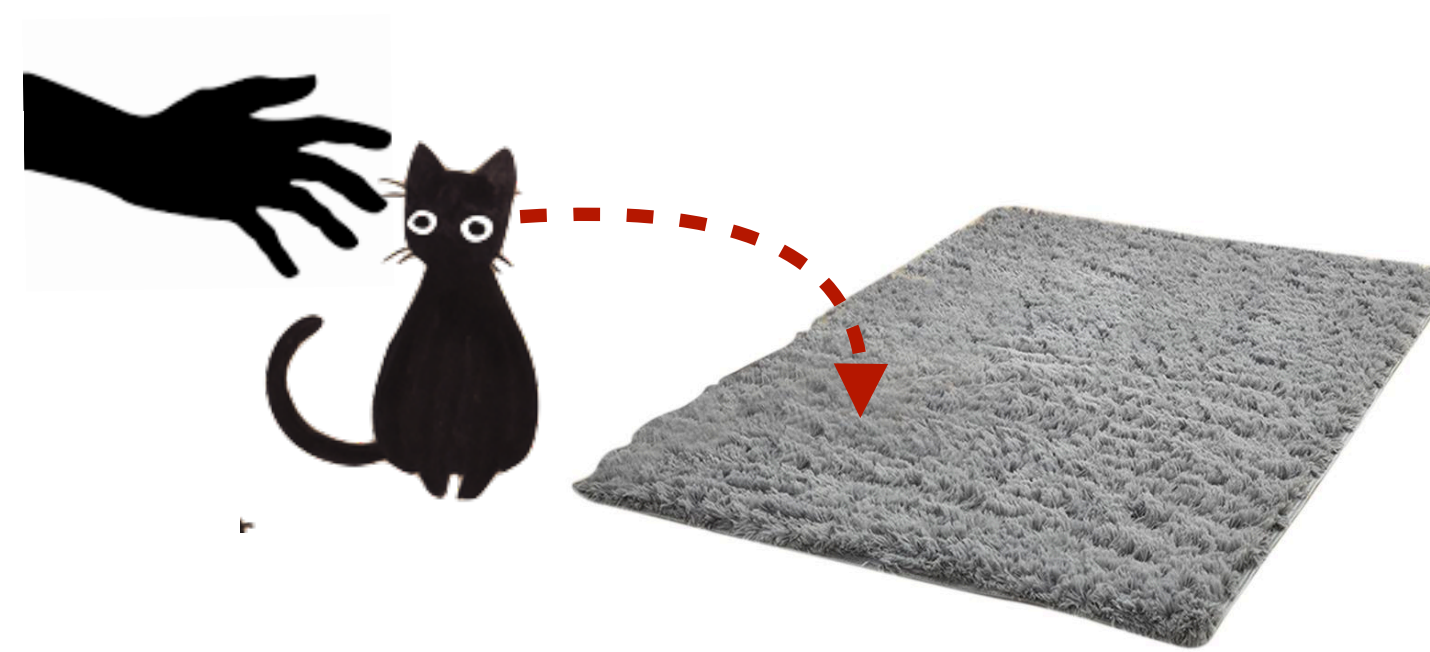


The cat sits **on** the mat

Scene Role: **LOCUS**

Function: **LOCUS**

LOCUS

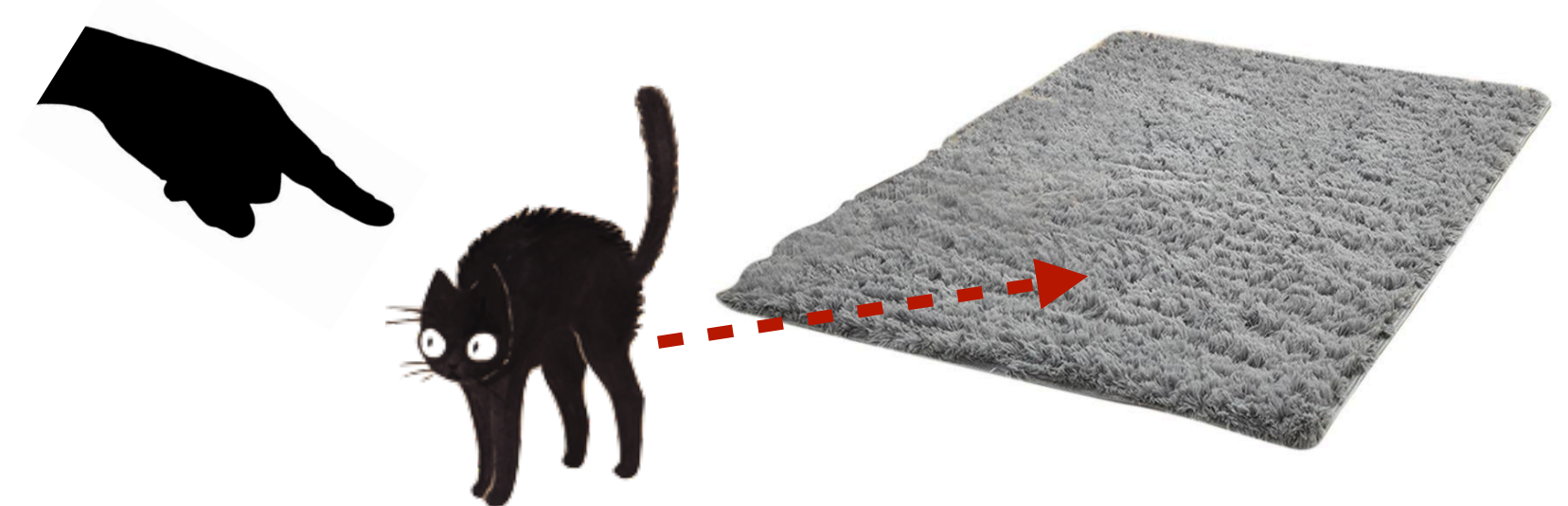


Put the cat **on** the mat

Scene Role: **GOAL**

Function: **LOCUS**

GOAL ~ LOCUS



Banish the cat **to** the mat

Scene Role: **GOAL**

Function: **GOAL**

GOAL

Accompaniment

ENSEMBLE

Rice and beans

Rice with beans

They arrived with a pie.

POSSESSION

People with money

Walk with me!

Luna vacationed with
her father.

ANCILLARY

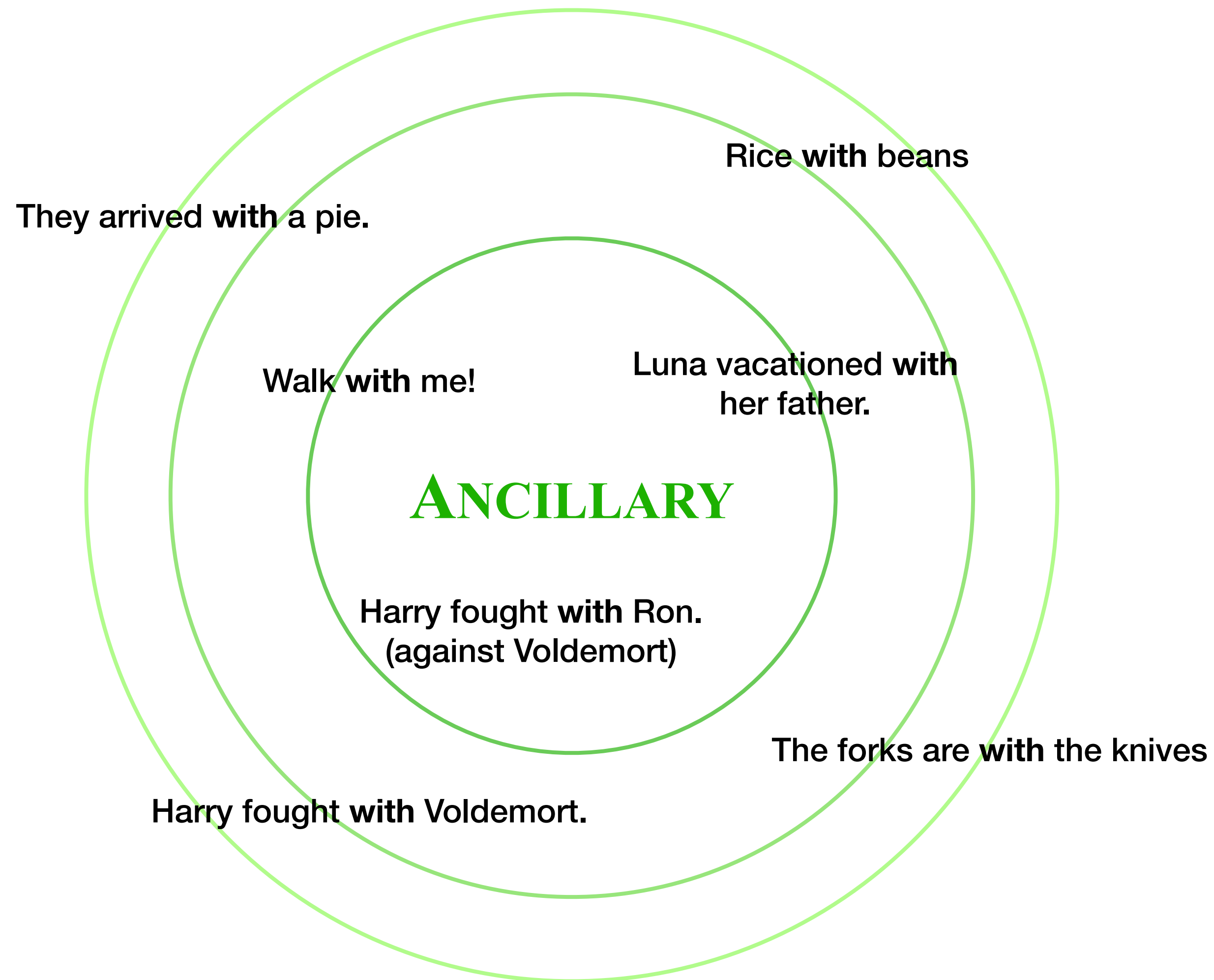
Harry fought with Ron.
(against Voldemort)

The forks are with the knives

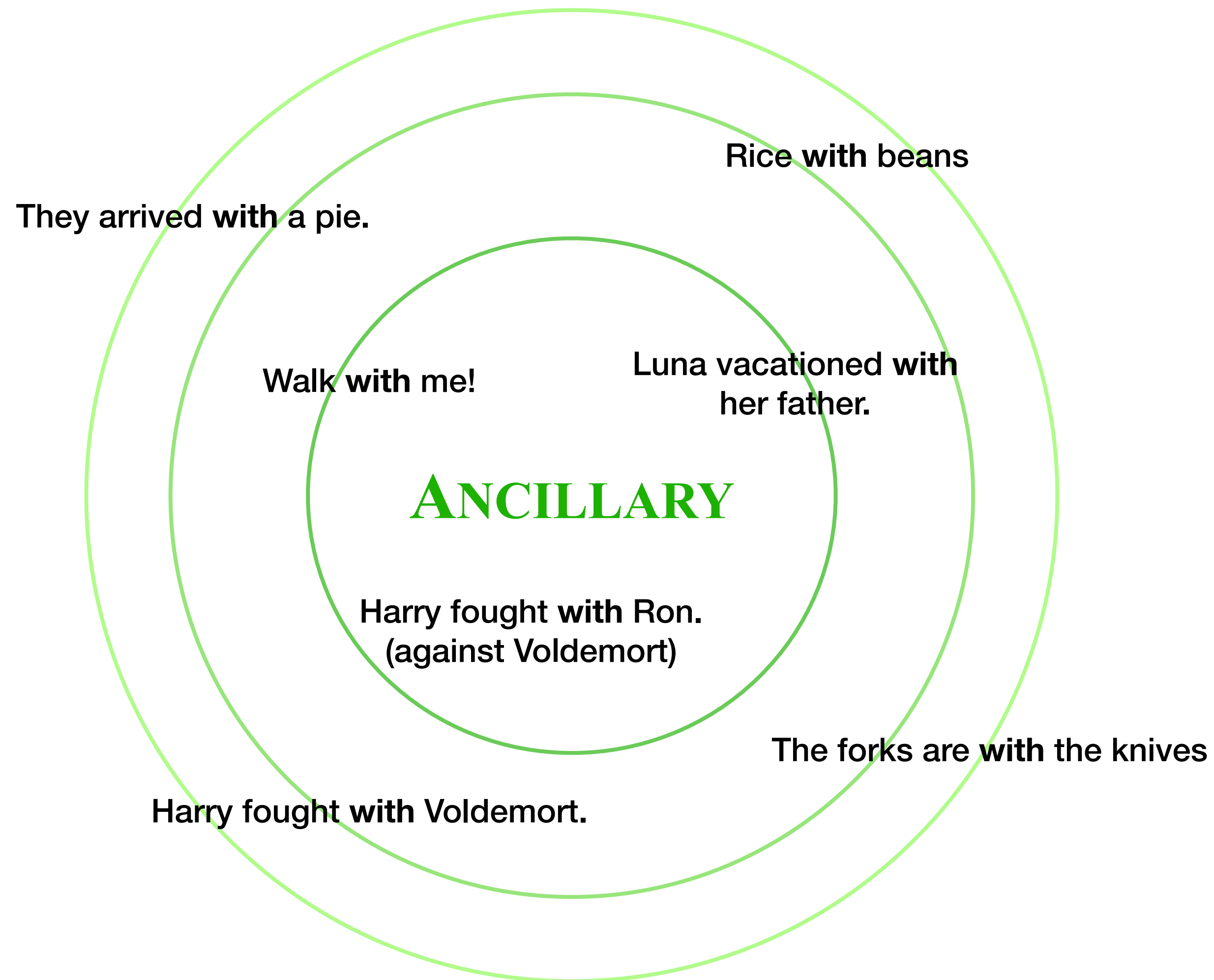
Harry fought with Voldemort.

LOCUS

The folks are in the drawer



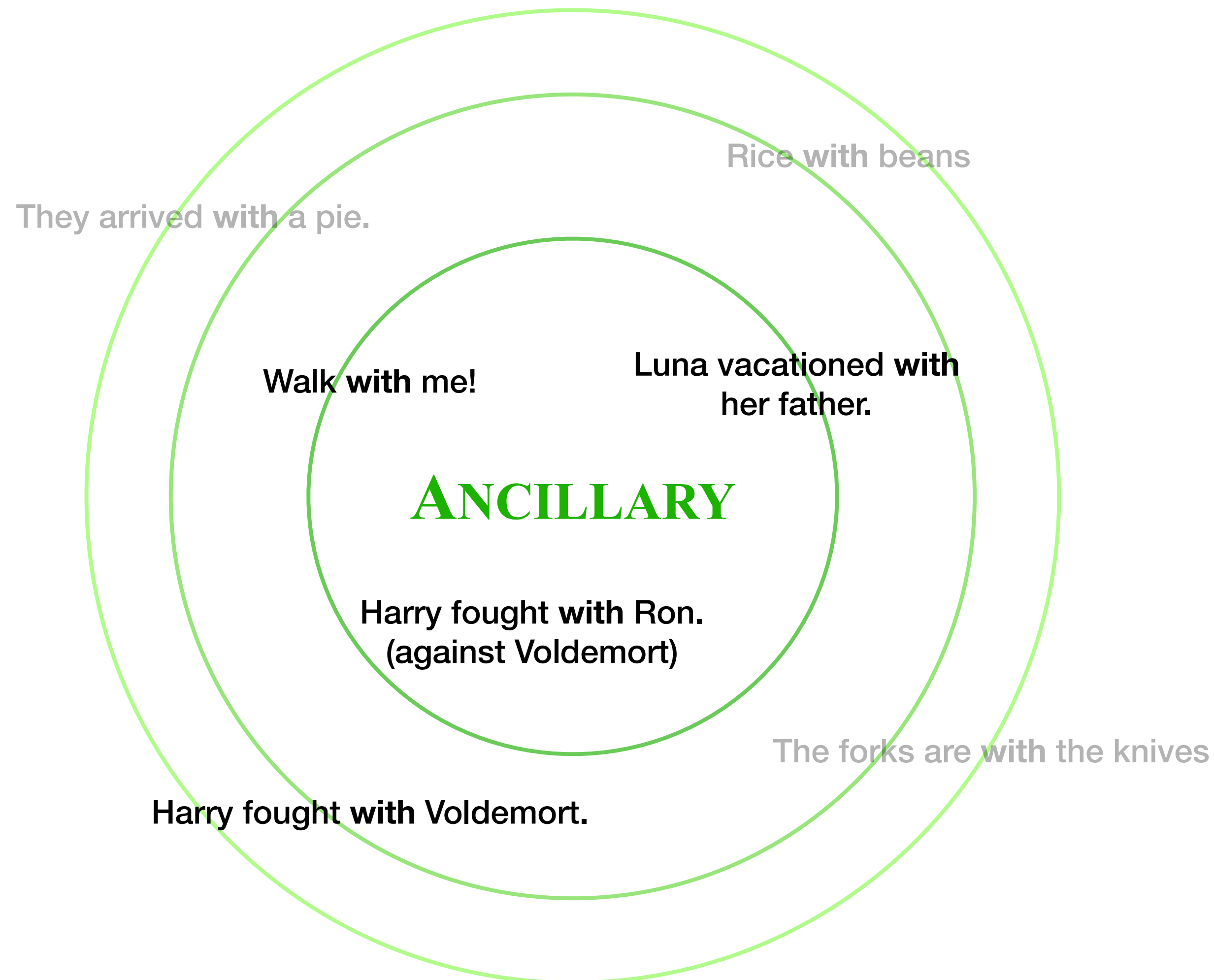
PROTOTYPE	“Surplus Participant”
HIPPOGRIFF	Co-Participant
HIPPOGRIFF	Configurational Ancillaries
HIPPOGRIFF	Compound Entity



PROTOTYPE

“Surplus Participant”

- Accompanies another participant in the context of event
- Participation is similar to that of the other participant
- Participation is of secondary importance



HIPPOGRIFF

Co-Participant

- Core participant in the situation engaged symmetrically, reciprocally, or in a qualitatively different way with respect to another participant

Harry fought with Voldemort

AGENT~ANCILLARY

The Snitch collided with a Bludger

THEME~ANCILLARY

I agree with her

EXPERIENCER~ANCILLARY

- Does not allow for *together*-insertion text, while prototypical **ANCILLARIES** do.

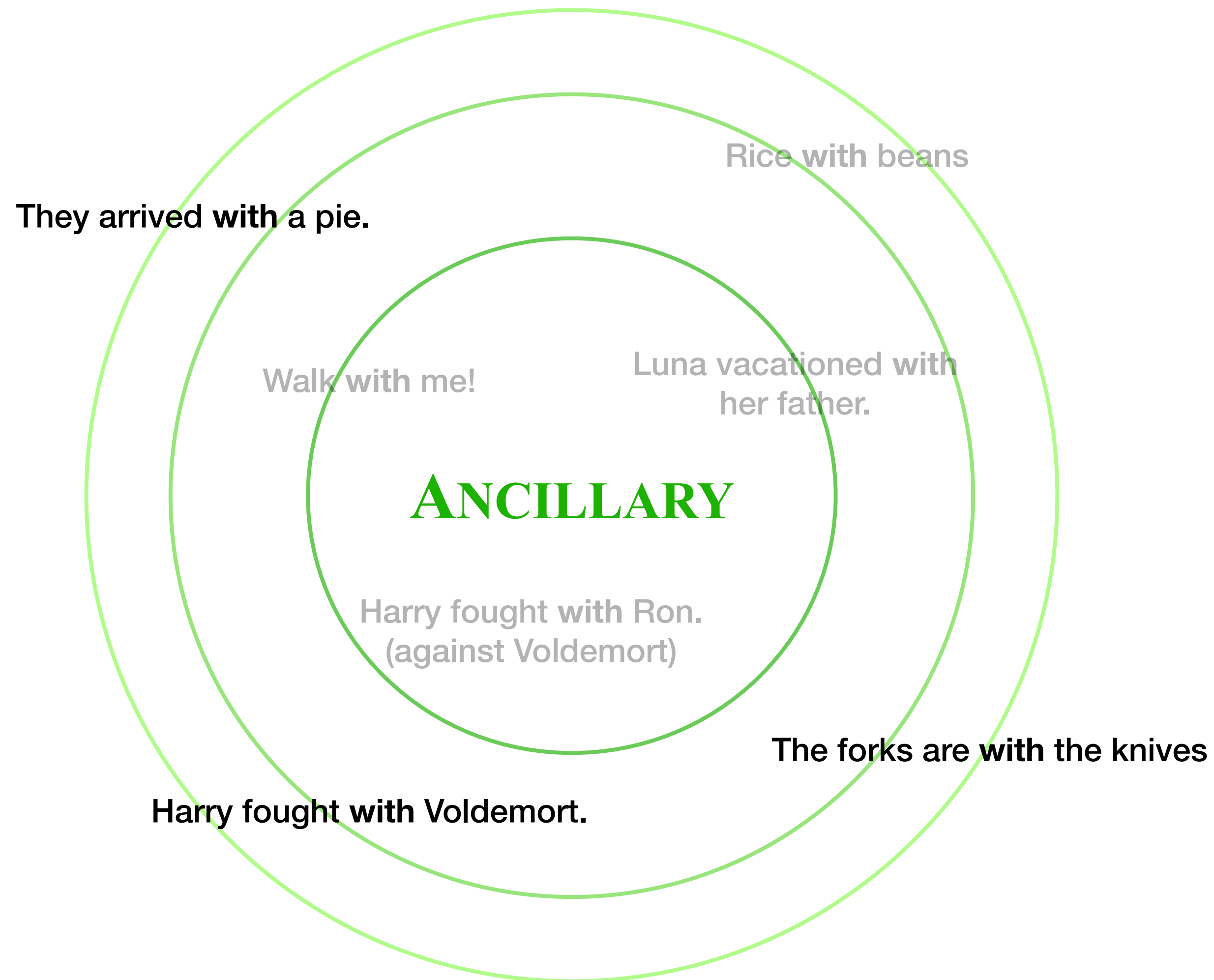
Luna vacationed **together** with her father.

Harry fought **together** with Ron.

vs.

X Draco met **together** with Bellatrix.

X Harry fought **together** with Voldemort.



HIPPOGRIFF

Configurational Ancillaries

- Mediates configurational information with respect to the governing head

The forks are **with** the knives

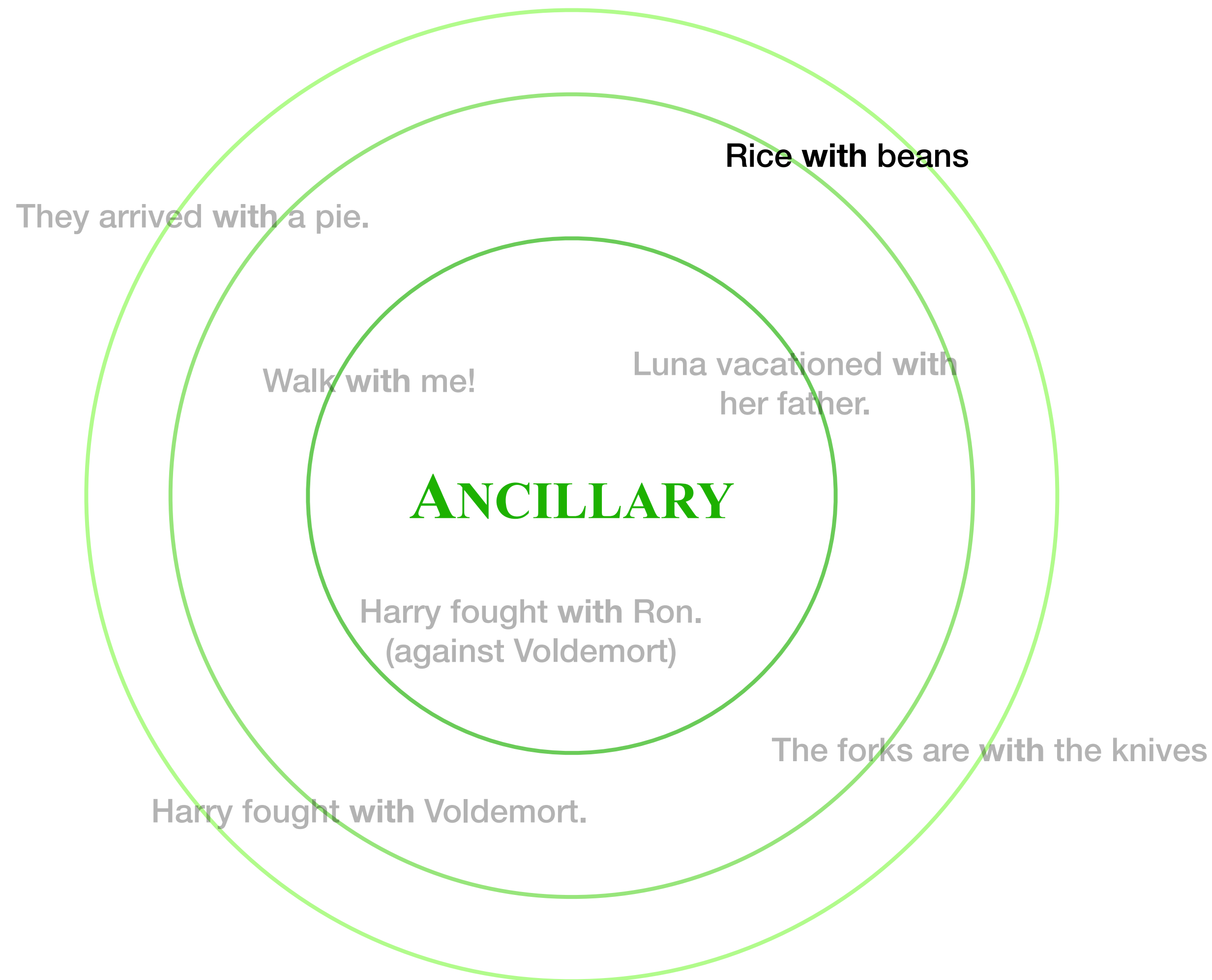
LOCUS~**ANCILLARY**

They arrived **with** a pie

POSSESSION~**ANCILLARY**

Vernon is **with** Grunnings

ORG~**ANCILLARY**



HIPPOGRIFF

Compound Entity

- Two items on equal semantic footing

Rice with beans

ENSEMBLE ~ ANCILLARY

~ “Rice and beans”

- **ENSEMBLE:**
 - Grouping of two (or more) entities that are on equal semantic footing with one another
 - In English, **ENSEMBLE** has no prepositional prototype; equivalent to coordinating conjunctions (e.g. Korean)

Purpose

COMPARISONREF

It is bigger than me

A great place
for Quidditch

It is too large for groceries

A shoulder
to cry on

Tools for
weeding

Minerva rose to
give a speech

PURPOSE

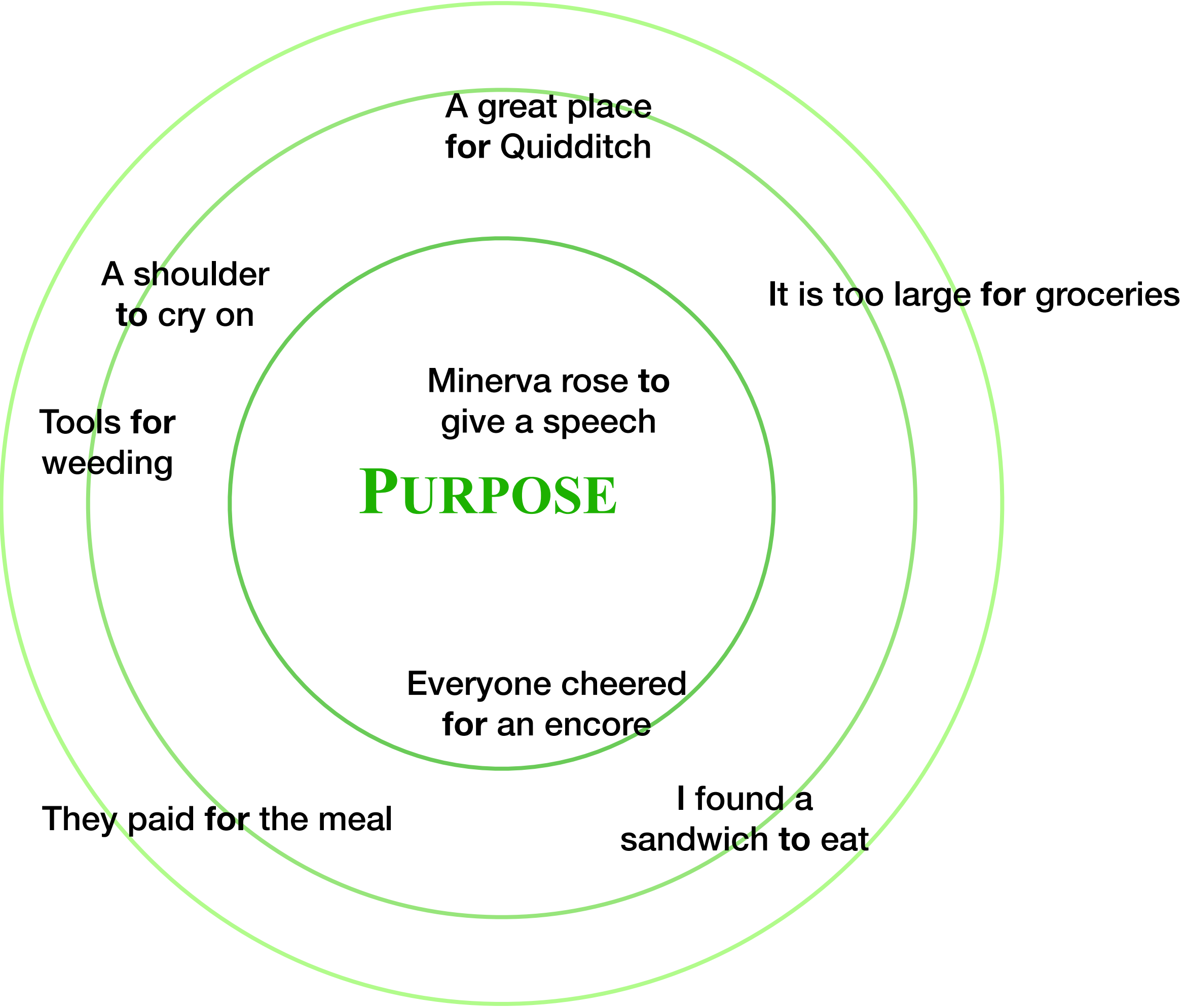
Everyone cheered
for an encore

I found a
sandwich to eat

They paid for the meal

THEME

Let's wait for Steve



PROTOTYPE	Motivation & Desired Outcome
PROTOTYPE	Intended and Evaluated Use
HIPPOGRIFF	Other Purpose

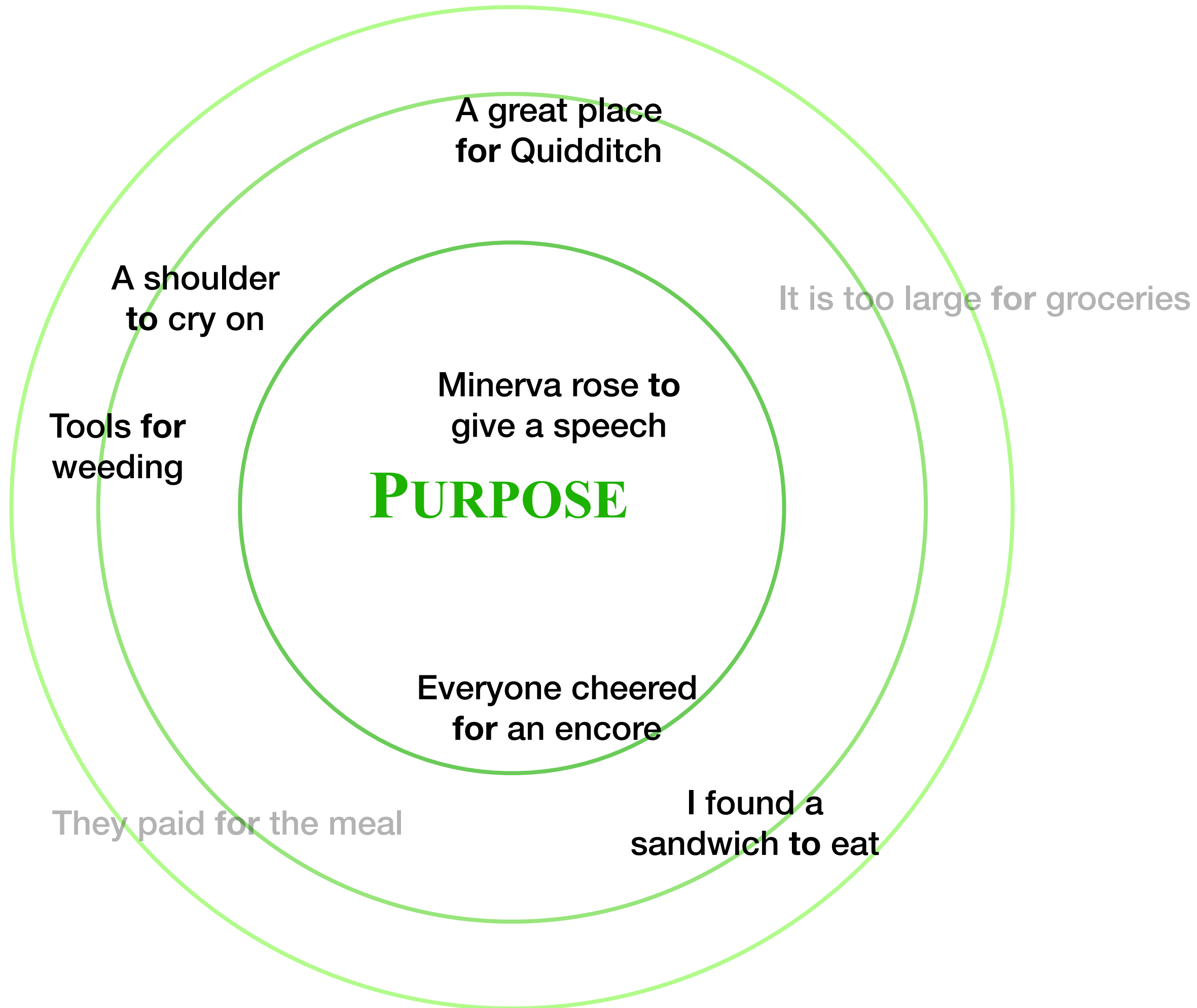


PROTOTYPE Motivation & Desired Outcome

- Expresses the '*why*' of the event, indicating a desired outcome as the motive for action

Why did Minerva get up?

to give a speech



PROTOTYPE Intended and Evaluated Use

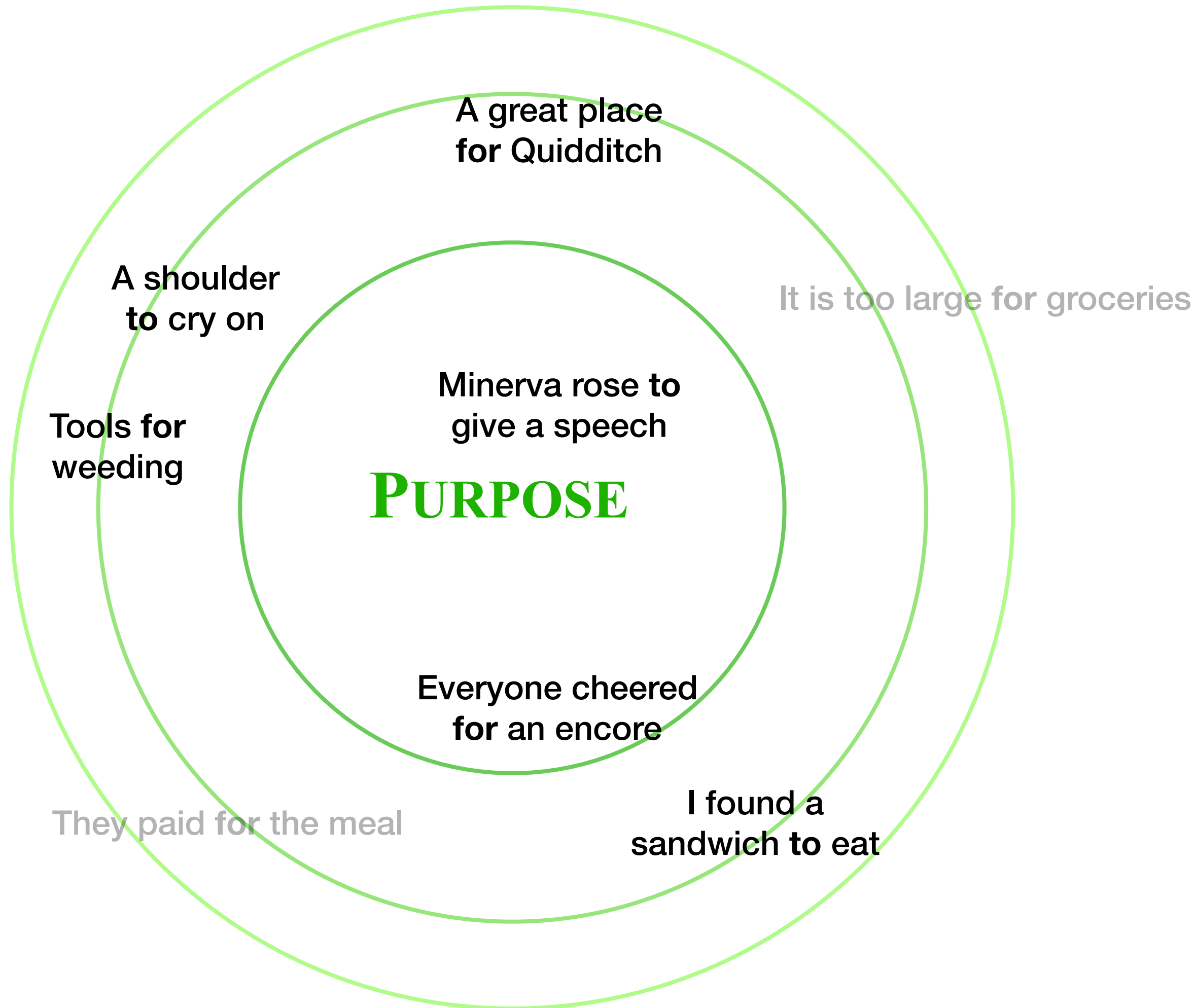
- Covers a range of abstract goals an action or entity can be applied to
- Considered inclusion of a new label, **AFFORDANCE**. However, the boundaries are overlapping.

I bought some detergent to wash hardwood floors.

↳ washing floors is a desired outcome of buying the detergent

I bought some detergent for washing hardwood floors.

↳ washing floors is the intended use of the detergent



PROTOTYPE

Purpose tests

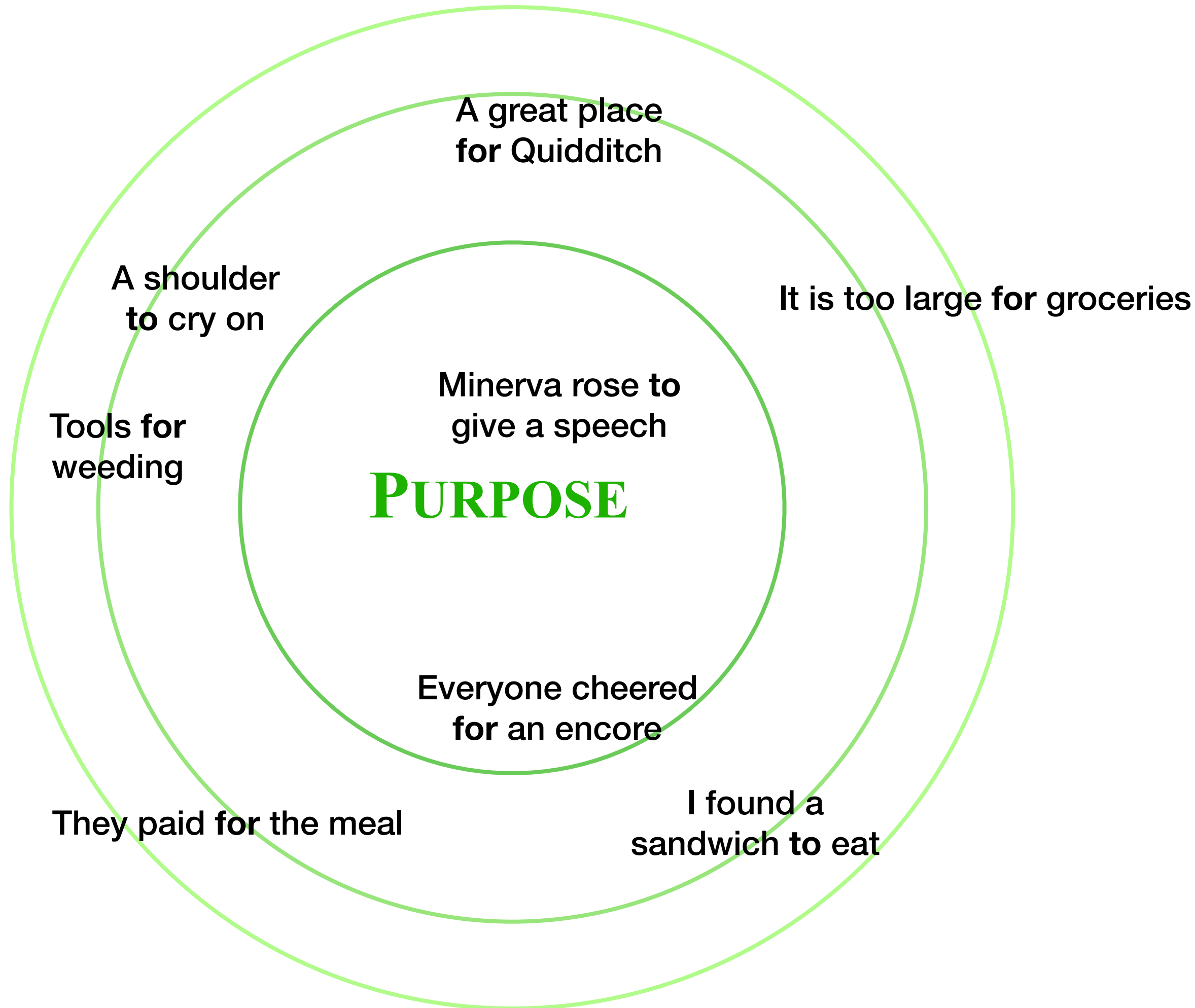
- Intention-based paraphrase tests
“in order to”, “for the purpose of”, “that I intend” insertions
- To distinguish from other labels, e.g.,:

Minerva rose **in order** to give a speech

X Allison built a house for **the purpose of** her mum
BENEFICIARY

I found a sandwich **that I intend** to eat

X I want a sandwich **that I intend** to eat
He needs **In order to** to leave soon
OTHER-INF



HIPPOGRIFF	Other Purpose
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- Two construals for even more non-prototypical cases
- Infinitival clauses licensed by extent adverbials like *too* and *enough*. PP provides a reference point against which sufficiency or excess is evaluated.

It is too large for groceries.	COMPARISONREF~PURPOSE
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- Commercial event where the **for**-PP specifies the exchanged item receives a Theme label for the scene.

They paid for the meal.	THEME~PURPOSE
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Further details are available in the paper.

Conclusion

- Clarified category boundaries, tests for English prepositions and infinitive clauses marking accompaniment and purpose.
- Challenge: thorny non-prototypical examples
 - Strategy for accompaniment: **distinguish** the various non-prototypes via **construal**
 - Strategy for purpose: **lump** distinctions with new definitions and guidelines
 - See paper for argumentation vis-à-vis previous guidelines
- Implemented in STREUSLE 4.3+ releases
- Future: To what extent do these criteria work in other languages?



STREUSLE 4.4 Counts

scene role	function	#
Ancillary	Ancillary	24
Agent	Ancillary	28
Characteristic	Ancillary	1
ComparisonRef	Ancillary	1
Ensemble	Ancillary	4
Experiencer	Ancillary	1
Locus	Ancillary	1
Org	Ancillary	11
Possession	Ancillary	11
Possessor	Ancillary	4
Recipient	Ancillary	4
SocialRel	Ancillary	19
Theme	Ancillary	6

Lemmas: with, without, along with, together

scene role	function	#
Purpose	Purpose	360
ComparisonRef	Purpose	10
Gestalt	Purpose	2
Purpose	Goal	1
Purpose	Locus	2
Theme	Purpose	34
<i>Lemmas: for, to, for the sake of, in hope to, into, (out) to eat</i>		
OTHER-INF		482

Acknowledgments

Many thanks to Bill Croft for helpful discussions as we were formulating the analysis!