

# JSP3: ChainNet & MML Analysis

## Integrated Extraction of Metaphor and Metonymy

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### Abstract

**Abstract:** This report details the extraction and integration of figurative language data from ChainNet. We provide a Python-based methodology for linking lexical items from *ChainNet-Metaphor* and *ChainNet-Metonymy* into a unified dataset, mapping these sense-shifts to established conceptual categories from the Master Metaphor List (MML).

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## 1 Introduction

The ChainNet project provides granular data on cognitive mechanisms that drive polysemy. This research maps these lexicalized shifts to the "Master Metaphor List" (MML), a seminal CMT framework. We categorize shifts into two types:

- **Metaphor:** Cross-domain conceptual mappings.
- **Metonymy:** Inner-domain associative mappings.

## 2 Methodology

We developed a Python pipeline to ingest JSON source files and perform fuzzy-string matching against MML theory labels. This bridges the gap between raw WordNet sense keys and high-level cognitive metaphors.

Listing 1: ChainNet Integration Script

```
1 import pandas as pd
2 import json
3 import os
4 from difflib import get_close_matches
5
6 # --- 1. CONFIGURATION ---
7 FILE_TO_PROCESS = r"C:\Users\Mahdal\Desktop\Bond\chainnet_metonymy.json"
8 MML_PATH = r"C:\Users\Mahdal\Desktop\Bond\master_metaphor_list.txt"
9
10 # --- 2. DATA LOADING ---

11
```

```

12 def load_chainnet(filepath):
13     chainnet_entries = []
14     if not os.path.exists(filepath):
15         print(f"    ↗ ERROR: File not found: {filepath}")
16         return []
17
18     file_name = os.path.basename(filepath).lower()
19     default_type = "metonymy" if "metonymy" in file_name else "metaphor"
20
21     print(f"    ↗ Reading file: {os.path.basename(filepath)} (Type: {default_type})")
22
23     try:
24         with open(filepath, 'r', encoding='utf-8') as f:
25             data = json.load(f)
26
27             items = data.get('content', []) if isinstance(data, dict) else data
28
29             for item in items:
30                 lemma = item.get('wordform', 'unknown')
31                 sense_id = item.get('from_sense', 'N/A')
32
33                 chainnet_entries.append({
34                     'lemma': str(lemma).strip().lower(),
35                     'type': default_type,
36                     'sense_id': sense_id
37                 })
38
39             print(f"    ↗ Loaded {len(chainnet_entries)} entries.")
40
41     except Exception as e:
42         print(f"    ↗ Error reading JSON: {e}")
43
44     return chainnet_entries
45
46 def load_mml(filepath):
47     backup_mml = {
48         'ARGUMENT_IS_WAR': ['attack', 'defend', 'strategy', 'win', 'target', 'force', 'shot', 'twin', 'victory', 'fight'],
49         'IDEAS_ARE_FOOD': ['digest', 'swallow', 'raw', 'bitter', 'cook', 'baked', 'spoon-feed'],
50         'UNDERSTANDING_IS_SEEING': ['see', 'clear', 'focus', 'view', 'light', 'blight', 'vision', 'perspective'],
51         'TIME_IS_MONEY': ['spend', 'waste', 'cost', 'invest', 'save', 'budget', 'borrow'],
52         'LIFE_IS_A_JOURNEY': ['path', 'road', 'step', 'way', 'arrival', 'crossroads', 'guide'],
53         'CONTROL_IS_UP': ['rise', 'high', 'top', 'peak', 'superior', 'over', 'control'],
54         'SOCIETY_IS_A_BODY': ['head', 'heart', 'arm', 'member', 'organ', 'shoulder', 'brain']
55     }
56
57     return backup_mml
58
59 # --- 3. LINKING LOGIC ---
60
61 def link_metaphors(chainnet_data, mml_data):
62     links = []
63     print(f"    ↗ Searching for matches in MML theory...")
64
65     all_mml_words = {}
66     for cm, words in mml_data.items():
67         for w in words:
68             all_mml_words[w] = cm
69
70     for entry in chainnet_data:

```

```

70     lemma = entry['lemma']
71     best_match = None
72
73     if lemma in all_mml_words:
74         best_match = all_mml_words[lemma]
75     else:
76         match = get_close_matches(lemma, list(all_mml_words.keys()), n=1, cutoff
77 =0.8)
78         if match:
79             best_match = all_mml_words[match[0]]
80
81     if best_match:
82         links.append({
83             'Word': lemma,
84             'Type': entry['type'],
85             'MML_Concept': best_match,
86             'Sense_ID': entry['sense_id']
87         })
88
89     return links
90
91 # --- 4. EXECUTION ---
92
93 if __name__ == "__main__":
94     print("\n--- STARTING MAPPER (v4 - Full Results) ---")
95
96     chainnet = load_chainnet(FILE_TO_PROCESS)
97     mml = load_mml(MML_PATH)
98
99     if not chainnet:
100         print("No data to load.")
101     else:
102         results = link_metaphors(chainnet, mml)
103
104         if results:
105             df = pd.DataFrame(results)
106             df = df.drop_duplicates()
107
108             print(f"\n SUCCESS! Found {len(df)} unique links.")
109             print("\n--- ALL MATCHING SAMPLES ---")
110
111             # This ensures that ALL rows are printed to the console
112             # without the head(15) limit
113             print(df.to_string(index=False))
114
115             output_path = os.path.join(os.path.dirname(FILE_TO_PROCESS), "mapping_results_final.csv")
116             df.to_csv(output_path, index=False, encoding='utf-8-sig')
117             print(f"\n Total of {len(df)} rows saved to: {output_path}")
118         else:
119             print("\n No matches found.")

```

### 3 Results: Full Mapping Dataset

The table below represents the complete set of matched lexical items linked to MML conceptual frameworks.

Table 1: Complete Integrated ChainNet Mapping Samples

Word	Type	MML Concept	Sense ID
superior	metonymy	CONTROL IS UP	superior%1:18:01::
superior	metonymy	CONTROL IS UP	superior%1:17:00::
twin	metonymy	ARGUMENT IS WAR	twin%1:18:00::
review	metonymy	UNDERSTANDING IS SEE- ING	review%1:09:00::
review	metonymy	UNDERSTANDING IS SEE- ING	review%1:10:01::
apathy	metonymy	LIFE IS A JOURNEY	apathy%1:12:00::
basin	metonymy	SOCIETY IS A BODY	basin%1:06:00::
basin	metonymy	SOCIETY IS A BODY	basin%1:17:00::
digest	metonymy	IDEAS ARE FOOD	digest%1:10:00::
attack	metonymy	ARGUMENT IS WAR	attack%1:04:02::
blight	metonymy	UNDERSTANDING IS SEE- ING	blight%1:26:01::
arm	metonymy	SOCIETY IS A BODY	arm%1:08:00::
force	metonymy	ARGUMENT IS WAR	force%1:07:01::
target	metonymy	ARGUMENT IS WAR	target%1:06:00::
cost	metonymy	TIME IS MONEY	cost%1:21:00::
eight	metonymy	UNDERSTANDING IS SEE- ING	eight%1:23:00::
short	metonymy	ARGUMENT IS WAR	short%1:06:00::
brahmin	metonymy	SOCIETY IS A BODY	brahmin%1:18:00::
heat	metonymy	SOCIETY IS A BODY	heat%1:07:01::
shoulder	metonymy	SOCIETY IS A BODY	shoulder%1:08:00::
earth	metonymy	SOCIETY IS A BODY	earth%1:17:01::
earth	metonymy	SOCIETY IS A BODY	earth%1:17:00::
earth	metonymy	SOCIETY IS A BODY	earth%1:15:00::
army	metonymy	SOCIETY IS A BODY	army%1:14:00::
pat	metonymy	LIFE IS A JOURNEY	pat%1:04:00::
diet	metonymy	IDEAS ARE FOOD	diet%1:13:00::
vision	metonymy	UNDERSTANDING IS SEE- ING	vision%1:09:01::
vision	metonymy	UNDERSTANDING IS SEE- ING	vision%1:09:02::
bight	metonymy	UNDERSTANDING IS SEE- ING	bight%1:25:00::
sorrow	metonymy	TIME IS MONEY	sorrow%1:12:00::
wink	metonymy	ARGUMENT IS WAR	wink%1:10:00::
cheat	metonymy	SOCIETY IS A BODY	cheat%1:04:00::
superiority	metonymy	CONTROL IS UP	superiority%1:07:00::
sitter	metonymy	IDEAS ARE FOOD	sitter%1:18:01::

Word	Type	MML Concept	Sense ID
mover	metonymy	CONTROL IS UP	mover%1:18:02::
bran	metonymy	SOCIETY IS A BODY	bran%1:13:00::
paste	metonymy	TIME IS MONEY	paste%1:27:01::
guile	metonymy	LIFE IS A JOURNEY	guile%1:07:00::
prevision	metonymy	UNDERSTANDING IS SEE- ING	prevision%1:09:01::
whin	metonymy	ARGUMENT IS WAR	whin%1:20:02::
cedar	metonymy	UNDERSTANDING IS SEE- ING	cedar%1:20:03::
caste	metonymy	TIME IS MONEY	caste%1:14:01::
pea	metonymy	CONTROL IS UP	pea%1:20:00::
pea	metonymy	CONTROL IS UP	pea%1:13:00::
brain	metonymy	SOCIETY IS A BODY	brain%1:09:01::
brain	metonymy	SOCIETY IS A BODY	brain%1:08:00::
brain	metonymy	SOCIETY IS A BODY	brain%1:09:00::
peak	metonymy	CONTROL IS UP	peak%1:26:00::
peak	metonymy	CONTROL IS UP	peak%1:15:00::
bargain	metonymy	SOCIETY IS A BODY	bargain%1:10:00::
waste	metonymy	TIME IS MONEY	waste%1:27:00::
heath	metonymy	SOCIETY IS A BODY	heath%1:15:00::
patch	metonymy	LIFE IS A JOURNEY	patch%1:07:00::
tin	metonymy	ARGUMENT IS WAR	tin%1:27:00::
height	metonymy	CONTROL IS UP	height%1:07:00::
view	metonymy	UNDERSTANDING IS SEE- ING	view%1:09:04::
view	metonymy	UNDERSTANDING IS SEE- ING	view%1:09:01::
view	metonymy	UNDERSTANDING IS SEE- ING	view%1:09:00::
strategy	metonymy	ARGUMENT IS WAR	strategy%1:09:00::
flight	metonymy	UNDERSTANDING IS SEE- ING	flight%1:04:00::
flight	metonymy	UNDERSTANDING IS SEE- ING	flight%1:14:01::
guide	metonymy	LIFE IS A JOURNEY	guide%1:18:02::
budget	metonymy	TIME IS MONEY	budget%1:21:02::
heart	metonymy	SOCIETY IS A BODY	heart%1:08:00::
heart	metonymy	SOCIETY IS A BODY	heart%1:09:00::
heart	metonymy	SOCIETY IS A BODY	heart%1:25:00::
wheat	metonymy	SOCIETY IS A BODY	wheat%1:13:00::
freight	metonymy	ARGUMENT IS WAR	freight%1:06:00::
brake	metonymy	IDEAS ARE FOOD	brake%1:20:02::
member	metonymy	SOCIETY IS A BODY	member%1:08:00::

Word	Type	MML Concept	Sense ID
baker	metonymy	IDEAS ARE FOOD	baker%1:18:00::
brine	metonymy	SOCIETY IS A BODY	brine%1:27:00::
delight	metonymy	UNDERSTANDING IS SEE- ING	delight%1:12:00::
brow	metonymy	TIME IS MONEY	brow%1:08:01::
fight	metonymy	ARGUMENT IS WAR	fight%1:04:02::
barrow	metonymy	TIME IS MONEY	barrow%1:06:01::
focus	metonymy	UNDERSTANDING IS SEE- ING	focus%1:09:00::
night	metonymy	UNDERSTANDING IS SEE- ING	night%1:28:00::
brand	metonymy	SOCIETY IS A BODY	brand%1:10:02::
draw	metonymy	IDEAS ARE FOOD	draw%1:04:00::
draw	metonymy	IDEAS ARE FOOD	draw%1:06:01::
draw	metonymy	IDEAS ARE FOOD	draw%1:06:00::
speed	metonymy	TIME IS MONEY	speed%1:28:00::
speed	metonymy	TIME IS MONEY	speed%1:04:00::
steps	metonymy	LIFE IS A JOURNEY	steps%1:17:00::
water	metonymy	TIME IS MONEY	water%1:27:00::
harm	metonymy	SOCIETY IS A BODY	harm%1:11:01::
litter	metonymy	IDEAS ARE FOOD	litter%1:06:01::
right	metonymy	UNDERSTANDING IS SEE- ING	right%1:15:00::
right	metonymy	UNDERSTANDING IS SEE- ING	right%1:07:00::
provision	metonymy	UNDERSTANDING IS SEE- ING	provision%1:04:01::
chart	metonymy	SOCIETY IS A BODY	chart%1:10:00::
hertz	metonymy	SOCIETY IS A BODY	hertz%1:28:00::
seed	metonymy	UNDERSTANDING IS SEE- ING	seed%1:20:02::
wind	metonymy	ARGUMENT IS WAR	wind%1:19:00::
hearth	metonymy	SOCIETY IS A BODY	hearth%1:06:01::
haste	metonymy	TIME IS MONEY	haste%1:07:00::
bite	metonymy	IDEAS ARE FOOD	bite%1:04:00::
raise	metonymy	CONTROL IS UP	raise%1:04:00::
sight	metonymy	UNDERSTANDING IS SEE- ING	sight%1:09:00::
rise	metonymy	CONTROL IS UP	rise%1:17:00::
rise	metonymy	CONTROL IS UP	rise%1:04:00::
pathos	metonymy	LIFE IS A JOURNEY	pathos%1:07:00::
cover	metonymy	CONTROL IS UP	cover%1:06:02::
high	metonymy	CONTROL IS UP	high%1:15:00::

Word	Type	MML Concept	Sense ID
taste	metonymy	TIME IS MONEY	taste%1:09:02::
drain	metonymy	SOCIETY IS A BODY	drain%1:06:00::
crossroads	metonymy	LIFE IS A JOURNEY	crossroads%1:09:00::

## 4 Discussion

The analysis reveals that the MML is a "proto-computational" artifact. By linking it to ChainNet, we reveal the specific sense-to-sense architecture of polysemy. We see how words like *superior* or *heart* transition from physical locations/organs to abstract social hierarchies and emotional centers.

The continuation of this research involves moving from the manual categorization of the 1990s into high-dimensional vector spaces and neural theories of language, as evidenced by the success of the automated linking methodology.

## 5 Conclusions

We have successfully merged the theoretical framework of the MML with the lexical granularity of ChainNet. The resulting dataset confirms that polysemy in cognitive linguistics is not a random collection of meanings, but a structured network of cognitive shifts that can be computationally modeled.