

**A source of knowledge
for Role and Reference Grammar:
FunGramKB**

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Introduction

Natural Language Understanding =

common-sense knowledge base

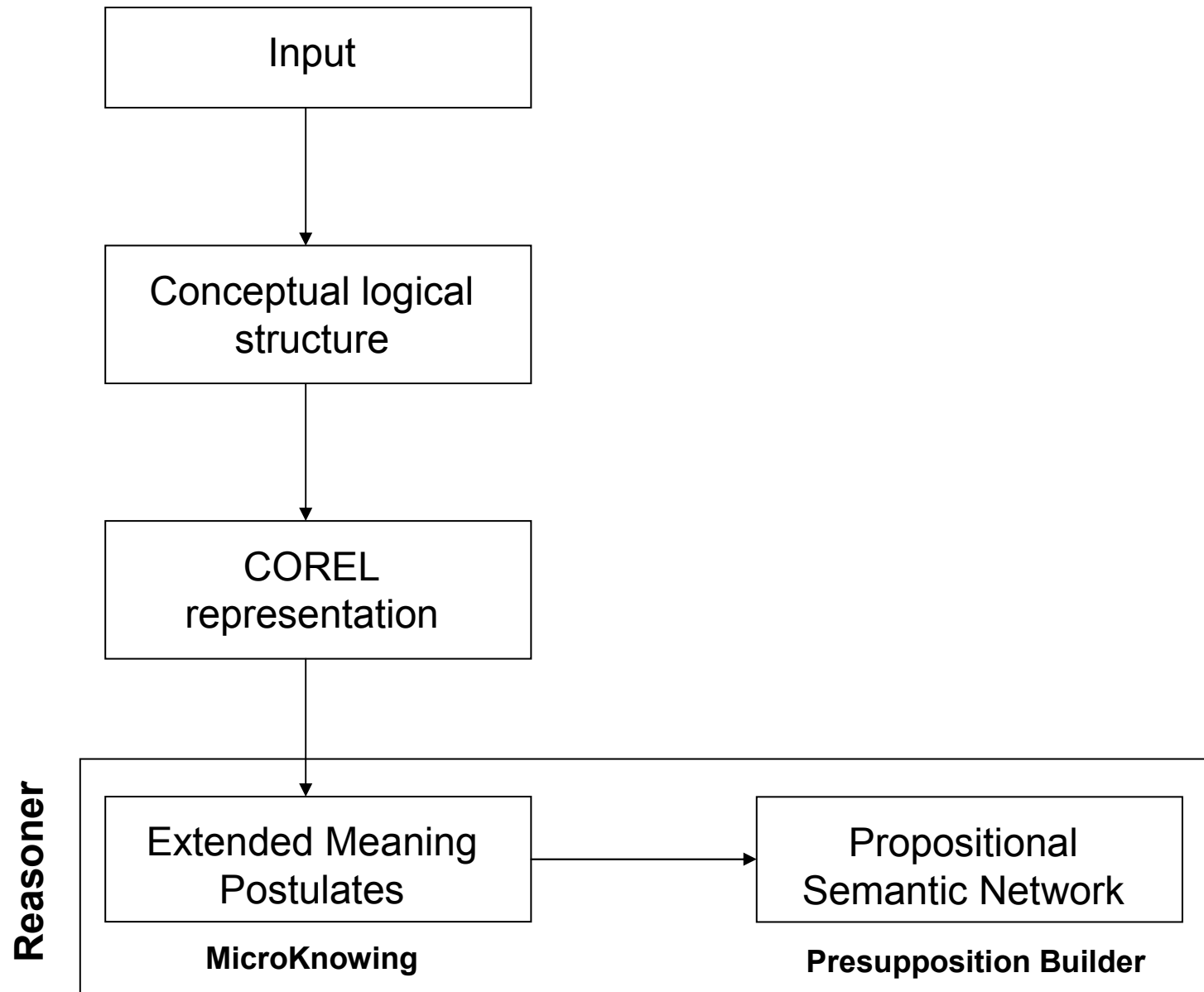
+

reasoner



FunGramKB

Reasoning



Reasoning

Betty asked Bill for an apple.



```
<_IF DECL <_TNS PAST <[do (%BETTY_00Theme, [+REQUEST_01  
(%BETTY_00Theme, %BILL_00Goal))] PURP [do (%BILL_00Goal, 0)]  
CAUSE [BECOME +REQUEST_01 (%BETTY_00Theme,  
+APPLE_00Referent)]>>>
```



```
+(e1: past +REQUEST_01 (x1: %BETTY_00)Theme (x2: +APPLE_00)Referent  
(x3: %BILL_00)Goal)
```

M I C R O K N O W I N G

+ (e1: past +REQUEST_01 (x1: %BETTY_00)Theme (x2: +APPLE_00)Referent (x3: %BILL_00)Goal)

+RESQUEST_01
 *(e1: +SAY_00 (x1: +HUMAN_00)Theme (x2)Referent
 (x3: +HUMAN_00 ^ +ANIMAL_00)Goal (f1: (e2:
 +GIVE_00 (x3)Agent (x2)Theme (x3)Origin
 (x1)Goal))Purpose (f2: (e3: +NEED_00 (x1)Theme
 (x2)Referent))Reason)

+GIVE_00
 +((e1: +TRANSFER_00 (x1: +HUMAN_00 ^
 +ANIMAL_00)Agent (x2:
 +CORPUSCULAR_00)Theme (x3)Origin (x4:
 +HUMAN_00 ^+ANIMAL_00)Goal (f1:
 +HAND_00)Instrument)(e2: +BE_02 (x1)Theme
 (x4)Location (f2: m +NEAR_00)Position)(e3: +BE_00
 (x1)Theme (x3)Referent))

+TRANSFER_00
 +(e1: +MOVE_00 (x1: +HUMAN_00)Agent
 (x2)Theme (x4: +HUMAN_00)Location (x3)Origin
 (x4)Goal (f1: (e2: +HAVE_00 (x3)Theme
 (x2)Referent))Condition (f2: (e3: n +HAVE_00
 (x3)Theme (x2)Referent))Result (f3: (e4: +HAVE_00
 (x4)Theme (x2)Referent))Purpose)

+APPLE_00
 +(e1: +BE_00 (x1: +APPLE_00)Theme (x2:
 +FRUIT_00)Referent)

+FRUIT_00
 +(e1: +BE_00 (x1: +FRUIT_00)Theme (x2:
 +FOOD_00)Referent)

+FOOD_00
 *(e2: +INGEST_00 (x3: +HUMAN_00 ^
 +ANIMAL_00)Agent (x1: +FOOD_00)Theme
 (x4)Location (x5)Origin (x6)Goal (f1: (e3:
 +BE_01 (x3)Theme (x7:
 +HUNGRY_00)Attribute))Reason)

+(e1: past +REQUEST_01 (x1: %BETTY_00)Theme (x2: +APPLE_00)Referent (x3: %BILL_00)Goal)



P R E S U P P O S I T I O N B U I L D E R



***(e1: past +THINK_00 (x1: %BETTY_00)Theme (x2: (e2:
past +HAVE_00 (x3: %BILL_00)Theme (x4:
+APPLE_00)Referent))Referent)**

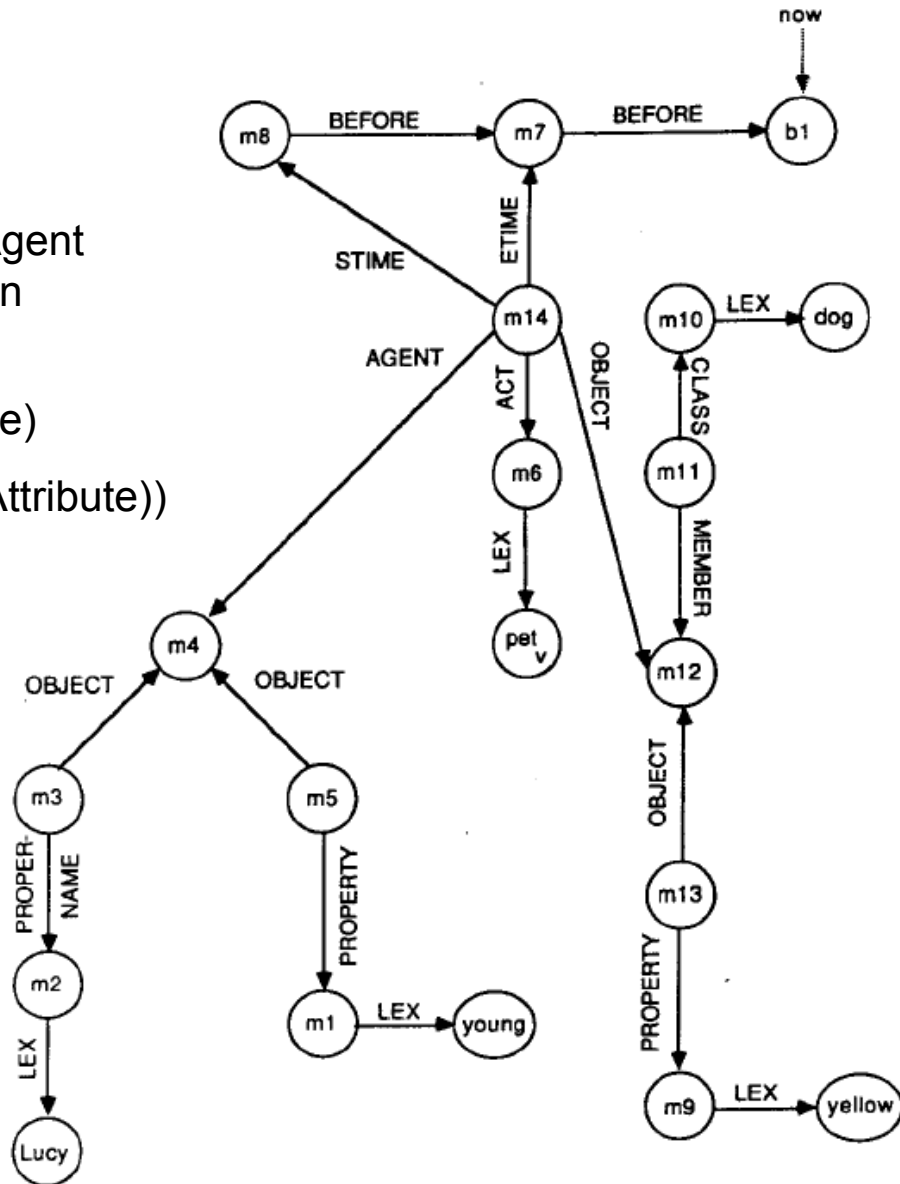
***(e3: +INGEST_00 (x1)Agent (x4)Theme (x5)Location
(x6)Origin (x7)Goal (f1: (e4: +BE_01 (x1)Theme (x8:
+HUNGRY_00)Attribute))Reason)**

***(e3:)**

W O R K I N G M E M O R Y

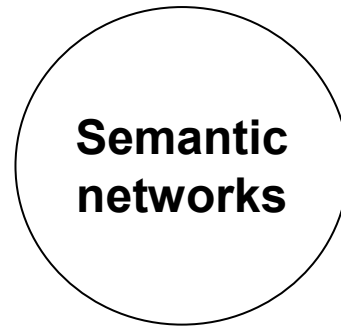
Young Lucy petted a black dog.

+((e1: past +STROKE_00 (x1: %LUCY_00)Agent
 (x2)Theme (x3: +DOG_00)Location (x4)Origin
 (x5)Goal)
 +(e2: +BE_01 (x1) (x6: +YOUNG_00)Attribute)
 +(e3: +BE_01 (x3)Theme (x7: +BLACK_00)Attribute))



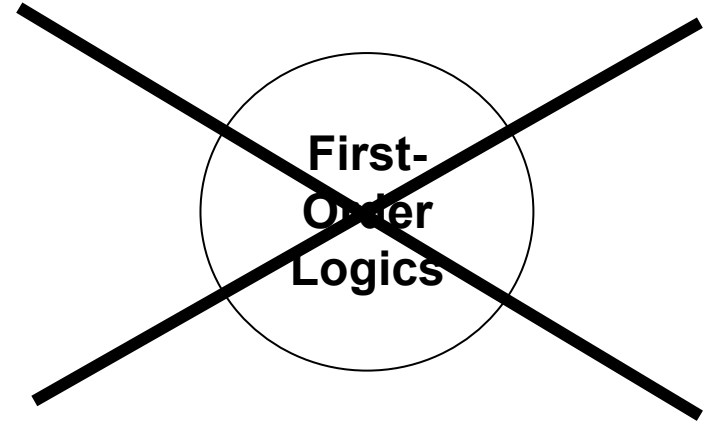
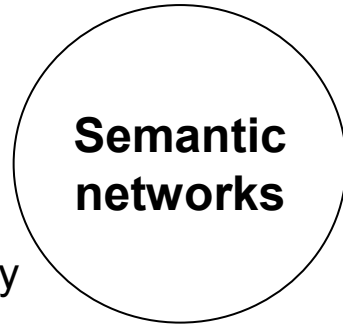
Reasoning

* Oriented to reasoning



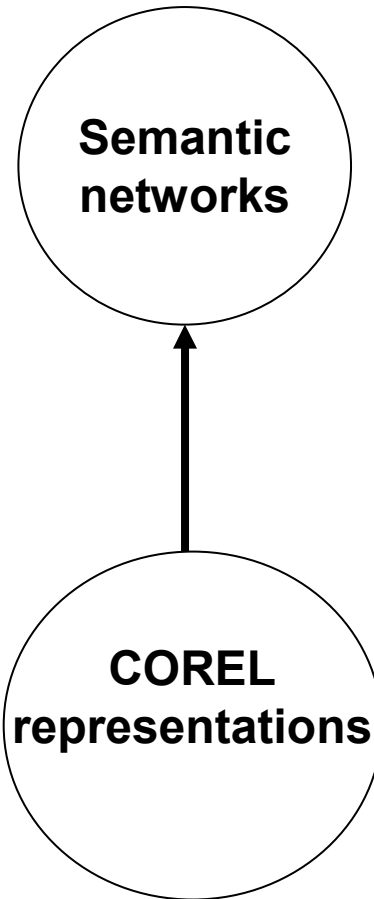
Reasoning

- * Oriented to reasoning
- * More natural
- * More expressive adequacy



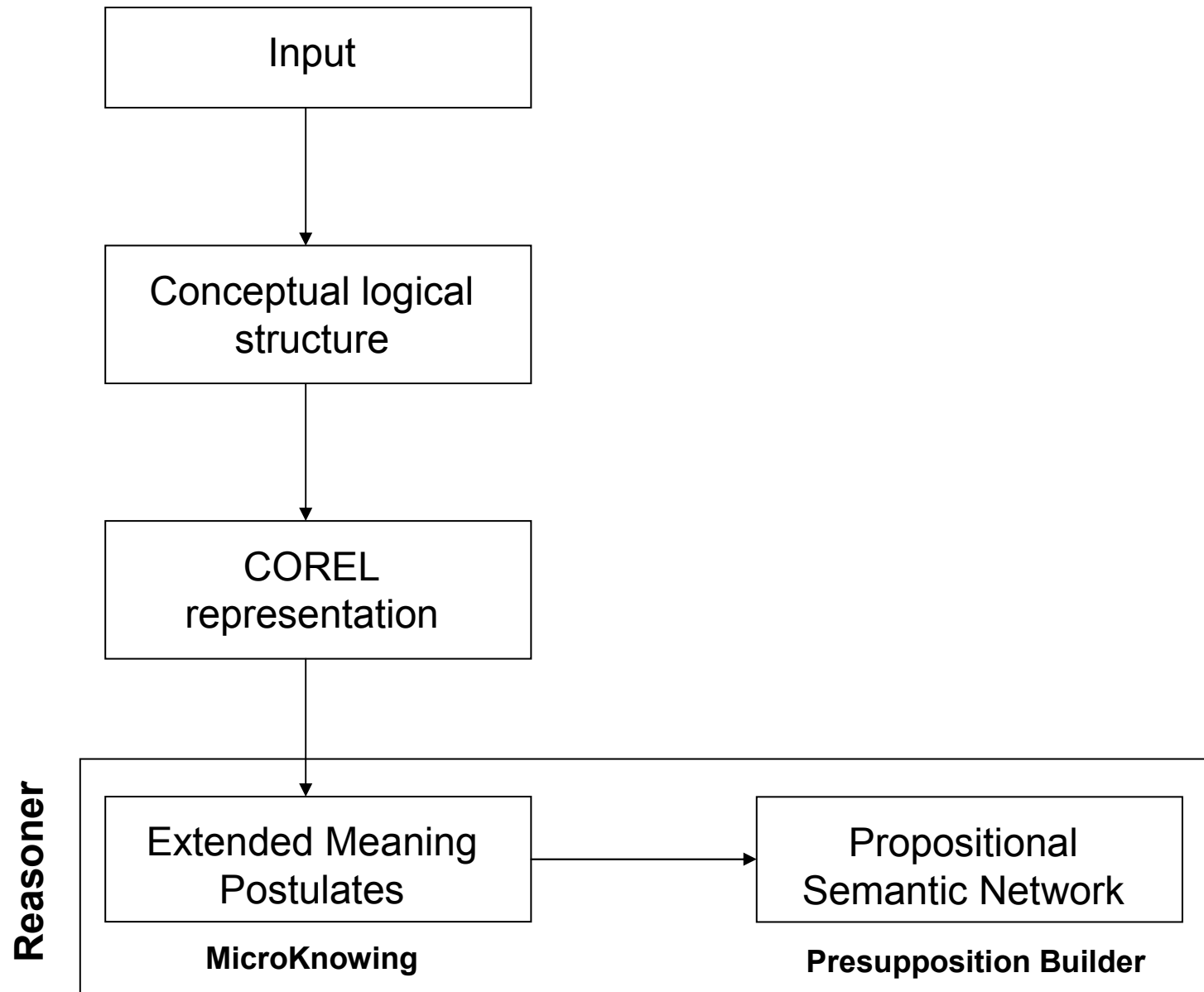
Reasoning

- * Oriented to reasoning
- * More natural
- * More expressive adequacy



- * More consistent and direct

Reasoning



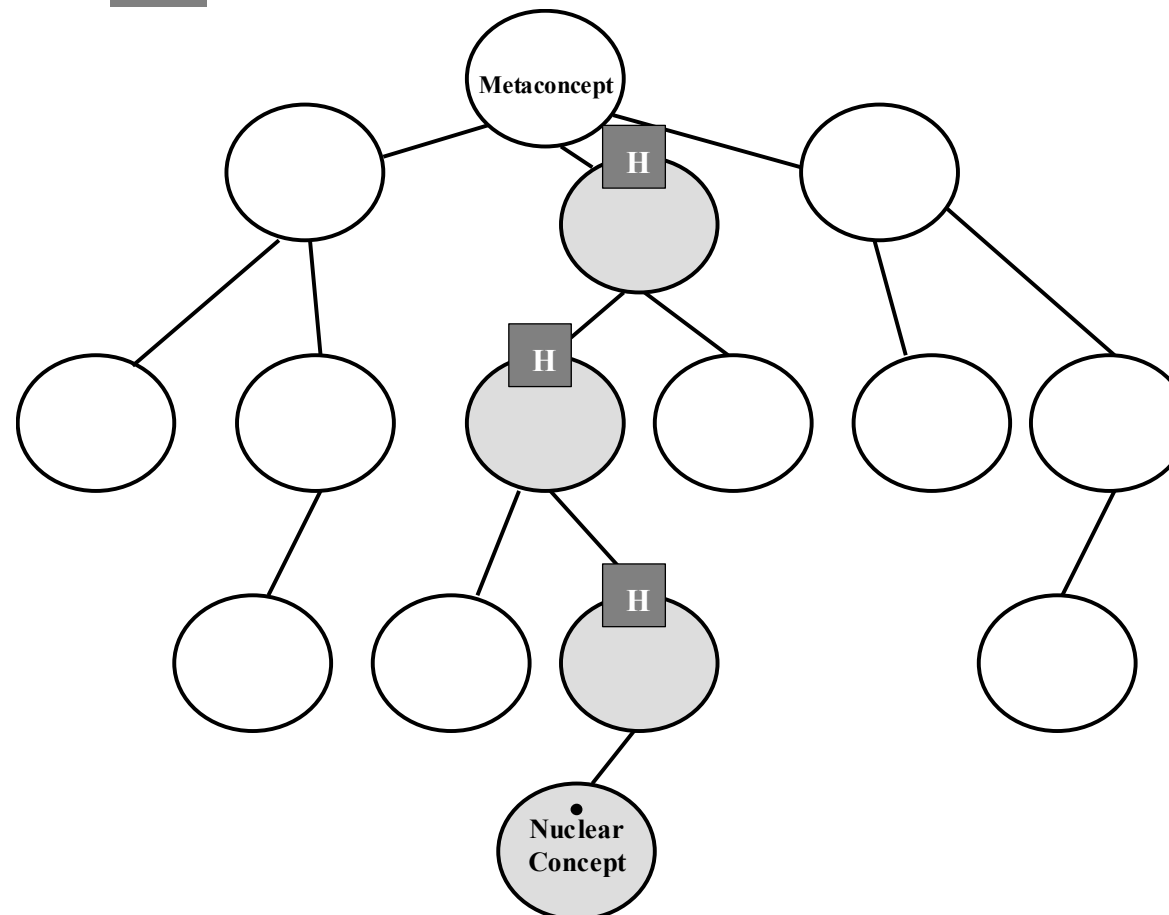
Reasoning: the MicroKnowing

MICROconceptual-KNOWLEDge spreadING

INHERITANCE

H

INFERENCE

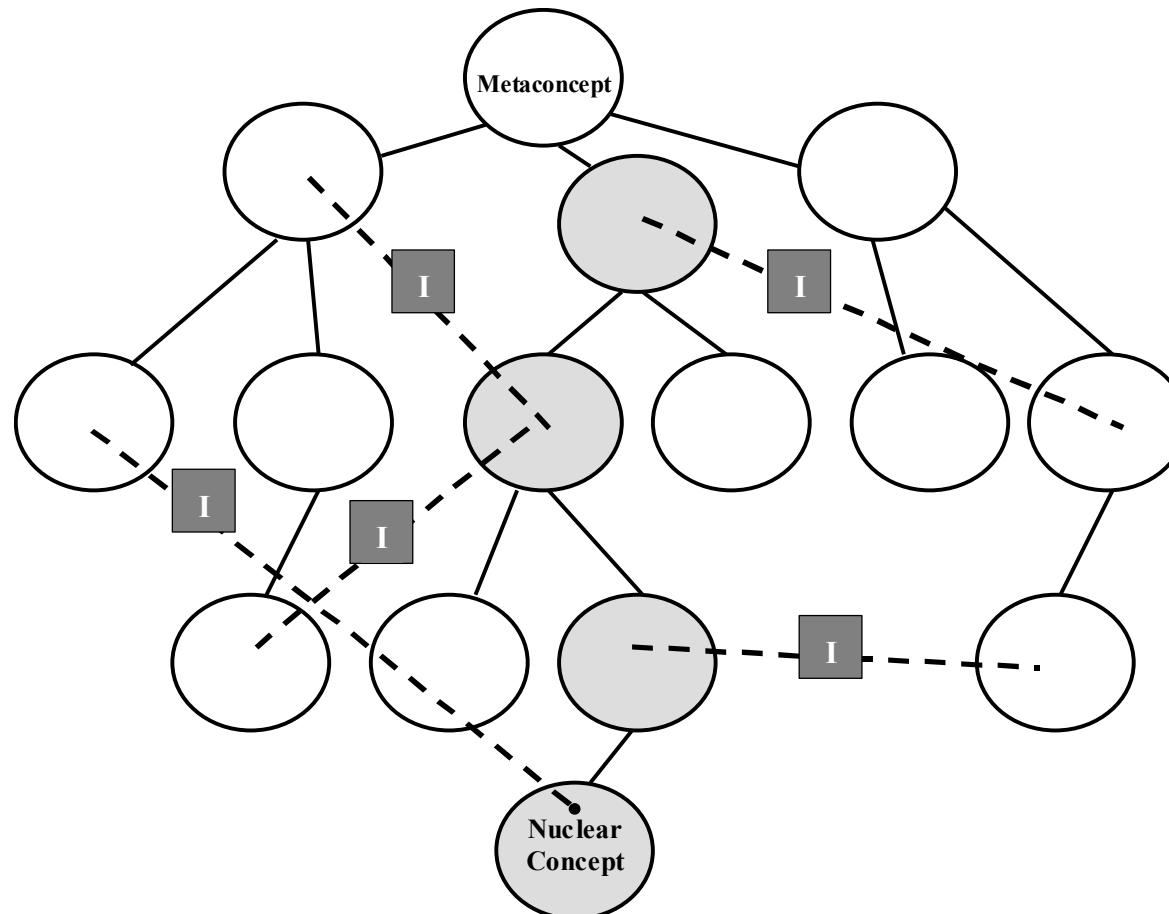


MICROKNOWING IN FUNGRAMKB ONTOLOGY

MICROconceptual-KNOWLEDge spreadING

INHERITANCE

INFERENCE **I**



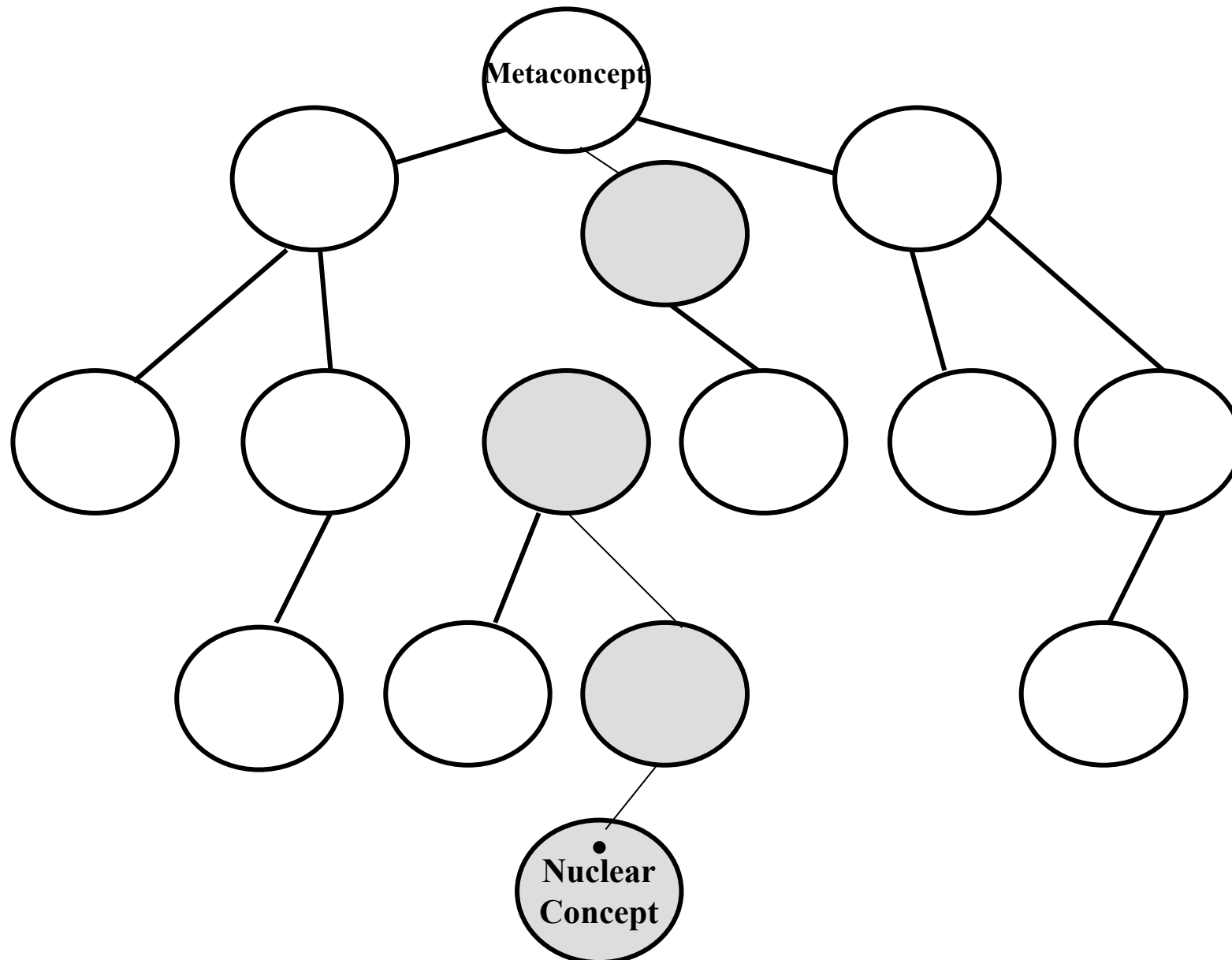
MICROKNOWING IN FUNGRAMKB ONTOLOGY

+TURKEY_00

+(e1: +BE_00 (x1: +TURKEY_00)Theme (x2: +POULTRY_00)Referent)

*(e2: +BE_01 (x1)Theme (x3: +BIG_00)Attribute)

MICROKNOWING IN FUNGRAMKB ONTOLOGY



MICROKNOWING IN FUNGRAMKB ONTOLOGY

+TURKEY_00

+(e1: +BE_00 (x1: +TURKEY_00)Theme (x2: +POULTRY_00)Referent)
*(e2: +BE_01 (x1)Theme (x3: +BIG_00)Attribute)

\$WATTLE_00

....

*(e2: +COMPRISE_00 (x3: +TURKEY_00 ^ +CHICKEN_00)Theme (x1)Referent
(f1: +NECK_00)Location)

MICROKNOWING IN FUNGRAMKB ONTOLOGY

Extended Meaning Postulate (Spreading Level #1)

+TURKEY_00

+(e1: +BE_00 (x1: +TURKEY_00)Theme (x2: +POULTRY_00)Referent)

*(e2: +BE_01 (x1)Theme (x3: +BIG_00)Attribute)

*(e3: +COMPRISE_00 (x1)Theme (x4: \$WISHBONE_00)Referent)

*(e4: +COMPRISE_00 (x1)Theme (x5: \$WATTLE_00)Referent (f1:
+NECK_00)Location)

*(e5: +COMPRISE_00 (x1)Theme (x6: \$TURKEY_00)Referent)

MICROKNOWING IN FUNGRAMKB ONTOLOGY

+POULTRY_00

+(e1: +BE_00 (x1: +POULTRY_00)Theme (x2: +BIRD_00)Referent)

*(e2: +BE_01 (x1)Theme (x3: +TAME_00)Attribute)

*(e3: +LIVE_00 (x1)Theme (f1: +FARM_00)Location)

*(e4: +OBTAIN_00 (x4: +HUMAN_00)Theme (x5: +EGG_00 |
+FOOD_00)Referent (f2: x1)Origin)

MICROKNOWING IN FUNGRAMKB ONTOLOGY

Extended Meaning Postulate (Spreading Level #2)

+TURKEY_00

+(e1: +BE_00 (x1: +TURKEY_00)Theme (x2: +POULTRY_00)Referent)

*(e2: +BE_01 (x1)Theme (x3: +BIG_00)Attribute)

*(e3: +COMPRISE_00 (x1)Theme (x4: \$WISHBONE_00)Referent)

*(e4: +COMPRISE_00 (x1)Theme (x5: \$WATTLE_00)Referent (f1: +NECK_00)Location)

*(e5: +COMPRISE_00 (x1)Theme (x6: \$TURKEY_00)Referent)

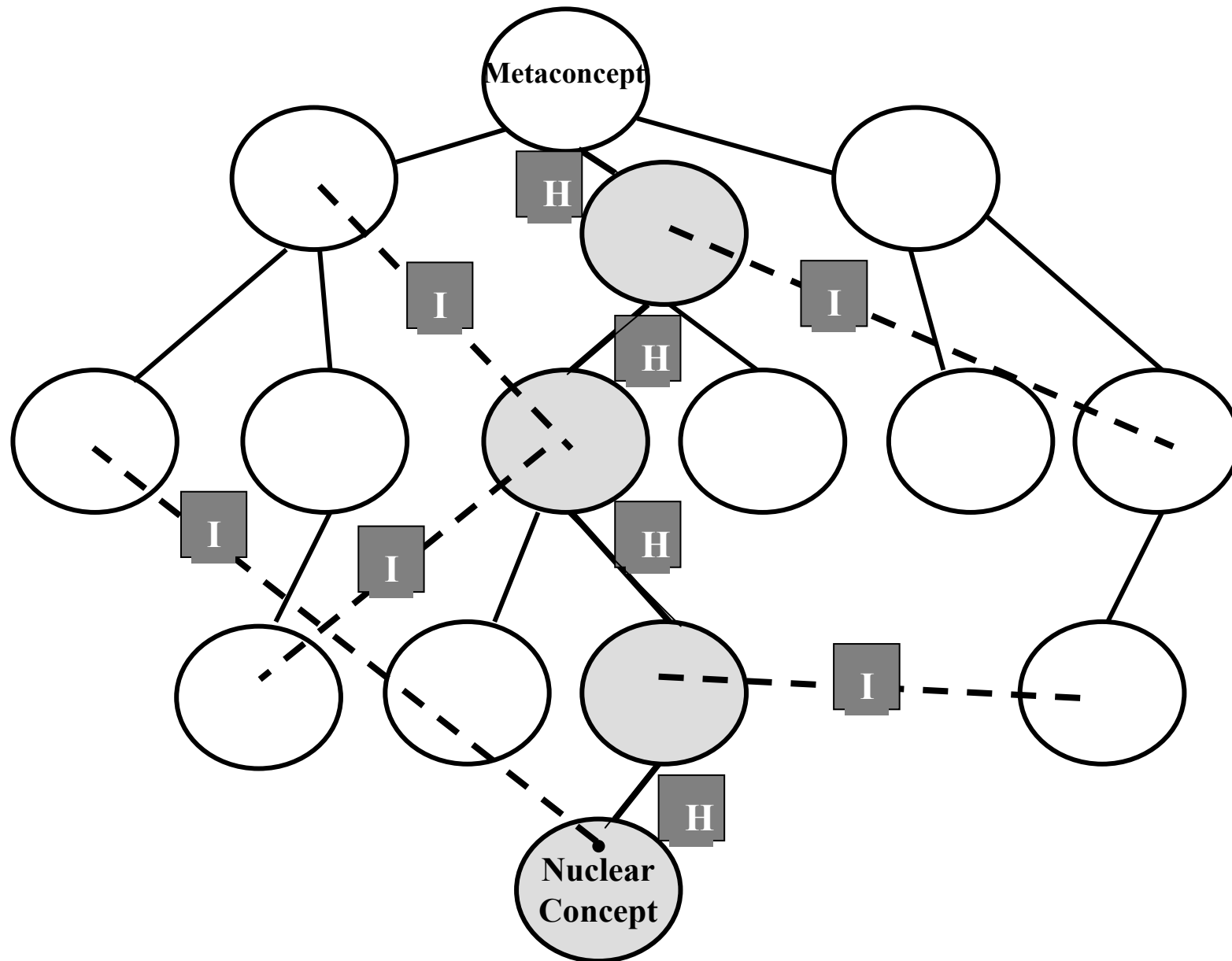
+(e6: +BE_00 (x1)Theme (x7: +BIRD_00)Referent)

*(e7: +BE_01 (x1)Theme (x8: +TAME_00)Attribute)

*(e8: +LIVE_00 (x1)Theme (f2: +FARM_00)Location)

*(e9: +OBTAIN_00 (x9: +HUMAN_00)Theme (x10: +EGG_00 | +FOOD_00)Referent (f3: x1)Origin)

MICROKNOWING IN FUNGRAMKB ONTOLOGY



Level	Meaning Postulate	Activator
Φ_0	$+(e_1: BE (x_1: TURKEY)_{Theme} (x_2: POULTRY)_{Referent})$	TURKEY
	$*(e_2: BE (x_1)_{Theme} (x_3: BIG)_{Attribute})$	TURKEY
	$*(e_3: HAVE (x_1)_{Theme} (x_4: FEATHER)_{Referent} (f_1: HEAD \& NECK)_{Location})$	TURKEY
Φ_1	$+(e_4: HAVE (x_1)_{Theme} (x_5: WATTLE)_{Referent})$	WATTLE
	$+(e_5: GOBBLE (x_1)_{Theme})$	GOBBLE
	$+(e_6: OBTAIN (x_6: PERSON)_{Agent} (x_7: TURKEY_01)_{Theme} (f_2: x_1)_{Origin})$	TURKEY_01
Φ_2	$+(e_7: BE (x_1)_{Theme} (x_8: BIRD)_{Referent})$	POULTRY
	$*(e_8: BE (x_1)_{Theme} (x_9: DOMESTIC)_{Attribute})$	POULTRY
	$*(e_9: KEEP (x_{10}: PERSON)_{Theme} (x_1)_{Referent} (f_3: FARM)_{Location})$	POULTRY
Φ_3	$+(e_{10}: BE (x_1)_{Theme} (x_{11}: VERTEBRATE)_{Referent})$	BIRD
	$*(e_{11}: HAVE (x_1)_{Theme} (x_{12}: FEATHER)_{Referent})$	BIRD
	$*(e_{12}: HAVE (x_1)_{Theme} (x_{13}: LEG)_{Referent})$	BIRD
	$*(e_{13}: HAVE (x_1)_{Theme} (x_{14}: WING)_{Referent})$	BIRD
	$*(e_{14}: LAY (x_1)_{Agent} (x_{15}: EGG)_{Theme})$	BIRD
	$*(e_{15}: FLY (x_1)_{Theme} (f_4: WING)_{Instrument})$	BIRD \cup WING
Φ_4	$*(e_{16}: CHIRP (x_1)_{Theme})$	CHIRP
	$*(e_{17}: HAVE (x_1)_{Theme} (x_{16}: CLAW)_{Referent} (f_5: TOE)_{Location})$	CLAW
	$*(e_{18}: PECK (x_1)_{Agent} (x_{17}: THING)_{Theme})$	PECK
	$*(e_{19}: HAVE (x_1)_{Theme} (x_{18}: BEAK)_{Referent})$	BEAK
	$*(e_{20}: PREEN (x_1)_{Theme})$	PREEN
Φ_5	$+(e_{21}: BE (x_1)_{Theme} (x_{19}: ANIMAL)_{Referent})$	VERTEBRATE
	$+(e_{22}: CONTAIN (x_1)_{Theme} (x_{20}: SKELETON)_{Referent})$	VERTEBRATE
	$+(e_{23}: CONTAIN (x_1)_{Theme} (x_{21}: BACKBONE)_{Referent})$	VERTEBRATE
	$*(e_{24}: HAVE (x_1)_{Theme} (x_{22}: TAIL)_{Referent} (f_6: BACK)_{Location})$	VERTEBRATE

Thank you!

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