

INTERPRETING NON-CANONICAL ARGUMENTS IN MANDARIN CHINESE THROUGH  
METONYMY

by

Michael Sayle

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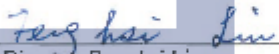
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## Abstract

This study investigates how L1 and L2 users of Mandarin perceive a rare construction in Mandarin that involves interpreting an NP in the object position as a location argument or instrument argument instead of as a theme/patient argument. For example, *kai zuoshou* (literally “drive left-hand”) has been used to mean “use the left hand to drive” (Lin, 2014). Some explanations for the interpretation/production of non-canonical arguments invoke Davidsonian event structure while other explanations defer to Chinese typology and semantics. However, the latter explanation diminishes the role of grammatical structure in meaning-making, and the former explanation allows the production of infelicitous sentences. Those who have addressed this phenomenon themselves acknowledge limitations of event structure and either reference “semantic extension” (Lin 2014) or the “conventional/institutionalized relationships between the verb and object” (Li, 2014).

The first part of the study argues that (1) metonymic relationships are implicated in the use of an NP as a non-canonical argument, (2) that for the argument to be interpretable, the metonymic relationship must be made salient through context, world knowledge and active frames or denied saliency by lack of access to the same, and (3) that the degree of saliency determines the degree of interpretability and the degree of acceptability. The second and third parts use survey data of L1 and L2 Mandarin users, respectively, to determine how interpretable and acceptable Mandarin users find non-canonical arguments to be when the following factors were manipulated: context v. no-context; bare noun phrase v. determiner phrase; conventional collocations v. unattested collocations; and location arguments v. instrument arguments. For L2 users, an additional factor of years of study was added.

The results have implications for how context influences grammatical acceptability and how L2 users perceive less common grammatical constructions in relation to native speaker perceptions.

## Chapter 1: Introduction

Little known outside of specialized linguistic and literature sub-fields, metonymy is a basic and universal cognitive process by which an entity or sense within one cognitive domain is used to reference another sense or entity within the same cognitive domain (Brdar-Szabo & Brdar, 2012; Evans, 2010; Peirsman & Geeraerts, 2006; et alia). In an English sentence like *Table 5 wants another diet Coke*, the metonymy *Table 5* points to a real-world referent like ‘the person sitting at table 5.’ Though metonymy has received some attention in phonology, morphology, and syntax (e.g., Ädel, 2014; Bierwiazzonek, 2013a; X. Chen & Shen, 2010; Janda, 2011, 2014), it has otherwise been restricted to the domains of semantics and pragmatics. This restriction has been primarily because of a concern that metonymic explanations create a generative engine that is too powerful to offer useful explanations or theories (See Brdar & Brdar-Szabó, 2014; Janda, 2011): if everything can be interpreted as metonymic, metonymy stops being a useful term. However, if metonymy is a basic and universal cognitive process, then its effects might be expected at multiple levels of linguistic behavior.

While metonymy has traditionally been understood as a figurative trope where one entity stands for another entity,<sup>1</sup> the research has shown that the relationships described in metonymy are more basic to human cognition than simply an occasional rhetorical feature. Early on, Lakoff & Johnson (1980) argued that metonymy functions to “allow us to conceptualize one thing by means of its relationship to another,” symbolically as well as linguistically (39). Lakoff & Johnson point to metonymy in religious symbolism as an example of this, where “dove” stands for the “Holy Spirit.” With regard to this specific example, I would argue that the initial impetus for the association between the two entities is one of metaphor rather than metonymy but that over the centuries Christian iconography and tradition has altered the intent of the

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<sup>1</sup> E.g., (i) ***The White House*** spoke to reporters this afternoon about the Senate’s Torture Report – LOCATION FOR PERSON ASSOCIATED WITH LOCATION. *The White House* is a location entity standing for the entity (collective or individual) that is associated with that location.  
(ii) ***The ham sandwich*** wants another diet coke – ORDERED MEAL FOR PERSON ASSOCIATE WITH ORDERED MEAL. *The ham sandwich* is an entity standing for the entity (collective or individual) that is associated with the ordered meal.



original text to imply that the Holy Spirit incarnated as a dove, instead of moving in the manner of a dove, therefore, making later references metonymic rather than metaphoric.<sup>2 & 3</sup> Whichever way that specific example is viewed, one entity is conceptualized in relationship to another, the difference being that in metaphor the other entity isn't in the same conceptual domain. In the metonym *ham sandwich* (footnote 1 ii above), the person who ordered the ham sandwich is conceptualized by means of his/her relationship to the ordering of it.

For a reference between conceptual entities to be considered metonymic, such entities must also occur within the same domain. Following Langacker (1987) a domain can be explained as follows:

All linguistic units are context-dependent to some degree. A context for the characterization of a semantic unit is referred to as a domain. Domains are necessarily cognitive entities: mental experiences, representational spaces, concepts, or conceptual complexes. (147)

Therefore, within the domain of waiting on tables in a restaurant, a waiter may conceptualize his experience in relation to the customers by the most foregrounded feature in the context, which is the dish each customer orders; in the case of (ii), a *ham sandwich* is more salient than a name, facial feature, clothing, etc. For a different waiter, he might conceptualize customers in a separate way and subsequently produce a sentence like *Table 5 wants another diet coke*. In both cases, the customers are interpreted through the feature most salient to the waiter in that context. Benczes (2011) builds on the discussion of domain and metonymy by arguing that metonymy functions “within a domain network” rather than within single domains and that “domains form web-like semantic links of associations” (p 245). There are

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<sup>2</sup> Though simile and metaphor might have different structures, they evoke the same conceptual frames. Dancygier & Sweetser's (2014) overviews attempts to differentiate simile and metaphor and reveals that, though they differ in syntactic construction and though there is a reduced likelihood that similes will have “rich inferences,” both evoke the same conceptual frames.

<sup>3</sup> Matthew 3.16 (NIV) – “... At that moment, heaven was opened, and he saw the Spirit of God descending *like a dove* and lighting upon him” (emphasis mine). The manuscripts of the original Greek text all use ὡς, meaning “similar to” in manner, rather than ὁμοιος, meaning “similar” in form. The same phrasing occurs in the parallel gospel stories (Luke 3.22, John 1.32). The latter term is used in places where form is emphasized, e.g., Act 17.29 (NIV) – “... we should not think that the divine being is *like* gold or silver or stone – an image made by man's design and skill” (emphasis mine)

various domains involved in the restaurant context, including denotations, connotations, and associations with *Table 5* and the target referent. Benczes also supports Jackendoff's (1992) argument that metonymy is not unidirectional, where the target sense supplants the source sense; there are varying degrees to which the source sense is still salient as the target sense is activated. This conclusion is also supported by Panther (2005), Ruiz De Mendoza Ibáñez (1999), and Ruiz De Mendoza Ibáñez & Hernández (Ruiz De Mendoza Ibáñez & Hernández, 2001).

This understanding of domain set will be integrated with Radden & Kovecses's (1999) explanation of domain, which characterizes it as a "cognitive process where by one conceptual entity, the vehicle, provides mental access to another conceptual entity, the target, within the same [domain]" (21). "Domain" here will include the interaction of domains: "domain matrices". Though Benczes (2011) suggests mapping is not a necessary part of the interaction of domains and domain matrices in metonymy, Barcelona's (2011a) perspective sees metonymy as "an asymmetric mapping whereby the target is construed from the perspective of a reference point, namely the source" (14). In this perspective "the source projects its conceptual structure onto that of the target... by imposing a conceptual (and linguistic) perspective from which the target is activated" (13). Though there are elements of both the target and source senses within the metonymy, it does ask the interlocutor to look at the target sense through the lens of the source; in that sense, the metonymy is asymmetric. Barcelona supports the analysis of *ham sandwich* and *table 5* wherein the conceptual entity of a ham sandwich or table 5 provides mental access to another conceptual entity – the relevant customer – within the same domain of serving customers at a restaurant. The mapping is asymmetric because the customer is construed from the perspective of the ham sandwich or table 5, and not the other way around; to clarify, the server or cook sees the ham sandwich as that which is salient and then sees the customer attached to it rather than seeing the customer as that which is salient and then attaching the ham sandwich to him/her. Though some metonymies can be reversed, in the context of the individual sentence, the interlocutor has chosen that particular source for that particular target to "constrain the way in which the target is viewed" (p. 13). In regard to examples (1) – (13), it may be that the speaker has chosen a marked way of encoding the meaning such that the target

meaning is viewed through the lens of the source; for example, in (1) the instrument interpretation (“use chopstick to eat”) is understood through the object construction (“eat chopsticks”).

Attempts at classifying different types of metonymies also involve looking at sub-lexical and super-lexical categories. Barcelona in his discussion of “degrees of metonymicity” conceptualizes metonymies as being on a scale from prototypical to non-metonymic with the following basic points on the scale: schematic, typical, and prototypical.<sup>4</sup> Each of these points on the scale show increasing degrees of “secondariness” to the centrality of the domain. By this, he means how far from the center of the domain the metonymy selects its source. The examples given by Barcelona of each major point on the scale are as follows:

- A. This book is very large (schematic)
- B. This book is a history of Iraq (typical)
- C. Paris agreed to a truce (prototypical)

(A) is schematic because it highlights a sub-domain (physical entity) within the larger domain of *book*, (B) is typical because it highlights a “clearly distinguishable” sub-domain (the story or meaning of the writing contained in the physical entity) in the larger domain of *book*, and (C) is prototypical because it highlights a clearly distinguishable entity, *Paris*, to reference another entity, *the institution in control of the government of France*, in a domain. What’s useful here is the conceptualization that metonymy is scalar from more metonymic to less metonymic. And a scalar understanding of metonymy would seem to be justified when looking at conventionalized metonymies that only have a metonymic feel. For instance, when Jon asks Mary to *start the kettle boiling*, Mary can reasonably ask, “*Why would you want to boil the kettle?*” Unless Mary has learned no pragmatic skills throughout her life, she is pretending not to understand the metonymic reference, and she expects Jon to understand both the literal and the metonymic reference; but crucially, this can only be a joke in this context if the phrase “start the kettle boiling” still has metonymicity. The conceptualization of metonymy as scalar also captures language

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<sup>4</sup> Other researchers have viewed metonymy as scalar, but they’ve done so on a scale from metonymy to metaphor, not within metonymy. See, for example, Dirven (2009), Radden (2009), and Croft (2002).

change in that it allows metonymic senses of a word to become the central sense, like the word *orange*. In an analysis of diachronic semantic change through metonymy and metaphor, Györi (2002) points to *orange* – one lexical item among many other examples – as originally designating the fruit before metonymically extending to other senses like the color *orange* or juice from the fruit *orange* (see also OED entry for *orange*). Györi then cites an example in Watkins (1985; the animal *bear* from Proto-Indo-European for *brown*) in noting that semantic change is not always from concrete senses to abstract (130). At any particular point in its evolutionary timeline, secondary meanings can become more central or less central to a lexical item. Semantic drift always happens towards a contiguous or associative relationship that has been established within a discourse community. For example, *orange* could never drift in such a way as to mean *computerized* without a discourse community first having established a metaphoric, metonymic, or associated relationships between the established and emerging senses.

Though Barcelona's (2011a) scalar view of metonymy is useful in some ways, it seems to undermine itself - at least as far as the "schematic" end of the scale is concerned; if, as it seems to suggest, the activated domain has a nebulous center, how can one determine if a sub-domain is being selected? If we assume that the larger domain of "bookness" includes all secondary meanings as well as the center, then everything is metonymic; selecting the central meaning (a sub-domain) of a domain without intending to refer to the rest of the domain is schematic metonymy. Thus, according to Barcelona's description and categorization, there is no part of any lexical item (or language generally for that matter) that is not in some sense metonymic. A definition in this vein would seem to render the term "metonymy" as near meaningless. For this reason, the present discussion will jettison the schematic point on Barcelona's scale, viewing it as non-metonymic, and instead posit that the highlighting of a sub-domain not clearly distinguishable from the central conceptualization of the domain is, in fact, a central conceptualization of the domain (e.g., the physical sub-domain of *book*). The rest of the scalar nature of metonymy (typical to prototypical) should be considered in categorizing non-canonical arguments.

The particular metonymy at issue in this dissertation is at the level of argument structure in Mandarin and can be exemplified by the phrase 开左手 (*kai zuoshou* – lit. 'open/drive left hand'), having

the intended meaning of ‘use the left hand to drive’ or ‘drive using the left hand.’ What is at issue is the noncanonical lexico-grammatical relationship between the verb *kai* and its object *zuoshou*. The latter lexical item functions as though it’s an instrument rather than a theme or patient, as in 开车 (*kai che* – lit. ‘open/drive car’) where the complement of the verb *kai* is interpreted as a theme: ‘drive a car’. Other instances of noncanonical arguments show varied types of relationships, such as location 吃馆子 (lit. ‘eat restaurant’ meaning ‘eat at a restaurant’), time, or reason. Part of the first chapter of this dissertation will overview explanations for these constructions and show why metonymy should be considered as a constraining factor for the otherwise over-generating explanations.

The first article will also argue that in order for the noncanonical construction to be interpretable, the relationship between the verb and the type of relationship must be salient to the interlocutor. And that same saliency also determines the degree to which the interlocutor will consider the sentence grammatical.

To support this thesis, the second article reports on the results of a grammaticality judgment task conducted on L1 users of Mandarin. The task involves several sub-portions. The first of them measures the response time of L1 users when presented with paraphrases of test items that would be used in later portions of the experiment. The next portion takes the test items, reconstructs them as noncanonical verb-object pairings, and presents them to participants, asking them to judge the acceptability of the sentence on a scale of 1 – ‘I don’t understand this at all’ to 5 – ‘I understand this and have used it’. At the same time, participants are asked to paraphrase the sentence in their own words, and once all of the test items and filler items have been judged and paraphrased, participants are shown the intended meanings of those test items and asked again to judge their acceptability.

The third article builds on this analysis by conducting the same judgment and paraphrase tasks on L2 users of Mandarin. This dissertation will ultimately argue that both native and non-native users of Mandarin access the intended meaning of non-canonical arguments through metonymic processes.

## Chapter 2: An Argument on the Interaction of Metonymy and Non-Canonical Objects

### 1. Introduction

Non-canonical arguments are the Noun Phrases and Determiner Phrases that occur without additional lexical markers like prepositions and whose meaning when selected as objects or subjects by verbs do not refer to any thematic argument of the verb. These noun phrases can include location, time, and instrument, though others are attested in the literature. In English, this can occasionally be seen with denominal verbs like *fish*, which can take a non-canonical argument; in the case of *fish*, a location argument can be selected, e.g., *fish Lake Michigan*. However, because non-canonical arguments are not normally selected by the verb, these constructions in English are not easy to find outside of their use with denominal verbs. In Mandarin, the situation is similar. Sentences which use non-canonical arguments are not frequent, and native speakers are often ambivalent about the acceptability judgments of the non-canonical phrases proposed by scholars who use and analyze the phenomenon. Example (1) below from Li (2014) illustrates an sentence that contains a non-canonical argument – in this case, *kuaizi* (‘chopsticks’) as an instrument argument – that she finds acceptable but that other native speakers may not, including some of my own consultants; (2) is unacceptable to Li as well my own native speaking consultants.

1. Ni chi zhe-shuang kuaizi ba!  
You eat this-CL chopstick PRT  
Use these chopsticks to eat (instrument argument)
2. \*Ni chi zhe-ba chazi ba!  
You eat this-CL fork PRT  
[intended: “use this fork to eat”] (instrument argument) (p. 300)

Many of the researchers who have analyzed these sentences are native speakers of Mandarin: Lin, 2010, 2014; Lin & Liu, 2004; Lin, 2001, C.-T. James Huang, Li, & Li, 2009, Li, 2014, Tai, 2013; Tai, 2008, Tao, 2000, and Barrie & Li, 2012. The fact that they have used these sentences to support one argument or another about the underlying structure of Mandarin syntax or semantics indicates that each of these researchers believes that Mandarin does produce sentences with non-canonical arguments similar to these; there is little indication in any of the literature above that (1) or (3)-(15) are odd or outlier sentences, though native speaking consultants from Mainland China judge at least some if not all of those sentences as odd. In a few of the studies, it is suggested that reviewers and other native speaking consultants have disagreed with these judgments, but the disagreements always concern specific sentences and not the phenomenon in general. Footnote 11 in Li (2014), for example, says,

[n]on-canonical arguments are generally used in colloquial, casual speech. The acceptability judgments of all the logically possible cases... are not always unanimous among native speakers, and the choice of verbs and noun phrases for non-canonical objects also affects judgments. The generalization seems to be that the more conventionalized/institutionalized the relation between the verbs and objects is for a speaker, the greater the acceptability is for that speaker. A high degree of conventionalization or institutionalization also makes it easier to use in formal speech. (p 304)

It should be noted that Li acknowledges that this is an intuitive judgment and that “large scale correlation studies” are needed to confirm it. But the fact that these sentences are being analyzed as part of acceptable syntax also suggests that these authors believe that these individual sentences are not simply idiomatic/figurative language; in other words, if the sentences were considered figurative or idiomatic, these studies should treat the sentences as lexical chunks instead of as compositional constructs. But they don't.

The present discussion will argue that these sentences are in fact figurative in the sense that the non-canonical meaning must be metonymically processed the first time a specific instantiation is encountered. If the conceptual associations between what would otherwise be a theme/patient argument

(the source sense) and the non-canonical sense (the target sense) are made salient, a lexical item in the theme/patient argument position may be interpreted non-canonically. The following discussion will propose that (1) metonymic relationships exist between an entity and its use as an argument, (2) that for metonymy to be interpretable, the metonymic relationship must be salient, which is achieved through access to the relevant context, world knowledge and active frames or to be uninterpretable it must be denied access to those same elements, and (3) the degree of salience determines the likelihood to which an interlocutor can interpret the sentence and the degree to which an interlocutor views the sentence as acceptable.

## **2. Literature Review**

The current section will discuss the literature that has attempted to answer why these constructions occur, first concerning Lin (2001) and related analyses that reference light verb structure and second concerning Tai (2008) and related explanations from semantic/pragmatic analysis. The gap in the literature suggests that this phenomenon cannot be explained by syntactic arguments alone. The present section will also overview the literature on metonymy that are relevant to the discussion.

### **2.1 Non-canonical arguments**

#### **2.1.1 Light Verbs and Light Verb Structure as Explanations for Non-Canonical Arguments**

Examples (3) – (15) come from Lin (2014), Li (2014), Tai (2008), and Tao (2000). Examples (3) and (8) are canonical theme/patient arguments and are included for contrast.

From Lin (2014):

3. Kai jicheng-che  
drive taxi  
“to drive a taxi” (Theme/patient argument – canonical argument, used for contrast here)



4. Kai gaosu-gonglu  
drive freeway  
“to drive on/along the freeway” (Location argument)
5. Kai ban-ye  
drive late.night  
“to drive in the late night” (Time argument)
6. Kai zuo shou  
drive left hand  
“to drive with the left hand” (Instrument argument)
7. Kai hao-wan  
drive fun  
“to drive for fun” (Reason argument) (p. 77)

From Tai (2008)

8. Chi niuroumian  
eat beef-noodles  
“eat beef noodles” (theme/patient object)
9. Chi Sichuan guan  
eat Sichuan restaurant  
“Dine at a Sichuan restaurant” (location object)
10. Chi da wan  
Eat big bowl  
“eat a large bowl (of food)” (instrument object)
11. Chi wanshang  
Eat evening  
“(The banquet) is in the evening” (time object)
12. Chi touteng

Eat headache

“(The medicine) is for headache” (reason<sup>5</sup> object)

13. Zaijia chi fumu, chuwai chi pengyou

At home eat father-mother, outside eat friend

“One lives on his parents when at home, but on friends when traveling”

A few brief notes about the examples from Tai (2008) above: Tai lists example (10) as an instrument object; however, consultants seem to suggest that this example is a theme argument inside an ellipsis (i.e., bowl of food) rather than an instrument object (i.e., bowl). That is, this example may not illustrate the instrument-argument concept Tai intends. Additionally, Tai does not classify use of (13) beyond calling it “other expression;” *chi* in this context would seem to be metaphoric for “rely on,” though a deeper analysis would focus on the metonymic/metaphoric chain that is productive – one can say *eat government* as well with the same sense.

Tao (2000) focuses entirely on the verb 吃 (*chi* – “eat”), and from it, several non-canonical objects appear:

From Tao (2000)

14. Zai Zhongguo renmen xihuan chi kuaizi, zai Xifang renmen xihuan chi daocho,  
er xiao haizi hui chi shaozi

at/in China people like eat chopsticks, at/in West people like eat knife-fork, and  
little child can eat spoon

“In China people like using chopsticks to eat, in the West people like using knife  
and fork to eat, and children can eat with spoons.”

15. Jiner zai “sanhongjiedaizhan” chi, jiu shi “sanhong” guandian de, minger shang  
“jinggangshan bingtuan houqinbu” chi, jiu shi “jinggangshan” de, chi shei shuo  
shei hao.

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<sup>5</sup> Tai’s designation. Another way to frame this would be “purposive object” or “teleologic object”

Today at “Sangong reception station” eat, then be “Sangong” opinion DE,  
tomorrow on “Jingangshan corps logistics department” eat, then be “Jingangshan”  
DE, eat who say who good

Today if you eat at San Gong reception station, you’ll accept San Gong’s opinion,  
tomorrow if you eat at Jin Gang Shan logistics corps, then you’ll accept Jin Gang  
Shan’s opinion. Whoever you eat from is who you’ll say is good.

The relevant phrases in Tao (2000) are underlined. (14) has three parallel uses of *eat* + instrument, while (15) has one *eat* + group-associated-with-location. The non-canonical object in each of the sentences from (1) – (15) can be rephrased with a preposition or verbal phrase to make overt the location, instrument, time, or reason sense. And for many of these sentences, the paraphrase would be more acceptable. Even so and excluding (2), these are considered acceptable by at least one native Mandarin-speaking researcher.

Li (2014; see also Barrie & Li, 2012) argues that non-canonical arguments occur in the same syntactic position as canonical objects in that they observe the following conditions:

16. a. Non-canonical objects are not incorporated into the verb
- b. Non-canonical objects are in complementary distribution with canonical objects
- c. Non-canonical objects take the same position as a canonical object when occurring with post-verbal duration/frequency phrases
- d. Non-canonical objects can combine with a double-object verb to take an affected object
- e. Non-canonical objects can be relativized (pp. 304-305)

It should be noted, however, that they cannot participate in passive “bei” and theme-marking “ba” constructions, as in (17) - (20) below. In both constructions, the “bei” and “ba particles would indicate that the object is being acted upon as a theme argument, precluding a non-canonical interpretation.

17. \*ba youshou kai che

PRT right-hand drive car

18. \*bei youshou kai che

PRT right-hand drive car

19. \*ba che kai youshou

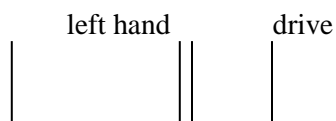
PRT car drive right hand

20. \*bei che kai youshou

PRT car drive right hand

Lin (2001, 2014) proposes that non-canonical arguments are motivated by light verbs. Light verbs provide elemental semantic content for the purpose of realizing the event structure of a sentence (Hale & Keyser, 1993). For instance, in the sentence *John took a shower*, the verb *take* does not have semantic content beyond “an event happened.” Hale & Keyser (1993) uses light verbs to explain the selection of arguments for denominal verbs like “saddle” and “corral,” as in *John saddled the horse* and *John corralled the horse*. They also claim that the formation of denominal verbs is a syntactic process that incorporates the noun into an abstract V node that would otherwise in English be filled by the relevant light verb, e.g., DO, CAUSE, EXIST. So, the sentence *John took a shower* does not involve incorporation of the noun *shower* into the light verb *take*, whereas the sentence *John showered* does. It isn’t clear what determines the phonological manifestation of the light verb, nor is it clear why in English the light verb manifests as *take* in this example but as *do* in other places: *\*take your homework*, *\*do a shower*; but *do your homework*. This is where the arguments must rely on non-syntactic processes to limit productivity and rule out sentences like (2) as well as rule out *\*take your homework*, and *\*do a shower*. Li (2014) and Lin (2014) hold that “action verbs in Mandarin do not directly select the arguments they are combined with; the arguments are instead introduced by light verbs [and occur] as eventuality predicates” (Lin 2014: 77). In the case of example (6), the movement in the underlying structure would look like (21) below.

21. [<sub>VP</sub> DO [<sub>VP</sub> zuo shou USE [<sub>VP</sub> kai]]]



The argument *zuo shou* is “introduced” by the light verb USE, and the activity verb *kai* (meaning ‘drive’ in this context) moves from the VP up into the phonologically null position of the light verb USE and then again into the higher, phonologically null position of the light verb DO. Lin (2014) explains that this coincides with the fact that when the light verb USE is phonologically realized, as in (22), the verb *kai* is prevented from moving higher in the structure.

22. *yong zuo shou kai*

use left hand drive

“use the left hand to drive”

Lin argues that this can be done in Mandarin because, unlike in English, “only a small portion of event information is lexicalized into the verbs” (82). However, an explanation that uses light verb theory runs into a problem that Li herself points out: light verbs do not “effectively constrain the ‘over-sprouting’ of [possible non-canonical] arguments” (97). Under such over-sprouting, one would expect (2) to be acceptable if (1) is.

### 2.1.2 Semantic and Pragmatic Explanations for Non-Canonical Arguments

Huang et al. (2009) & Lin (2014) both argue that null light verbs can account for the presence of locative, instrument, reason, and temporal arguments. Yet both acknowledge that the theories leave the selection of these kinds of subjects and objects, as well as their deletion, too unrestricted to account for sentences that have been judged unacceptable. Li (2014) also tries to account for this selection through revising Lin’s (2014) light verb argument by proposing a thematic hierarchy to constrain object deletion. However, neither are able to entirely explain why sentences like (1) are acceptable but why sentences like (2) are not – unless syntactically primed with (1) and/or semantically primed with a rich context. (1) and (2) are reproduced below as (23) & (24).

23. *Zhangsan chi zhe shuang kuaizi*

Zhangsan eat this CL chopstick

"Zhangsan eats using these chopsticks"<sup>6</sup>

24. ??Zhangsan chi zhe ba chazi

Zhangsan eat this CL fork

(intended: "Zhangsan eats using this fork")

Explanations for why (23) is acceptable but (24) isn't make reference to "semantic extension" (Lin, 2014; cf. Pustejovsky & Boguraev, 1993) or "conventional/institutionalized [relationship] between verbs and objects" (Lin, 2014: 304). Barrie & Li (2012) in discussion of Noun Incorporation restrictions in Northern Iroquois and in non-canonical objects in Mandarin argue that both phenomena are constrained by "idiosyncratic and institutionalized meanings" (p 68). These explanations seem similar to Kiparsky's (1997) "canonical use constraint" on denominal verbs, which will be discussed later. Researchers that have dealt with non-canonical arguments propose adding more structure in the syntax in order to restrict the productivity of the syntactic rules they've argued for.

If the only restriction were syntactic, any Noun Phrase should be able to replace "chopsticks" and be at least grammatically acceptable to mean "use NP to do X;" for example, the oddness of an sentence like *?chi guanzi* ("eat tube" intending 'eat using a straw/tube') would be a semantic oddness rather than a syntactic one. NPs in post-verbal position for a syntactic construction like (24) are typically interpreted as theme arguments, not instrument arguments. Semantically and syntactically, there should be no reason why a utensil used for eating cannot be replaced by another utensil for eating, except if in that particular conversation, the party interpreting the sentence does not know that the replacement is a utensil for eating. This issue is, instead, a problem with the pragmatic and socio-cultural relevance of the replacement NP rather than a problem with the syntactic structure.

Tai (2008, 2013) similarly argues that the interaction between pragmatic, semantic and syntactic modules of language should be more central to the study of language, Chinese in particular, because an interactive analysis does not leave explanatory power solely in the hands of one module or another. He

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<sup>6</sup> It should be noted that several of my consultants judged this sentence itself to be unacceptable; The inconsistency among consultants is also part of the problem with analyzing this phenomenon.

suggests that, at least for Chinese, a syntax “simplified with pragmatic inferences” offers a simpler, alternative explanation of the outliers in Lin’s (2001) light verb argument selection. Tai points to Culicover & Jackendoff (2005) who note that even though denominal verbs can be analyzed as conflation, there is nothing in the theory of syntax proposed by generative semanticists like Hale and Keyser to explain why “table” and “chair” can be conflated but not “sofa” and “desk” – i.e., “to table the motion” and “to chair a committee” but not “\*to sofa the movie” and “\*to desk the homework.” Also, when lexical items are conflated, they often have idiosyncratic meanings; “to father” and “to mother” respectively imply “to bring about the child’s birth” and “to treat the person (not necessarily a child) like a mother would treat them” – not “to treat the person like a father would treat them,” “to bring about the birth of the child,” or “to treat the person as though he/she were a mother.” Culicover & Jackendoff’s third point, that light verb structure cannot address the thematic roles of associated nouns, is addressed to some degree in Mandarin by syntacticians like Lin (2001). However, such an explanation may not work for conflation in English because the verbs in Mandarin are not conflated from nouns or noun phrases, e.g., “eat” in “eat chopsticks.” According to Tai, syntax and semantics must take pragmatics into account because social, cultural, and institutional concerns have an influence on the acceptability of sentences. In support of this, Tai (2008) presents word order variation examples where the semantics are recoverable from world knowledge even if the syntax is odd; (25) & (26) are his examples.

25. a. Tuzi laohu chi-le ('The tiger ate the rabbit')

Rabbit tiger eat-ASP

- b. ?Laohu tuzi chi-le (intended 'The tiger ate the rabbit')

Tiger rabbit eat-ASP

- c. Laohu chi-le tuzi ('The tiger ate the rabbit')

Tiger eat-ASP rabbit

26. a. Shizi laohu chi-le ('The tiger ate the lion')

Lion tiger eat-ASP

- b. \*Laohu shizi chi-le (intended 'The tiger ate the lion')

Tiger lion eat-ASP

c. Laohu chi-le shizi ('The tiger ate the lion')

Tiger eat-ASP lion

He argues that "syntactic notions [in Mandarin] such as subject and object are secondary to the semantic notion" (p. 9-10). If (26)b is unacceptable to mean 'the tiger ate the lion', then syntactically (25)b should be unacceptable also; yet, he notes that Mandarin speakers would accept (25)b, but uncomfortably. They would not accept (26)b to have the implied meaning above. Consultants say that (25)b is a case where the syntax is very odd but the semantics are recoverable. This poses a challenge to Tai's argument that "the semantic notion" is primary. Regardless of a speaker's intentions, at best (26)b means that "the lion ate the tiger," not "the tiger ate the lion." To illustrate semantic recoverability in English from syntactic oddity, "Me Tarzan you Jane" is semantically recoverable (i.e., "I am Tarzan, you are Jane."), but "Me Jane you Tarzan" cannot be semantically recovered as "I am Tarzan, you are Jane." There is one set of circumstances that might allow semantic recoverability in the "Tarzan" situation: (1) the speaker is Tarzan, (2) the other interlocutor is Jane and she either knows that the speaker's name is Tarzan or that the speaker knows her name is Jane, and (3) Jane recognizes that Tarzan is trying to communicate and that he frequently makes grammatical errors. Obtaining an interpretation from situations like this relies on the Gricean co-operative principle that when a speaker utters anything, the speaker intends it to be understood by the targeted recipient (Y. Huang, 2014: 30). Though Tai's argument about the primacy of semantics over syntax is not absolute, an interlocutor under some circumstances may still recover the semantics due to his/her world knowledge and the sentence's context. World knowledge and context are an inseparable part of a sentence's interpretation, and this is especially true where metonymies are involved.

To clarify, the purpose here is not to argue against light verb structure generally, but to suggest an explanation for the gaps. If the restrictions on argument selection in this phenomenon can be more simply explained through an interaction with semantics or pragmatics, a semantic or pragmatic explanation should be integrated.



## 2.2 Metonymy, Qualia, and Coercion

In explaining the relationship between the binding theory and pragmatic interpretation of polysemy, Jackendoff (1992) argues for an interaction between a conceptual-structure binding theory and the better-known syntactic binding theory – that is, an interaction between a semantic/pragmatic theory and a syntactic theory. To support this, he presents several examples of metonymies, of which, (27) and (28) are sufficient for explaining the arguments here:

27. Plato is on the top shelf (*Plato* denotes book(s) by Plato)

28. [In Mme. Tussaud’s Wax Museum] Ringo fell on himself

a. ‘The actual Ringo fell on the statue of Ringo’

b. ?‘The statue of Ringo fell on the actual Ringo’

Jackendoff argues that only three options are possible in order to explain how the shift in reference happens, opting for the third: (1) a pragmatic principle of interpretation that has no relation to syntax, (2) there is a partitive phrase that is deleted or moved (e.g., in (27) “a book by” was deleted from an underlying sentence: “A book by Plato is on the top shelf”), or (3) there is a rule that allows matching between the semantic/conceptual structure and the syntactic structure. He argues that the first explanation isn’t possible because (28b) is not an acceptable interpretation; that is, the binding theory seems to disallow ‘himself’ to refer to the actual Ringo, yet the reverse is acceptable. The second option is also not acceptable because in other circumstances “<statue of> Ringo behaves syntactically as though its head is Ringo, not statue.” See (29) – (31) below.

29. (Case marking)

a. He [pointing at <plain> Ringo] is cute

b. The statue of him [pointing at statue of Ringo] is cute.

c. He/\*him [pointing at statue of Ringo] is cute

30. (Number agreement)

- a. The four oxen [pointing at <plain> four oxen] are cute.
- b. The statue of four oxen is cute.
- c. The four oxen [pointing at single sculpture of four oxen] are/\*is cute

31. (Pronominal agreement)

- a. Look at the statue of Ringo over there. Isn't he/it cute!
- b. Look at <statue of> Ringo over there. Isn't he/\*it cute!
- c. Look at <statue of> the four oxen over there. Aren't they/\*Isn't it cute! (9)

The third option proposes a “statue rule” that states, “The syntactic structure NP may correspond to the semantic conceptual structure PHYSICAL REPRESENTATION (X), where X is the ordinary interpretation” (16). The problem with this analysis is that it hinges on the latter parts of (29a), (30b), and (31c) being infelicitous. Jackendoff argues that, in the case of (30c) and (31c), the plural verb highlights the four source entities (four oxen), not the target entity (i.e., statue). However, using plural nouns to elicit grammaticality judgments is questionable; an experiment on subject-verb agreement found an asymmetry in markedness for plural count nouns over singular count nouns, such that the participants in the study unknowingly made significantly more errors when plural nouns were a factor (Eberhard, 1997). The saliency of plurality in experiment items over-ruled the number marking on the verb. This would call into question the validity of using number agreement to identify source/target referent, and it would support the need for considering conceptual saliency in interpreting polysemy. In ruling them infelicitous, there's an additional question of why Plato in (27) doesn't fit the pattern of excluded metonymies. (27) is expanded below into (32a) – (32c), and (33) is added from Jackendoff (1992: 10).

32. [bookshop worker, asked about books written by Plato, replies:]

- a. Plato is on the top shelf. ?He's/?They're arranged chronologically
- b. \*Plato are on the top shelf. They're arranged chronologically.
- c. ?Plato-s are on the top shelf. They're arranged chronologically.

33. [One nurse to another:]

The measles in Room 426 needs/\*need a fresh IV

Jackendoff claims that a feature of the ‘statue rule’ is that number and pronoun agreement are triggered by the source entity rather than the target entity, but other types of reference shifters, like that in (34), reverse the trigger – i.e., the target entity seems to trigger number and pronoun agreement.

34. [One nurse to another:]

The measles in Room 426 needs/\*need a fresh IV

However, if it were a one-way trigger, (32a) should show acceptability for the singular masculine pronoun and unacceptability for the plural; but both seem odd. The problem with (33) is that the measles isn’t a plural noun in the conventional sense; one doesn’t speak of having a *measle* and sentences that use *measles* as a subject require a singular verb – “the measles is/\*are a terrible disease”. Jackendoff shows an interaction between the syntax and semantics through reference shifting and that in at least some metonymies, this reference shifting is not the result of syntactic processes alone and in particular not the result of a deletion rule. That is, there is both a syntactic and semantic/pragmatic component in the interpretation of metonymic patterns, and the semantic/pragmatic portion of the explanation cannot be substituted with an additional syntactic (i.e., deletion) rule.

Some of these metonymies have been addressed through qualia structure. Pustejovsky & Boguraev (1993) defines qualia structure as “the essential attributes of objects, events, and relations, associated with a lexical item” (p 203). Qualia structure involves four component roles (detailed below) that allow for nominals to be conceptualized as “active functions” instead of “passive arguments;” that is, the sublexical-level looks at “prototypical predicates and relations associated with [the noun under consideration]” (ibid).

Aspects of qualia structure:

Constitutive Role: The relation between an object and its constituent parts

Formal role: That which distinguishes it within a larger domain

Telic Role: Its purpose and function

Agentive role: Factors involved in its origin or “bringing it about” (p 204)

The benefit of analyzing certain types of metonymy through qualia structure is that it offers an explanation for argument-selection differences in metonymic sentences – e.g., the non-metonymic sentence *read a book* (看一本书 *kan yi ben shu* – read one CL book) is acceptable in English and Chinese, but *start a book* (\*开始一本书 *kaishi yi ben shu* – start one CL book) is only acceptable in English.<sup>7</sup> In both English and Chinese, the verb wants to select an event, but only in English can the nominal following *start* be coerced into an event (i.e., a telic role). If it were simply a matter of specific verbs in Chinese categorically not being able to take non-eventive NPs, then it could be chalked up to syntax alone. As others have also concluded (e.g., Pustejovsky, 2013), to suggest that the lexical item *start* should have more than one entry in the lexicon would increase the size of the lexicon to unmanageable proportions for natural language processing; a solution to this is the coercing of arguments or shifting of meaning for already existent lexical items. Metonymy has been offered as one of those processes for coercing or shifting (see Nunberg, 2005), a process that is seen early in language development (Rabagliati, Marcus, & Pytkänen, 2010).

It's uncertain whether qualia structure might altogether remove the need for light verbs as an explanation for (1) – (15) as well as remove the urgency to explain away infelicitous and questionable sentences like (2). However, other questions arise in their place if light verb structure isn't a part of the analysis. For example, the verb is not type-coercing “chopstick” in (1) to an agentive type and certainly not to a constitutive type – unless the metonymic coercion happens after type-coercion to its constitutive role and then the tip of the chopsticks becomes metonymic for the item of food being held by them. The type-coercion would have to be to a telic type, implying that the verb can select objects with a telic-role of utensil for eating; this brings the question full circle to why (2) is still unacceptable since the only purpose (telic-role) for a fork is as a utensil for eating. Additionally, there is still a problem for (9), *eat Sichuan restaurant*, where location is not one of the four roles laid out by Pustejovsky (2013) – the restaurant is not being eaten (formal) nor functioning as an event (telic) or origin (agentive); the constitutive role could

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<sup>7</sup> The same pattern is true for *start* with the nouns *movie* and *painting*

be argued if the food from a Sichuan restaurant is considered as an essential part of *Sichuan restaurant* through metonymy. Qualia structure and similar “meta-entries” are intended to account for the effect of knowledge relationships on argument selection and restriction, but how much it does this is still a concern (James Pustejovsky & Boguraev, 1993).

The similarity between "lexical conceptual paradigms (LCPs)" in Pustejovsky & Boguraev and “conceptual domain” in Langacker (1987), Radden & Kovecses (1999), and Barcelona (2011b) show independent attempts to account for the same general problem: the need to account for the connection between knowledge relationships. Pustejovsky & Boguraev (1993), in discussing the inheritability of syntactic information between lexical items, claims that varied alternations are accountable in the lexical conceptual paradigm; however, of the alternations they list in footnote 10 (p 217), all are described in other literature by metonymy – with the exception of “count/mass alternation: sheep”. These alternations and their examples are reproduced as (36) – (42) below

35. Count/mass alternations: sheep
36. Containter/containee alternations: bottle
37. Figure/ground reversals: door, window
38. Product/producer diathesis: newspaper, IBM, Ford
39. Plant/food alternations: fig, apple
40. Process/result diathesis: examination, combination
41. Place/people diathesis: city, New York

There would seem to be parallels between different attempts to integrate knowledge relationships.

Though Bierwiczzonek (2013) also classifies metonymy beyond a simplistic definition of one lexical item standing for another lexical item, he provides an expansion of metonymy that shows it working beyond the lexical level – from discourse to semantic, syntactic, phonological, and conceptual levels. Of particular interest here are (1) the conceptual level and (2) the link between the physical-neural networks and the linguistic-conceptual networks. His characterization of metonymy is that at its most basic level, metonymy is either a whole-part or part-part association within a domain. It is “a process of

co-activation of strongly associated concepts within single integrated conceptualizations” (37). And it is to metonymic relationships and structure that we turn next.

### 3. Metonymic relationships and structure

In sentences like (3)-(15), the relationship between the lexical form and its interpretation as instrument/location is a metonymic relationship. Because, as Bergler (2013) suggests, the verb can select non-literal arguments based on interactions at a sub-lexical level. This section will first address Kiparsky’s Canonical Use Constraint (Kiparsky, 1997) and then the requirement that denominal verbs and their direct objects must have salient associations with each other in order to be acceptable.

Without the overt marking of thematic roles (e.g., *bei* or *ba* as theme markers in Mandarin), interpreting which lexical items receive which thematic roles has been taken up by some as a syntactic issue. As mentioned already for Lin (2001) and Hale & Keyser (1993), thematic roles are marked covertly through light verbs; but those thematic markings aren’t constrained enough to avoid producing sentences like (24), let alone interpreting those sentences as instrument or location arguments. In response to the over-productiveness of an exclusively syntactic approach, Kiparsky (1997) proposes that encyclopedic knowledge should be considered integral in constraining productivity. This is not to say that syntax doesn’t play a significant role in the interpretation of denominal verbs but that conceptual knowledge constrains it. Kiparsky claims, “The principles of conceptual interpretation should thus be regarded as default rules, which govern the interpretation of a lexical item *unless other knowledge specifically precludes it*” (p. 5; emphases his). Kiparsky’s general principle for denominal verbs states, “If an action is named after a thing, it involves a canonical use of the thing” (9). A *saddle*’s canonical use is “to be put on a horse and sat upon,” and therefore as a verb, it selects the location it’s put on as an argument – thus, “saddle the horse.” A *corral*’s canonical use is “to put livestock in,” and therefore as a verb, it selects an “entity associated with being put in corrals” as an argument – i.e., “corral the horse/sheep/goats/etc.” Kiparsky’s point is that the primacy of encyclopedic knowledge – the canonical use of corrals –

constrains argument selection; in other words, location or locatum conflation can only occur when the action described by the denominal verb is typical of the underlying noun's use. So, one can "blanket a horse" [put a blanket on a horse] because it is a typical use of a blanket to be put on *things*, though specifically covering a horse with a blanket is not necessarily a typical use of a blanket; such a phrase may still be considered odd by some interlocutors because the conceptual association between horses and blankets is not salient for those persons. In other words, cultural or idiosyncratic associations for some cultures/individuals may not exist between blankets and horses, rendering the phrase odd. In the phrase *corral the horse*, the relationship between *corrals* and *horses* is closer than that between *blankets* and *horses* – again, assuming the interlocutors both have some degree of encyclopedic knowledge of the relationship between corrals and horses. When the noun is conflated, assigning the type of contiguity involved (*on* vs. *in*) between the two associations (*blanket-horse* and *corral-horse*) is as much a world knowledge issue as a syntactic issue.

Similarly, one cannot "hat a horse" without a significant context in which it would be conventional, institutional, or canonical for a hat to be placed on a horse; even then, it is still rather odd. Such a context might look as follows:

*Mary was an eccentric child who had only two loves – hats and horses. The only thing she loved more than hats and horses was putting hats on horses, so every time she went to the stables, she would bring along a new hat. Each time she would "hat" a horse, she would get very excited.*

While this use of *hat* might not ever be used again as a verb to mean *put a hat on something*<sup>8</sup> and though it may still be odd to many native speakers of English even in this context, the use of "hat" as a verb is made at least a little more acceptable by the context of the sentence – not to mention the context of the present discussion about denominal verbs. The interpretation can still be attributed, at least in part, to

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<sup>8</sup> In the writing of the current article, the game design company Addicting Games developed a version of their *Zero Punctuation: Hatfall* game for the Steam gaming platform and titled it *Zero Punctuation: Hatfall – Hatters Gonna Hat Edition*. The basic premise of the game is that "hats are falling from the sky (because, why not?) and it's your job to catch them on your head"

syntax; the nouns which are conflated to denominal verbs can only be bare singular nouns and, as such, denote properties of predicates rather than properties of individual entities (Chierchia, 1997, 1998a, 1998c, 2010; Krifka, 2003). As such, even if the context designated a specific entity, the denominal verb would be capitalizing on the properties of that type of entity rather than properties of that specific entity. In the *corral the horse* example, *corral* would not designate a specific entity but would designate *corral* as an abstract set of properties and is subject to the canonical use constraint when incorporated (cf. Gerstner-Link, 1988; Krifka, 1995). The Mandarin examples discussed earlier, where non-canonical arguments are used, capitalize on properties of those entities rather than on the specific entities themselves – otherwise, they would be interpreted as patient arguments.

As a side note, the primacy of the context beyond syntax for interpretability can also be seen in jargon and slang, where professional and social contexts permit specialized, community-accepted uses of otherwise odd sentences; e.g., in a kitchen, chefs can ‘plate’ food to send to the dining room (‘put food on a plate’), or in a gang-controlled neighborhood, an underpass might get *tagged* as belonging to one gang or another (‘an underpass might get a tag placed on it’). Technical terminology needs context for laymen to make any sense of it. For example, comedian John Pinette capitalizes on this fact in his story of going to a weight-loss “expert” who tells him he needs to “juice,” which is a denominal verb meaning “drink only juice for a period of time for the purposes of ‘cleansing’ the colon” (Pinette, 2008). Used in this way, the verb “juice” violates the Canonical Use Principle in speech communities outside those that advocate or are familiar with this approach to weight loss. A similar example occurs within the Gluten-free community with the denominal verb “gluten,” except that the concept “gluten” is associated with negative outcomes. In private communication about the difficulty of finding truly gluten-free restaurants, the following two lines were used when it was clear that I was not very knowledgeable about the gluten-free community. A & B below are both from separate gluten-free communities.

A: We use the verb “to glutenate” to refer to those incidents [in which someone gets sick from eating gluten]. As in ‘A glutenated C with the chocolate.’

B: Lol. I tend to use ‘gluten’. Same function and meaning. (Private communication)



Though some in that community use the verbalized form (“glutenate”), others use the denominal form (“gluten”) with the same purpose. Using “gluten” to mean “cause someone to get gluten poisoning” is not a canonical use of the entity “gluten” except as it pertains to that particular discourse community; the same is true of using “juice” where the canonical use of “juice” cannot be reasonably conceived of as meaning “use juice to ‘cleanse’ your system” except in a particular discourse community.

In the discussion of what factors are involved in metonymy, Brdar & Brdar-Szabó (2014) criticize Janda (2011) for an over-extension of the word “context.” Specifically, Janda is criticized for claiming an affix serves as a context for a word-base (e.g., *-er* and *bake* respectively) and that this context is underspecified, thus allowing the word-base to have metonymic reference. The point in Brdar & Brdar-Szabó (2014) with regards to context is that it is separate from the lexical item under consideration and that it clarifies the meaning of the lexical item. Janda (2014) responds to these criticisms by explaining that most terms in linguistics are slippery and that the point in Janda (2011) was that the contextual cues for lexical metonymy are “parallel” to the cues given by affixes in word-formation. To better define context, Roberts (2005) notes that when context is discussed in linguistic analysis, it can include any or all of the following: (1) “the actual discourse event” including the physical surroundings and phenomena that would affect meaning, (2) “the linguistic content of the verbal exchange,” and (3) “the structure of the information that is presupposed and/or conveyed by the interlocutors in an exchange.” For our purposes here, context refers to any of Roberts elements that affects the interpretation of a lexical form not already encoded in the lexicon for that form; this would also include cognitive domains evoked by such a context. By such a definition, one might argue that context loses all meaning because there is no context-free situation. However, in an out-of-the-blue sentence, most lexical items - whether single words or idiomatic phrases – have core meanings within each discourse community. The problem of polysemy in words like *bank* becomes a problem of how a particular meaning is accessed and whether more than one meaning – literal or figurative – is available at onset.<sup>9</sup>

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<sup>9</sup> See Kearns (2006), Geeraerts (1993), and Tuggy (1993) for discussions on the differences between polysemy, homonymy, and underspecification.

For location denominal verbs, it is at least slightly more acceptable to say an individual can “horse the corral with thoroughbreds” [fill the corral with thoroughbred horses] or “horse up the mountain” [go up the mountain on/by horse] in the same way as one might “people a stadium with rednecks” [fill a stadium with redneck (people)] or “bike up the mountain” [go up the mountain on/by bike]. The novel denominal verbs are a bit odd, and any particular novel denominal verb is unlikely to be widely used – the *process* of denominalization is wide-spread even though any particular denominal verb may not be. But it’s not the syntax alone that restricts those denominalized verbs from forming; it’s the context and encyclopedic knowledge that allow one sense to be accessed by the conceptual system and prevent others. The process that picks out the relevant sense in context and allows *horse* to refer to some specific property of the animal rather than all properties of the animal at the same time is a metonymic process. The process of creating a link or activating a pre-existing connection between a horse as an entity and a horse as an instrument/vehicle or between a corral as an entity and a corral as a location is a process of associating senses within a domain or domain matrix; thus it can lead to various metonymies depending on whether those associations are salient, related in part to its canonicity in that present context (see also Heredia & Muñoz, 2015). A horse’s sense is as an instrument/ vehicle in *horse up the mountain*, so in a novel sentence with relevant context, the interlocutor will pick out an instrument/vehicle interpretation for *horse*; but in “horse the corral with thoroughbreds” and without other contextual cues in which to pick out *horse* as anything other than a theme interpretation, the hearer/reader will pick out *corral* as a locative argument because of the associations between *corral* as a location for holding livestock and *horses* as a type of livestock. Even with that explanation, *horse the corral with thoroughbreds* would not be acceptable unless primed with a similar structure, like *people a city*, and with the prior knowledge that horses can be kept in corrals. Granted, even then it may be highly questionable for some. Conversely, one cannot say *horse the blanket* with the intent of “put the blanket on the horse,” because it is not typical of a horse to be a location, and *horse* as a theme does not have the associations with *blanket* to be highlighted as a location sense.

*Horse* as a denominal verb is rare in modern literature<sup>10</sup>, but *unhorse*, *unhorsed*, and <sup>?</sup>*well-horsed*<sup>11</sup> are well established; *\*well-horse*, on the other hand, seems unacceptable as a verb. The first two are location denominal verbs with a negating morpheme attached meaning “removed from being located on a horse.” Though *well-horsed* in some cases accesses location as part of its meaning - to “sit well on a horse” in the sense of being well-situated on a horse<sup>12</sup> – in other cases it seems to mean well-supplied with horses or supplied with a particularly good horse. Context narrows the interpretation. ‘Horsing around’ is a common colloquialism with figurative meaning, though it encodes manner rather than locatum/location. *Horse* cannot appear as a location verb on its own to mean “put on a horse” – at least not without significant context to allow such an interpretation; even as a denominal verb of manner (i.e., “to travel by horse”) *horse* would require significant context. *To unhorse* someone would require the attachment of *un-* **after** conflation (i.e., *un-“ride on a horse”*), while *well* in *well-horsed* would conflate as a single unit (i.e., “*ride a horse well*”). *Lock* and *unlock* are acceptable, but only *corral* is acceptable, not *un-* or *de-corral*. An argument can be made here for acceptability being related to the need a discourse community might have for some of these forms versus the others. But the fact that it is interpretable is precisely the point: it’s the associations between conceptual entities with a particular domain/ICM that allow *horse*, *blanket*, and *corral* to have an interpretation as denominal verbs. A sentence without those cultural and contextual associations would fail otherwise, including for institutionalized meanings (Langacker, 2009). This might, arguably, be derived from pragmatic rather than syntactic processes. Others might make meaning of the sentence by extending the semantic boundaries of one or more lexical

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<sup>10</sup> One of few exceptions being in Fromhold (2010) within an appendix discussing Mountain Cree transportation, his ethnography states the following:

Passing references state that they were relatively well-horsed for the Cree. Other references state that another relatively well-horsed group, the SIPI WI INIWAK, were never fully horsed and continued to rely on dogs. The average ownership for the Plains Cree was 2-3 horses per family, suggesting that the “relatively well-horsed” ASINI WACHI would have had somewhere around 3-5 horses per family. (p. 309)

<sup>11</sup> These three examples were suggested derivations of “horse” in personal correspondence with Harley; however, the latter example (*well-horsed*) was initially odd to me. Perhaps my unfamiliarity with pastoral contexts might have contributed to the initial rejection.

<sup>12</sup> E.g., From the OED entry for “well-horsed,” a shift happens over time from “sitting solidly on a horse” to “supplied with sufficient horses;” contrast the more literal examples from before 1774 to the more mixed literal/non-literal examples from 1833 and later.

items through metaphor and/or metonymy; that is, associations between conceptual entities. For metaphor, the interpretation comes from links between separate conceptual domains. Though associations between concepts is not a sufficient condition for metonymy, it is a necessary one.

While denominal verbs focus on the conflated noun and its canonical use, the nouns that serve as the direct objects must also be semantically canonical direct objects for an interpretation to be understood literally instead of figuratively. In all the examples above, both the conflated noun and its direct object were taken as literal; for example, *corral the horses* without further context assumes that there is a corral into which horses are being herded. While it could mean to gather up the horses without putting them into a literal corral, it is understood that the concept *corral* is still invoked in the sense that the horses are gathered up as though they were being put into a corral or a corral-like entity, e.g., *corral the horses into the barn*. If the extended use is intended, then *corral* is figurative. *Corral* as a denominal verb includes further information than the paraphrase in (44). *Corral* is not simply a location, but a manner in which they are put in that location. That manner is drawn from encountering contexts – whether textual or experiential – in which *horses* and *corrals* are in association, and this manner is likely to be different from the associations built up between *horses* and *barns*; *barns* are not associated with a manner of doing something to horses in the same way as corrals. As per Kiparsky (1997), a noun cannot be conflated unless it has a canonical use known to and salient to the listener, but it also must have a salient canonical association with the direct object; thus, (45) is acceptable but not (46). (47) and (48) are given as contrast for manner.

42. Put the horses in the corral
43. Put the horses in the barn
44. Corral the horses
45. \*Barn the horses<sup>13</sup>
46. Corral the horses into the barn

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<sup>13</sup> In the Corpus of Contemporary American English article (Davies, <http://corpus.byu.edu/coca>) as of the writing of this, there are no instances of *barn* being used as a verb.

47. \*Barn the horses into the corral<sup>14</sup>

Contrast also the conflated noun *stable* as in (49) below.

48. Stable the horses

Having a canonical use does not preclude extended/figurative meanings, but extended/figurative meanings must be made salient enough for them to be interpretable. If the entity(ies) *horses* are replaced with the entity *people*, then the entity *corral* in *corral the people* would have to be taken as figurative. That is, *the people* is not figurative, though the way of viewing the people is; *people* is partially and temporarily re-conceptualized as analogous to livestock through the verb.

The interpretation of the verb itself as figurative or literal also depends in part on world knowledge about the direct object. Take the denominal verb *fish* in *fish Lake Michigan* and replace Lake Michigan with a made-up lake, which we'll call Lake X. Without any other information, it would be assumed that saying "fish Lake X" is most likely to mean "catch fish in/at Lake X". But imagine the following context:

Lake X is filled with salt water and has been used as a chemical dumping grounds for the past 40 years; no fish could possibly live in the lake. Tom believes with absolute certainty that there are no fish in Lake X; everyone knows that he believes this. Tom says, "I'm going to fish Lake X."

While a listener might not know in what way the verb *fish* is being extended, the listener knows for certain it has to be taken figuratively because of the knowledge all parties involved believe about Lake X.

*Fish Lake Michigan* illustrates that the direct object in these constructions is not always being treated solely as a location but in parallel as a theme. That is, there is a sense in which something is being done to the lake rather than just that the action is being done at/on the lake. Both the entity and location senses of Lake Michigan are evoked when in a direct object position.

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<sup>14</sup> Conflating the noun *corral* also adds a directional requirement that necessitates the preposition on the location be altered from *in* to *into*.

Dirven (1999) discusses event-schema metonymies that work on a “nuclear” level, in contrast to clause level metonymies (referential); these event schemata are semantic-conceptual relationships between predicates and complements. Within these event-schema metonymies, he divides converted verbs (denominal verbs) into five categories:

(a) object verbs

examples: *to fish, to crew, to anger*

(b) instrument verbs

examples: *to harpoon, to head, to veto*

(c) manner verbs

examples: *to queue, to balloon, to spoon*

(d) locative verbs

examples: *to bottle, to shelve, to record*

(e) essive verbs

examples: *to author, to nurse, to knight* (p. 280)<sup>15</sup>

He argues that both the nuclear and clause level metonymies “single out a salient participant to become either the identity marker for an unknown or unnamed referent (reference metonymy) or the main designation for the event itself (event-schema metonymy)” (278). Dirven gives the example of the denominal verb *fish*; “the patient *fish* is the metonymic focus of the whole action schema and, as a converted verb, it does not require the patient to be further specified,” though it can be: *He was fishing salmon* (281). He argues that the manner/ instruments with which fish are caught are also available for focus within the domain of fishing: *lure fish, harpoon fish, net fish*. Dirven’s argument about conversion is that it is a metonymic process that highlights a salient entity (patient *fish*) within a domain to refer to the event (catching fish) involving the entity in the same domain.

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<sup>15</sup> The examples of essive verbs as Dirven has laid out does require further division. *To knight* suggests a “conferring” event rather than a “being” event – i.e., “to confer on someone the title of X”. This is a limited phenomenon. Other essive verbs, like *to author* and *to nurse*, suggest “to do activities associated with being an X”.

Similar to the point of the *fish* example, setting up frames and cognitive domains is necessary for an interpretation of novel metonymies in children's literature, and these frames create a relationship between a verb and its object, even if that relationship is extraordinarily odd outside the current frame. For example in the J.K. Rowling's stories about Harry Potter, the wizards and witches are able travel long distances (teleportation) by touching enchanted objects; the following is an excerpt from the popular children's book *Harry Potter and the Goblet of Fire*, where the old rubber tire mentioned in the excerpt is enchanted in this way:

Mr. Weasley had a hurried discussion with Basil; they joined the queue, and were able to take an old rubber tire back to Stoa's Head Hill before the sun had really risen. (Rowling, 2000: 145)

It should be noted first that the noun phrase *old rubber tire* cannot be conflated because traveling magically by means of an old rubber tire is not even a canonical use of old rubber tires in this fictional world; therefore, even in the context, it would likely be very odd to say *\*they were able to rubber tire back to Stoa's Head Hill*. However, the fact that *take an old rubber tire* can be used to mean *teleport using an old rubber tire* indicates that more is happening than simply a semantically-underspecified verb with a direct object; the context must supply the connection between the verb and its direct object.

This relationship is not limited to the object position. In (50) below, the humor is accessed via a conceptual relationship between *the streets* as a location and *the people* as a metonymic referent (the environment around the streets and the population that by extension lives there). The hearer must access both interpretations of *the streets* – one as a location with metonymy and the other as a location without metonymy – for the sentence to be humorous. The humor comes from the metonymic interpretation of LOCATION FOR PEOPLE LIVING IN THAT LOCATION being processed (i.e., *the people in Philadelphia are safe*) before realizing that Rizzo meant the hearer to interpret *the streets* as literal: *the streets* as an entity are safe.

49. The streets are safe in Philadelphia. It's only the people who make them unsafe. (noted by Frank Rizzo, ex-police chief and mayor Philadelphia, in Tibbals, 2006: 511, qtd. in Goatly, 2012: 167)

Because this type of metonymy is productive in Mandarin, the metonymy translates easily if not directly; see (51) below.

50. 美国很安全, 只是人民会让美国危险

America hen anquan, zhishi renmin hui rang America weixian

America very safe, it's-only-that people is-able allow America dangerous

America is very safe; it's the people that make America dangerous

Brdar & Brdar-Szabó (2014) in their criticism of over-application of the term metonymy rejects derivation, compounding and inflection as metonymy. In parallel to Koch (2001), they claim that regardless of the closeness of the association between the claimed source and target entities, if the linguistic form is changed in order to indicate a proposed metonymy, it's not a metonymy. While there may be surrounding grammatical effects from a metonymic reference as in *He was the Shakespeare of his day*, claiming that a changed lexical form, as in *bake to baker*, is a metonymy would only be acceptable in certain theories (again, see Janda, 2011, 2014 for an example). This also follows with Panther & Thornburg (2002) who claim that the verbal base – in this case, *bake* – is not a metonymic reference point, but instead “evokes the whole scenario (with its concomitant participants) directly (i.e., non-metonymically)” (287). Brdar & Brdar-Szabó (2014) also counter this over application by noting that contiguity overlaps with metonymy, though it extends beyond it including other aspects of language like deixis. Citing Koch (2001) again, Brdar & Brdar-Szabó claim that all morphological processes, including gender change, compounding, prefixation, idioms, etc., are contiguity relations; “either we have to subsume all this under the label of “metonymy” ..., or we have to restrict metonymy to contiguity-based effects on a linguistic form that is really invariant” (Koch, 2001: 232). This is especially important for Mandarin since word formation is achieved primarily through compounding and especially since a



character-based orthographic system must represent borrowed words using pre-existing characters; in some cases the phonologic representation is the basis, in others the semantic representation is, and in the remaining a combination of the two are used. One example that illustrates the phonologic representation is the brand Coca-Cola which was transliterated to 可口可乐 *ke kou ke le*; sounding similar to the English pronunciation of the brand name, the Mandarin translation uses two characters that roughly mean “tasty” and “amusing/ entertaining.” The latter word 可乐 *ke le* has become the standard translation of cola and now no longer needs to reference an English word *cola* to have semantic meaning: e.g., 百事可乐 *baishi ke le* (Pepsi) and 非常可乐 *feichang ke le* (Future Cola – a Chinese brand); the latter literally means “extraordinary cola”, but the decision seems to have been to transliterate the name into English rather than translate. Because Mandarin does not have prefixes and suffixes to the extent that European languages do, it must rely more heavily on a variety of other cues – e.g., linguistic contextual cues – to distinguish parts of speech from each other. Within the definition provided by Koch (2001) and Brdar & Brdar-Szabó (2014), some of these instances where there is no phonetic change from one part of speech to another could arguably be metonymic – for example, 强壮 (*qiang zhuang*) meaning (adj.) “strong” or (verb) “strengthen” depending on the intended part of speech. But if compounding in all cases is also metonymic, then native speakers of Mandarin process all of their sentences through metonymy on first encounter with a new lexical item – a claim this paper certainly does not advocate. While one might make the argument that metonymic and metaphoric stretching of lexical items is central to language acquisition, it would be stretching the theory of language acquisition too far to suggest that ALL lexical items are based in metonymy and metaphor. Returning to Brdar & Brdar-Szabó’s (2014) criticism, if the base (*bake*) is the metonymic source and the suffixed word (*baker*) is the metonymic target, then all words with derivational suffixes are metonymic because the relationship between derivational suffixations and their base is contiguous; all derivational prefixes would have to be included in this category as well. Such a conceptualization of metonymy “inflates the phenomenon beyond any acceptable measure... If every contiguous or associative relationship in grammar is a priori metonymic, it becomes trivial to label

anything as metonymic as it does not add anything to ... our understanding of language” (323). For our purposes here, only those items that require shifting meaning and that maintain the same form will be considered metonymic.

#### 4. Metonymic relationships and saliency

This section will argue that context and world knowledge are necessary to make the metonymic relationship salient and, therefore, select the non-canonical argument interpretation.

Bergler (2013) approaches metonymy from a Generative Lexicon framework, proposing an interaction between lexical semantic co-compositionality and a Contextual Constancy Heuristic as a way to address the effect context has on interpretation. Co-compositionality is defined here as “the process of considering the role of each constituent in the context of other constituents;” this is to be contrasted with semantic composition which considers “the role arguments play in the context of their predicate” (139). Bergler motivates a co-compositionality approach by noting the contrast in (52) and (53).

51. The milk survived the thunderstorm (138)

52. The secretary survived the restructuring [of the company] (139)

In (52) and (53), the verb *survive* takes a metaphoric meaning, where “the purpose of the subject continues to be served,” and – rather than selecting a literal meaning of “remain alive or in existence” and therefore selecting a subject that subcategorizes as animate – is coerced to subcategorize for function in the qualia structure of the subject’s lexical entry (138-139). Though the intended interpretation in (52) can be arrived at through regular coercion, Bergler argues that (53) is more tricky because the verb does not have to be coerced to take the literal subject NP (the secretary as referencing a person), since it is an animate NP; she suggests that the theme, *the restructuring*, “orchestrates the proper reading of the entire sentence, the metaphoric reading of *survive*, and the functional type reading of the subject NP *the secretary*” (139). To put it another way, a sentence *The secretary survived* - without context - would seem to suggest *survive* should take an animate, directly-referential (i.e., literal) subject and a “remain alive or

in existence” meaning for the verb; the verb would need to be coerced to take a subject that subcategorizes for function (i.e., the position of secretary). The result would be a metaphoric reading for the verb through a metonymic reading of the subject. While the meaning of *secretary* in (53) may have a referential meaning of *that [person who is described by his/her position as a] secretary*, the reference must ultimately be about *the secretary’s position* for the verb to be understood metaphorically: *The secretary[’s position] survived [remaining in existence such that its propose continued to be served] the restructuring*, and not *The [person who held the position of] secretary survived [such that he/she remained in existence] the restructuring*. In cooperation with co-construction, the Contextual Constancy Heuristic is proposed to address metonymies like (54) and (55) below. The heuristic states: “A referring expression assumes the interpretation in focus in the local context” (139). Bergler motivates by coordination in (54):

53. \*The magazine costs \$3.50 and is laying off 30 people<sup>16</sup>

The local context for (54) selects the physical object interpretation first, and the coordination assumes that same interpretation should be applied to the elision – thus, the infelicity. In an sentence where local contexts (analogous to locality effects?) allows separate references, infelicity goes away; for example, in (57) the second reference is inside its own local context that puts it in relation to a board of directors, allowing an institutional reading and allowing the first reference to be read as a physical object.

54. The magazine costs \$3.50 and the magazine’s board of directors is laying off 30 people.

55. Can a magazine survive by downright thumbing its nose at major advertisers? (137)

56. Can a magazine survive being thrown from a helicopter for advertising purposes. (141)

Allowing predicates and arguments to co-specify the interpretation, the preference from the previous sentence for the institution reading of magazine selects the metaphoric meaning of survive without the need of computing all possible readings (including the confusing “Can magazine employees survive?” reading.) In a Generative Lexicon framework the required “mapping rule” is embodied in a so-called Lexical Conceptual Paradigm (a meta-lexical construct that allows lexical entries to inherit schematic

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<sup>16</sup> Bergler identifies this as only questionable. I, however, find this unquestionably bad.

behavior, such as alternations) (140). Bergler doesn't seem to indicate that there are constraints that privilege one local context over another; for example, why in (56) does the DP "the magazine's board of directors" block *the magazine* from being interpreted through the sentence's local context, like (58). And reinserting the elided "the magazine" in (54) does not create a new local context by which the second *magazine* becomes free from the larger context: "The magazine costs 3.50 and the magazine is laying off 30 people. It's possible that the number of links in a metonymic chain influence acceptability in cases like these; for example, there are two metonymic jumps in (54): the first is the jump from the magazine as a physical object to the magazine as an institution, then from the institution to the board of directors that makes decisions for that institution. It would be acceptable to say, "The magazine costs 3.50 but the corporation is laying off 30 people," but this takes away "magazine" as a metonym. Regardless of the answers to these final questions, Bergler (2013) points to an idea that others have found through experimentation: the saliency of a particular sense is necessary for metonymic interpretation, whether that saliency comes from a local context or from a larger discourse context.

Heredia & Muñoz (2015) found that salience matters for figurative language generally and that processing does not always prefer literal senses. They conducted two experiments on literal/figurative meaning activation in highly proficient bilinguals, with heterogeneous L1s. The results of the first experiment showed that highly proficient bilinguals do directly access both figurative and literal senses from 0ms after onset of stimuli. When the figurative meaning was primed, the literal sense remained activated at 1000ms from stimuli onset even "after they have accurately resolved the linguistic ambiguity" (103). The results of the second experiment reveal that both literal and non-literal senses are "equally accessible and involve similar processes" at both the 0ms and 300ms probe positions (106). Heredia & Muñoz argue that this supports a Graded Salience Hypothesis (see Giora, 1997, 2002, 2003), where given a polysemous lexical item all "*salient* meanings in the mental lexicon [for that lexical item] are processed initially, regardless of either their literality or contextual fit" (93, emphases mine). Salience in this context would be influenced by "word frequency, familiarity, conventionality, and prototypicality" (ibid.) Also, differences between degrees of aptness in the metaphor produce different results in what seems to be

accessed initially and later on. In the same vein but with English monolingual speakers, Blasko & Connine (1993) found that metaphors which were highly apt for the referent but have low familiarity to the participants activated both literal and non-literal senses initially, but moderately apt metaphors but with low familiarity only activated the literal sense at onset. These two studies and the Graded Salience Hypothesis would suggest that if the literal meaning is salient but the non-literal meaning hasn't been made so, then the literal has to be processed and rejected before a non-literal meaning can be considered.

If this reference or sense transfer isn't limited to relationships between lexical items but is inclusive of argument selection (i.e., sense transfer from theme to instrument), then the unexplained gaps and outlier sentences mentioned above that (by more syntactically-based accounts) should be acceptable can be explained when the relevant metonymic relationships have yet to be innovated and accepted into a discourse community. Their acceptable counterparts like (58) show that such metonymic relationships are more productive for culturally salient lexical items than for less salient ones, like (60). “Bowl” in (58) below arguably functions similar to “chopsticks” in (59); see Tai (2008).

57. chi da wan

eat big bowl

eat [something] out of a big bowl OR eat a big bowl [of something]

58. chi kuaizi

eat chopsticks

eat [something using] chopsticks

59. \*chi chazi

eat fork

eat [something using] a fork

In (60) forks are not as culturally prominent as chopsticks and bowls, and even though the essential purpose of a fork is as an instrument for eating, the intended interpretation would be near impossible

without contextual cues that make salient the relationship between the entity and its purpose. The same metonymic requirement of saliency can be seen in the referential/lexical metonymy *table 5* in *Table 5 wants his check*; though a customer may view the essential purpose of the table as an entity on which she can place her food, for the wait staff the table functions as one of the few easily understandable identifying markers for the location of [sets of] customers. *Table 5* as an entity must be not only identifiable as an entity that exists (or is assumed to exist in the world) but the relationship between the entity and the wait staff's purpose of identifying customers must be salient; otherwise, the interpretation of the TABLE FOR CUSTOMER metonymy will fail.

To illustrate that the saliency is also required beyond the lexical level, consider the examples below of what Panther & Thornberg (2003) call “propositional metonymy” in (61) and (62) and “illocutionary metonymy” in (63) and (64):

60. General Motors had to stop production (and they did stop production) [from Panther & Thornberg (2003a: 4)]
61. Jon had to finish his homework before class started (and he finished it)
62. You look tired. (Go to bed.) [adapted from Panther & Thornberg (2009: 26)]
63. It's time to go to bed. (Go to bed.)

The metonymies in (61) and (62) evoke a contiguous relationship between the obligation to do an action and the doing of the action itself. In these cases, being obliged to stop/finish often leads to fulfilling the obligation to stop/finish. The obligation is neither sufficient nor necessary for completing the action, nor is completing the action a necessary outcome of obligation to do the action. Yet, the contiguous relationship between obligation and action allows the obligation to be interpreted as though the action itself was a reliably consistent outcome of the obligation. The illocutionary metonymies in (63) and (64) capitalize on the conceptual relationship between giving a/the reason one might do some action and a desire for the other person to do the action – the relationship between the interlocutors might make this desire for action closer to a command for action. The metonymy evokes the connection between the reasons one might go to bed and the command to go to bed: i.e., when you're tired, one should sleep, and

when it's the right time (for children, especially), they should sleep. It should also be noted that "Go to bed" is itself part of a longer metonymic chain – "go to bed" is metonymic for "go to sleep;" "go to sleep" could also be uttered when the person/child is already in bed, so "go" has little lexical content, as there is no physical changing of location, and instead functions as the metaphor CHANGE OF PHYSICAL LOCATION IS CHANGE OF STATE. Another example of this metaphor is the sentence "He went crazy;" again, there is no literal change of location in the verb "went." As in the *Table 5* and *chopsticks* metonymies, illustrations (61) through (64) have literal interpretations, and given a different context, the target sense does not have to shift. That is, if the context makes a different relationship salient or negates either the obligation-for-action relationship or the reason-for-command relationship, the target meaning either shifts to a different sense or it blocks the sense from shifting altogether because there is no further salient sense to shift to. This is illustrated in (62) through (65) respectively; the (a) items are the target senses for (65) – (68).

64. General Motors should have stopped production of the car to properly fix the computer failures in their new model, but they kept producing the car anyway.
  - a. \*General Motors stopped production to properly fix the computer failures in their new model, but they kept producing the car anyway.
65. Jon had to finish his homework before class started, but his friends wouldn't stop asking about his new girlfriend long enough for him to finish it
  - a. \*Jon finished his homework before class started, but his friends wouldn't stop asking about his new girlfriend long enough for him to finish it
66. You look tired. Would you like some coffee?
  - a. \*Go to bed. Would you like some coffee?
67. It's time to go to bed. But it's the weekend, so you can finish watching this movie
  - a. \*Go to bed. But it's the weekend, so you can finish watching this movie

Metonymic processes rely on salient relationships between the source and target to be interpretable, and the context highlights the link between those relationships, regardless of whether the vehicle for the metonymy manifests on a lexical, super-lexical, or sub-lexical level.

The non-canonical arguments in the different sets of examples (3) - (15) could all be interpreted as theme arguments, even if some are semantically nonsensical or would require the verb to be metaphorically/metonymically stretched. For example, *chi wanshang* (“eat evening”) in (11) is semantically nonsensical if *wanshang* is interpreted as a theme instead of as a temporal marker; either *wanshang* is forced to be interpreted metonymically or metaphorically, or the verb *chi* is forced to be interpreted metaphorically while the direct object is interpreted literally. The flexibility of the verb *kai* in (6) *kai zuoshou* (“drive left hand”) can also allow it to mean “open the left hand,” where *zuoshou* literally means “left hand” instead of “using the left hand. *Chi fumu* (“eat parents”) in (13) can literally – and morbidly – mean to eat parents as a theme/patient in the same way as one would eat rice - however, the verb in that case is normally metaphorically extended to mean “rely on someone/something for sustenance” when the object of the verb is an institution that would canonically provide sustenance for the agent argument of the verb.

Though more than one conceptual relationship may be salient in a given context, if a sentence with a particular non-canonical argument hasn't been encountered before, the theme argument must be processed metonymically or metaphorically. In the case of (2), *fork* as a theme argument must undergo metonymic conversion to instrument argument when the theme interpretation fails. If that particular instantiation of non-canonical argument has not been encountered previously, then the argument is assumed by the listener to be whatever argument(s) he/she has typically encountered with that verb; once world knowledge causes the interpretation of the most salient argument(s) to fail, the sense of the object (or verb, in other situations) is metonymically extended to its most salient feature in the domain and context – in the case of *eat fork*, to *eat using a fork*, or if the instrument argument is not salient to the listener, it will be interpreted as a nonsensical, literal “eat a/the fork(s).” The salient feature determines whether the argument will be interpreted as a location, instrument, time, reason, or some other thematic



relationship. The diagrams below represent the basic view of metonymy (Figure 1) and the relationships between the source and target; Figure 2 shows a representation of the metonymic relationship between the entity as a theme argument and its non-canonical arguments as it relates to (1).

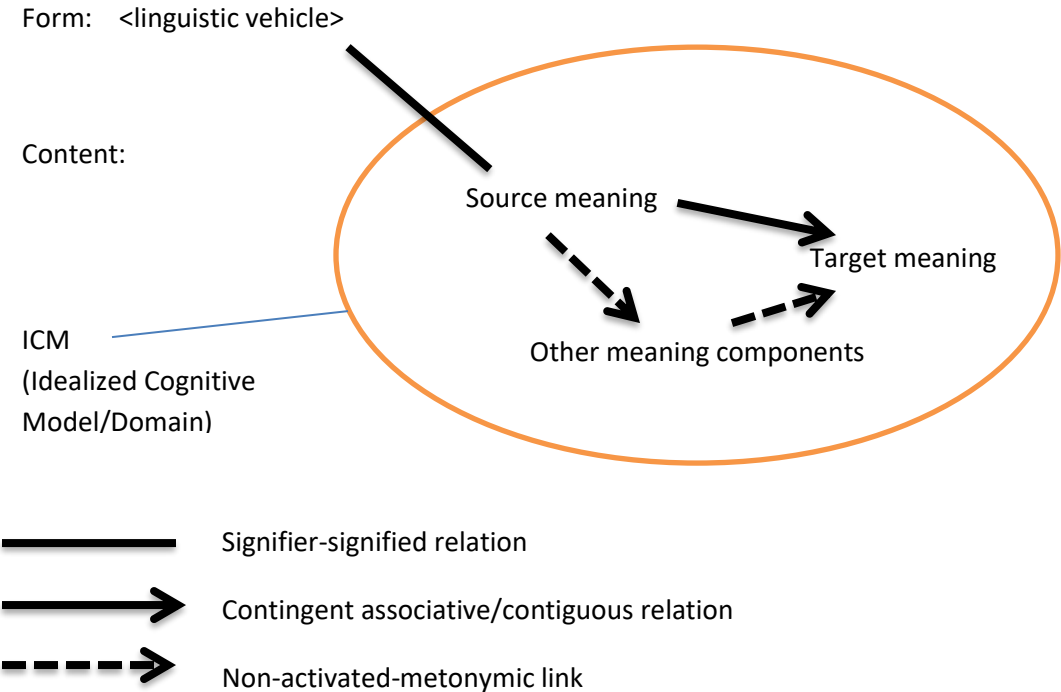


Figure 1: Basic metonymic relation (Panther 2005: 358; from Brdar & Brdar-Szabo 2014: 324)

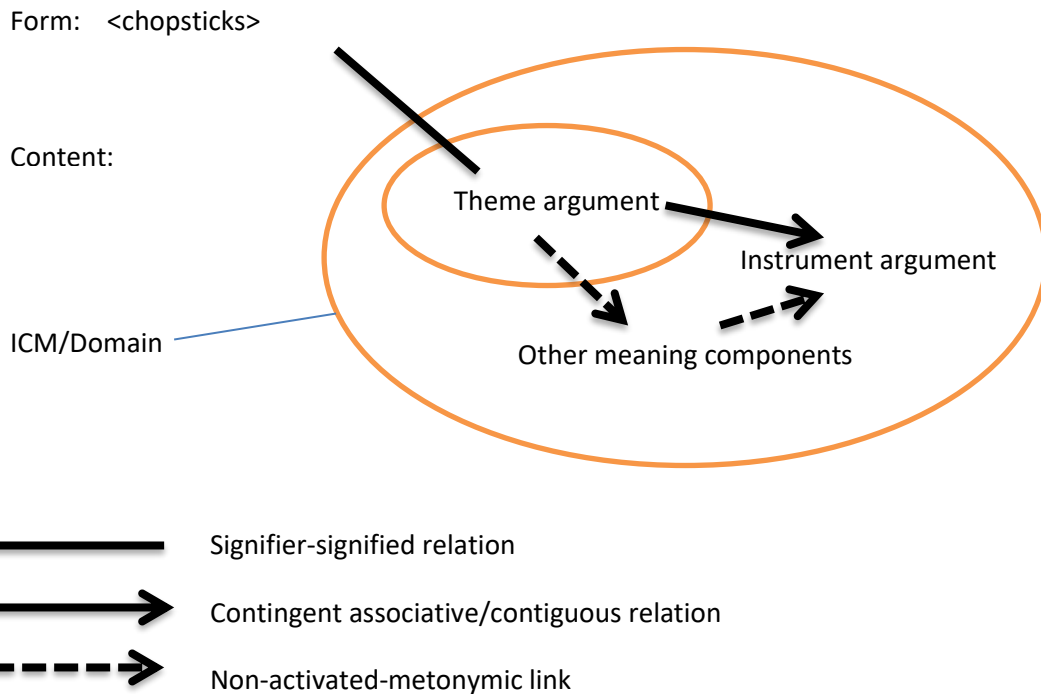


Figure 2: metonymic relation between "chopstick" as a theme and as an instrument without altering the form to "use chopstick"

Because the verb selects which kind of argument it takes, the argument in the position that would otherwise be interpreted as a theme is instead interpreted as some other type of argument because – to borrow a phrase from Kiparsky (1997)– “other knowledge specifically precludes it.” In fact, a search on Google for “eat chopsticks” as a phrase in Mandarin returns over 2 million hits; a scan through the links reveals that most of the sentences in which the phrase occurs use *chopsticks* as a theme argument rather than an instrument argument – e.g., babies chewing on chopsticks or dreams about chewing on chopsticks. The only hits that seem to discuss *chopsticks* as an instrument argument are academic discussions about this specific phrase; in other words, *eat chopsticks* is mentioned as a phrase rather than used; it should again be noted that those who have discussed this phrase up to this point do not identify it as an abnormal phrase.

As anomalous as such phrases individually are, their anomalous nature does not mean they should be ignored as language data. Anomalous terms and phrases that would never appear in even the largest corpora in the world still find their way into literature. And authors use them with the expectation that

their audience will understand the unique meaning precisely because the usage is marked. For example, Steven King in his novel *It* creates a particular style of speaking for a minor character, Tony Tracker, who refers to baseball bats and the kids he coaches by a combination of metonymic and metaphoric epithets:

Never called any of them by name, Eddie remembered. It was always hey Red, hey Blondie, hey Four-Eyes, hey Half-Pint. It was never ball, it was always bawl. It was never a bat, it was always something Tony Tracker called an “*ash-handle*,” as in “You ain’t never goan hit that bawl if you don’t choke up on the *ash-handle*, Horsefoot.” (526, emphases mine)

A search of both the Corpus of Contemporary American English (CoCA) only turns up four hits for *ash handle*, none of which have any relationship to baseball; the search term *ash-handle* with a hyphen reveals no hits anywhere within the same two corpora. On Google, the search term “‘*ash-handle*’ + *baseball* + *bat*” returns a few thousand hits (as of Sept. 4, 2015) but always places *ash-handle* as an adjective or a non-metonymic noun; a few hits refer to the quotation from Stephen King’s *It*. Yet, a reader from that point in the story onwards will uncritically accept that *ash-handle* metonymically refers to bat. That is, the context is necessary to make the connection between the source (*ash-handle*) and the target (bat) salient, and once that connection is salient, the sentence is no longer semantically odd.

A context that contrasts eating utensils, like (14), and the knowledge that one typically does not “eat chopsticks” (almost) precludes interpreting *chopsticks* as a theme argument; that is, it makes the relationship between the entity itself and its instrumental purpose more salient. If the conceptual relationships have not been built up between the lexical item in the object position and an instrument sense prior to encountering the sentence, there should be a processing delay before the mind rejects the theme interpretation and searches for a feature associated with the lexical item that can be interpreted. And for metaphors on the lexical level, Blasko & Connine (1993) discovered that low frequency metaphors are interpreted literally before any non-literal sense is considered. No literature was found that looks specifically at processing speed for metonymy. Theoretically, for metonymy at the argument level, the most salient feature – in this case, chopsticks as an instrument for eating – will be used to clarify the

relationship between the verb and its complement. If the context and encyclopedic knowledge cannot supply a feature salient enough for interpretation, the sentence will fail completely. This would explain the failure of “eat fork” in the absence of context, and it would also explain the oddness – but recoverability – of “eat chopsticks” for those who by consultants who had not heard this phrase uttered with the intended meaning of “using chopsticks to eat”. In short, non-canonical objects are constrained from being over-productive by the metonymic association (or lack thereof) between the lexical item and a salient feature in the domain of that conceptual entity; context and cultural knowledge are what make that feature salient. The context activates the cognitive frame which restricts the domain and the set of possible target references/senses inside it; some references/sense become less salient because of the context while others become more salient. It should be noted that the issue here is a restriction rather than prohibition activation.

Adult processing, then, seems to differ slightly from children’s semantic processing. Rabagliati, et al. (2010) looked at the acquisition of word meaning in children. Asking questions that evaluated whether children allow shifts in meaning (e.g., (69)-(72), they found that children allow more senses of a word than adults but produce fewer. (71) and (72) show a shift in meaning, where (71) is allowed and (72) is not.

68. Could a DVD be round?

= Could a DVD disc be round?

69. Could a movie be an hour long?

= Could a movie presentation be an hour long?

70. Could a DVD be an hour long?

= Could a movie on a DVD be an hour long?

71. Could a movie be round?

≠ Could a DVD containing a movie be round? (Rabagliati et al., 2010: 21)

(71) and (72) are metonymic uses of *DVD* and *movie* respectively, though (72) was unacceptable to the adults used as a control group; however, the younger the child participant, the more a non-licensed

sentence like (72) was ruled acceptable. What this does suggest about metonymy is that children are already engaged in figurative language processes at a young age; it also suggests that metonymy is used early in language *acquisition*, but also later in language *production*. Rabagliati et al. (2010) speculate that

...there is no obvious benefit to producing a previously unencountered shift; it only makes misunderstandings more probable. The only situation in which children might need to produce an unencountered shift is when they have a lexical gap... (33).

Over time as the lexical gaps for any individual child shrink, the need for such liberal extension of semantic meanings does too. Throughout linguistic development, the more an association (semantic, syntactic, or otherwise) is built up over time, the more the particular association will be considered acceptable; and the less frequent an association is encountered, the less that particular association would be considered acceptable. Extending an argument from Keil (1986), Rabagliati et al (2010) claim that it would not be unreasonable to suspect that if sense shifting in adults is dependent on background knowledge, so too is shift-sensing in children. The child participants were able to “use non-syntactic cues for sense resolution,” stretching their limited amount of knowledge further than adults would because their background knowledge is much more limited (p. 34). The study claims that sense shifts involving physical objects are more likely to be similar between children and adults than shifts involving abstract objects or events because children’s interactions with abstract concepts in others’ speech are much more limited than their interactions with physical objects (ibid). The study does not look at the judgments of senses unfamiliar to children, but the conclusions here would suggest that adults are constrained by the degree an association (semantically, syntactically, and pragmatically) is conventional, more so than children are. An association cannot be salient if it hasn’t been encountered, and the more a discourse community uses and references particular associations, the more the association becomes salient. Though adults have built up more complex associations, adults seem to privilege conventional associations, limiting potential senses, whereas children seem to be more open to senses that are non-conventional for

the surrounding discourse community. However, context and world knowledge are necessary to make any particular metonymic association salient, regardless of age.<sup>17</sup>

## 5. Degree of saliency and interpretability/acceptability

This section will argue that the degree of cultural/contextual saliency determines whether the sentence is interpretable as intended (i.e., instrument/location instead of theme); and if interpretable, the degree of cultural & contextual saliency determines how acceptable the sentence will be.

The idea that the degree of saliency determines interpretability is not new. Though there are theoretical criticisms of Sperber & Wilson's Relevance Theory (Clark, 2013; Sperber & Wilson, 2002; Wilson, 2010; Wilson & Sperber, 2005), there is little disagreement that context and processing effort play a central role in interpreting a sentence; and central to Relevance Theory is the idea that degrees of relevance – or salience, in the present argument – matter in bringing about a satisfactory interpretation. Input is mediated by two pragmatic principles of relevance (Sperber & Wilson, 2002):

1. Other things being equal, the greater the positive cognitive effects<sup>18</sup> achieved by processing and input, the greater the relevance of the input to the individual at that time.
2. Other things being equal, the greater the processing effort expended, the lower the relevance of the input to the individual at that time.

In this theory, disambiguation of senses is achieved by selecting one sense out of several possibilities, which are provided by the linguistic system, but mediated by context. Reference resolution is also achieved by contextual value being placed on one possible referent over others. One disagreement with this understanding of Relevance Theory (e.g., Heredia & Muñoz, 2015) is that more than one sense can be

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<sup>17</sup> As a side note, see Lippeveld & Oshima-Takane (2015) on child acquisition of denominal and deverbals.

<sup>18</sup> "Positive cognitive effects" refers to benefits derived from processing a stimulus.

activated at a given time;<sup>19</sup> however, agreements center on the degree of salience as a mediator of acceptability.

Studies looking at bilingual figurative-language processing have proposed three models of access for literal and non-literal meanings. The Direct Access model claims that the language user has access directly to the figurative meaning without first going through the literal meaning (Nelson, 1992); this would suggest that the two meanings are stored separately in the lexicon and that the literal meaning need not be accessed at all. The Indirect Access Model claims that the literal meaning is always accessed first before a figurative meaning can be derived from it (Swinney & Osterhout, 1990); this would suggest that both meanings are stored in the same lexical entry or that some mechanism activates when the literal meaning fails. The Graded Saliency Hypothesis (Giora, 2003; Heredia & Muñoz, 2015) model claims that a variety of circumstances – including language dominance, language proficiency, linguistic environment, etc. – make some meanings more salient than others at different times; in the way Heredia & Muñoz (2015) put it, “salient meanings [are] readily accessible and excitable with lower activation thresholds, and non-salient meanings [are] less accessible and less excitable” (109). Their study on response time for metaphoric reference challenges the Direct and Indirect Access models by showing that, though highly proficient/highly experienced bilinguals have direct access to figurative interpretations, highly proficient/less experienced bilinguals “require more effort and are more likely to exhibit parallel activation” of literal and non-literal meanings (110).<sup>20</sup>

Bierwiazzonek (2013) situates metonymy within the associations between conceptual and neural behavior: “the more often certain entities occur in experience, the stronger the associations between them become, and the more likely it is for them to be co-activated” (232). As it relates to the concept of salience, a target sense is more likely to be activated if associated senses are also activated, and if a frame of associated senses are active, processing speed for the target sense is likely to be faster. Of the more relevant empirical studies cited that relate to the present discussion, Frisson & Pickering (1999) and

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<sup>19</sup> See chapter 7 of Y. Huang (2014) for a discussion of other concerns about Relevance Theory. However, the concerns laid out there do not seem to warrant inclusion here as they have little bearing on the present argument.

<sup>20</sup> See also Kecskes (2015), Vaid et al (2015), and Yang et al. (2013)

Gibbs (2007) both studied place-for-institution metonymies and found that those who were familiar with the place/event processed that metonymy faster than those with less familiarity; that is to say, increased world knowledge or understanding of the context surrounding the place/event produced faster processing of the metonymy, as in (73). Subjects who were unfamiliar with the event took longer to process the sentence, as in (74), suggesting that the association between the source and target are not as strong for individual participants.

72. A lot of Americans protested during Vietnam

73. A lot of Americans protested during Finland (retrieved from Bierwiazzonek, 2013: 237)

Research on neural perceptual gaps that found the brain does not fill in those gaps with the surrounding material, but with “what is known and entrenched” (ibid., 241). Studies of memory also find that when subjects are asked to retell stories after reading them from a text, they retell them “on the basis of frames, scripts, and other forms of dispositional spaces rather than from the actual texts they’ve read” (Bower, Black, & Turner, 1979). That is, details within the story are supplied by their own conceptualizations rather than by information from the text.

Research on the effect of context and framing shows that activation of neural networks is dependent on and constrained by world knowledge, context, and active frames; in other words, building and strengthening associations between concepts, as well as the lexical items that reference those concepts, is dependent on world knowledge, context, and active frames. Whether or not the degree of saliency determines the degree of interpretability and acceptability in examples (1) – (15) will have to be looked at in experimental studies. The literature and arguments considered above would lead one to hypothesize that experimental studies would confirm those conclusions.

## 6. Conclusion

Though the discussion above requires experimental evidence to confirm the veracity of the claim that saliency influences the degree of interpretability and acceptability, there seems to be strong theoretical



support for the idea that metonymy can explain the discrepancy between the sentences ruled acceptable by Chinese researchers and the outliers, like (2), that seem to be inexplicable within a purely syntactic approach. The experimental approach will be addressed in the following article.

# Chapter 3: Mandarin native speaker acceptability of non-canonical arguments

## 1. Introduction

Metonymy has typically been the focus of pragmatics and semantics research and has received little attention in phonology, morphology, and syntax (see, however, Ädel, 2014; Chen & Shen, 2010; Janda, 2011, 2014). Metonymy is primarily viewed as a referential process and, as such, tends to be relegated to the domains of semantics and pragmatics. Attempts to extend it to other fields is often met with accusations – some valid – that such extensions create a generative engine that is too powerful to offer useful explanations or theories (See Brdar & Brdar-Szabó, 2014; Janda, 2011). Those who investigate the role of metonymy/metaphor in non-semantic/pragmatic domains see processes like metaphor and metonymy as basic to general cognitive activities (Brdar-Szabo & Brdar, 2012; Evans, 2010; Peirsman & Geeraerts, 2006; et alia). If this is true, then one might expect such a process to be relevant to multiple, if not all, levels of linguistic behavior. Though the present investigation does not address the philosophical underpinnings of the theory or try to referee these discussions, it does attempt to use metonymic processes at a sub-lexical level to explain the interpretation of non-canonical arguments in Mandarin. To state this a different way, the present investigation will argue that metonymy is used to interpret – at least on initial encounter – non-canonical arguments in Mandarin Chinese sentences for native speakers. A later study will pursue the question with regards to non-native speakers. The present experiment will show (1) that metonymy is available and used by native speakers in the process of interpreting non-canonical arguments, and (2) that cultural/pragmatic<sup>21</sup> knowledge constrains this metonymy from being over-productive.

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<sup>21</sup> But see Vicente (2015) who argues that semantics can take some of the burden of interpretation rather than pragmatics, contra Travis (2000, 1996) who claims that different situations yield different truth conditions resulting in an unconstrained approach to polysemy. He, on the other hand, argues that some cases of polysemy can be handled better by lexical semantics, specifically through qualia structure (cf. Pustejovsky & Bouillon 1995 and Pustejovsky 2011).

The current investigation arose out of the example in (1), which was pulled from Li, Y.-H.A. (2014). It illustrates a Mandarin non-canonical argument in context – in this case, *kuaizi* (‘chopsticks’) as an instrument argument – that Li finds acceptable but that other native speakers may not; it should be noted that (2) is unacceptable to Li as well as to other Mandarin-speaking consultants.

1. Ni chi zhe-shuang kuaizi ba!  
You eat this-CL chopstick PRT  
Use these chopsticks to eat (instrument argument)
2. \*Ni chi zhe-ba chazi ba!  
You eat this-CL fork PRT  
[intended: “use this fork to eat”] (instrument argument) (p. 300)

Mandarin-speaking consultants disagree with each other about the degree of acceptability for (1), and none of my own consultants find (2) acceptable. Sentences which use non-canonical arguments are not frequent in Mandarin, though they do occur, and native speakers are ambivalent about the acceptability of the non-canonical phrases proposed by researchers who have investigated the phenomenon (see Barrie & Li, 2012; Huang, Li, & Li, 2009; Yen-Hui Audrey Li, 2014; T.-H. J. Lin, 2010, 2014; T. H. J. Lin, 2001; J. H.-Y. Tai, 2013; J. H. Tai, 2008; Tao, 2000). Huang et al. (2009) note that, even though they discuss noncanonical objects as though they’re regular and common, in agreement with Lin (2001) “Chinese is far less restrictive [in which thematic relationships are acceptable] than English” (pp. 55-56). Because the various researchers are highly published and well respected in Chinese linguistics, their use of non-canonical arguments to support claims about the structure of Mandarin indicates that they all believe that Mandarin does produce non-canonical arguments similar to (1) and (3)-(15) below. Native speaking consultants judge at least some of these sentences as odd, and the researchers themselves acknowledge this in most of their published works. In a few of the studies, it is suggested that reviewers and other native speaking consultants have disagreed with these judgments, but the disagreements always concern specific sentences and not the phenomenon in general. And the fact that these sentences are being analyzed as compositionally interpretable suggests that these researchers believe that the individual sentences are not simply idiomatic/figurative language.

## 2. Literature Review

### 2.1 Non-canonical arguments

Examples (3) – (15) come from Lin (2014), Li (2014), Tai (2008), and Tao (2000). Examples (3) and (8) are canonical theme/patient arguments and are included for contrast.

From Lin (2014):

3. Kai jicheng-che  
drive taxi  
“to drive a taxi” (Theme/patient argument – canonical argument, used for contrast here)
4. Kai gaosu-gonglu  
drive freeway  
“to drive on/along the freeway” (Location argument)
5. Kai ban-ye  
drive late.night  
“to drive in the late night” (Time argument)
6. Kai zuo shou  
drive left hand  
“to drive with the left hand” (Instrument argument)
7. Kai hao-wan  
drive fun  
“to drive for fun” (Reason argument) (p. 77)

From Tai (2008)

8. Chi niuroumian  
eat beef-noodles  
“eat beef noodles” (theme/patient object)
9. Chi Sichuan guan  
eat Sichuan restaurant  
“Dine at a Sichuan restaurant” (location object)
10. Chi da wan  
Eat big bowl  
“eat a large bowl (of food)” (instrument object)
11. Chi wanshang  
Eat evening  
“(The banquet) is in the evening” (time object)
12. Chi touteng

Eat headache  
“(The medicine) is for headache” (reason object)

13. Zaijia chi fumu, chuwai chi pengyou  
At home eat father-mother, outside eat friend  
“One lives on his parents when at home, but on friends when traveling”

A few brief notes about the examples from Tai (2008) above. Tai lists example (10) as an instrument object; however, consultants seem to suggest that this example is a theme argument inside an ellipsis (i.e., bowl of food *da wan fan*) rather than an instrument object (i.e., *bowl*). That is, this example may not illustrate the instrument-argument concept Tai intends. Additionally, Tai does not classify use of (13) beyond calling it “other expression;” *chi* in this context would seem to be metaphoric for “rely on,” though a deeper analysis would focus on the metonymic/metaphoric chain that is productive – one can say *eat government* (*chi zhengfu*) as well with the same sense of “relying on someone/something”. Related to this last point, Tao (2000) focuses entirely on the verb 吃 (*chi* – “eat”), and in doing so, several non-canonical objects appear:

From Tao (2000)

14. Zai Zhongguo renmen xihuan chi kuaizi, zai Xifang renmen xihuan chi daocha, er xiao haizi hui chi shaozi  
at China people like eat chopsticks, at West people like eat knife-fork, and little child can eat spoon  
“In China people like using chopsticks to eat, in the West people like using knife and fork to eat, and children can eat with spoons.”
15. Jiner zai “sanhongjiedaizhan” chi, jiu shi “sanhong” guandian de, minger shang “jinggangshan bingtuan houqinbu” chi, jiu shi “jinggangshan” de, chi shei shuo shei hao.  
Today at “Sangong reception station” eat, then be “Sangong” opinion DE, tomorrow on “Jinggangshan corps logistics department” eat, then be “Jinggangshan” DE, eat who say who good

Today if you eat at San Gong reception station, you'll accept San Gong's opinion, tomorrow if you eat at Jin Gang Shan logistics corps, then you'll accept Jin Gang Shan's opinion. Whoever you eat from is who you'll say is good.

The relevant phrases in Tao (2000) above are underlined. (14) has three parallel uses of *eat* + instrument, while (15) has one *eat* + group-associated-with-location. One might claim that (14) is simply a poetic or stylistic way of phrasing “use chopsticks to eat” (*yong kaizi chi fan*); however, pragmatics shouldn't be the default location for unexplained phenomena, nor should additional structure (i.e., light verb structure) be appealed to without motivation.

The non-canonical object in each of the sentences from (1) – (15) can be rephrased with a preposition or verbal phrase to make overt the senses of location, instrument, time, or reason. And in many of these sentences, the paraphrase would be the more acceptable sentence. Even so and excluding (2), these are considered acceptable by at least one native Mandarin-speaking researcher.

Non-canonical arguments occur in the same syntactic position as canonical objects in that they observe the following conditions (Barrie & Li, 2012; Li, 2014):

16. a. Non-canonical objects are not incorporated into the verb
- b. Non-canonical objects are in complementary distribution with canonical objects
- c. Non-canonical objects take the same position as a canonical object when occurring with post-verbal duration/frequency phrases
- d. Non-canonical objects can combine with a double-object verb to take an affected object
- e. Non-canonical objects can be relativized (Li, 2014: pp. 304-305)

All of these criteria apply to examples (1) – (15). Non-canonical arguments, however, cannot participate in passive “bei” and theme-marking “ba” constructions, as in (17) - (20) below. Both

constructions would indicate that the object is being acted upon as a theme argument, precluding a non-canonical interpretation/argument.

17. \*ba youshou kai che  
PRT right-hand drive car

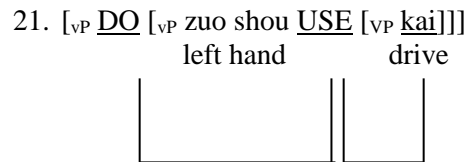
18. \*bei youshou kai che  
PRT right-hand drive car

19. \*ba che kai youshou  
PRT car drive right hand

20. \*bei che kai youshou  
PRT car drive right hand

Lin (2014; 2001) accounts for the possibility of non-canonical arguments by appealing to covert light verbs, which provide elemental semantic content for the purpose of realizing the event structure of a sentence (Hale & Keyser, 1993). For instance, in the sentence *John took a shower*, the verb *take* does not have semantic content beyond “an event took place.” In Hale and Keyser (1993), light verbs are used to explain the selection of arguments for denominal verbs like “saddle” and “corral,” as in *John saddled the horse* and *John corralled the horse*. The formation of denominal verbs is claimed to be a syntactic process that incorporates the noun into an abstract V node that would otherwise in English be filled by a relevant light verb, e.g., DO, CAUSE, EXIST. The sentence *John took a shower* does not involve incorporation of the noun *shower* into the light verb *take*, whereas the sentence *John showered* does. It isn’t clear what determines the phonological manifestation of the light verb, nor is it clear why in English the light verb manifests as *take* in this example but as *do* in other places: *\*take your homework*, *\*do a shower* (cf. Hale & Keyser, 1998 and Ramchand, 2002 for further discussions of light verbs). This is where the arguments must rely on non-syntactic processes to limit productivity and rule out sentences like (2) as well as *\*take your homework*, and *\*do a shower*. Lin (2014) holds that “action verbs in Mandarin do not directly select the arguments they are combined with; the arguments are instead introduced by light verbs [and occur] as

eventuality predicates” (p. 77). In the case of example (6), the movement in the underlying structure would look like (21) below.



The argument *zuo shou* is “introduced” by the light verb USE, and the activity verb *kai* moves from the VP up into the phonologically null position of the light verb USE and then again into the higher light verb position for the phonologically null position of the light verb DO. Lin explains that this coincides with the fact that when the light verb USE is phonologically realized, as in (22), the verb *kai* is prevented from moving higher in the structure.

22. yong zuo shou kai  
 use left hand drive  
 “use the left hand to drive”

Lin argues that this can be done in Mandarin because, unlike in English, “only a small portion of event information is lexicalized into the verbs” (p. 82). However, an explanation that uses light verb theory runs into a problem that Lin himself points out: it does not “effectively constrain the ‘over-sprouting’ of [possible non-canonical] arguments” (p. 97). Under such over-sprouting, one would expect (2) to be acceptable if (1) is.

## 2.2 The relationship between context and meaning-creation

Though the theoretical assumptions of some non-generative approaches to verbs and verb structure might be incompatible with Lin (2014; 2001), their examples and analysis do still have some merit. In particular, Zhang (2006) claims, in following Construction Grammar approaches, that senses of a verb should be considered variant in relation to context. Zhang criticizes Goldberg (1995) and Goldberg & Jackendoff (2004), among others, for claiming that verbs have static meanings across constructions,



and Zhang argues instead that verbs vary in meaning based on the grammatical construction they happen to be in. For example, Zhang uses the verb *sneeze* in (23) as illustrations:

23. (a) Frank sneezed.  
(b) Frank sneezed the napkin off the table.

In 23(b), *sneeze* incorporates a caused-motion sense while 23(a) does not. But 23(b) also includes what Zhang calls a “double salience effect” similar to nominal metonymy, where both the conventional and nonconventional (in this case, caused-motion) schemas are activated. In other words, context makes both senses salient. This context-based activation of both conventional and non-conventional schemas would seem to match experimental evidence with both native and non-native speakers, provided – of course – that there was sufficient saliency to activate either schema (e.g., Klepousniotou & Baum, 2005; Lapata, Keller, & Scheepers, 2003; cf. Lowder & Gordon, 2013, on types of sentence structure).

The third experiment of Frisson & Pickering (2007) is especially relevant to the relationship between metonymy and context. The study used eye tracking to investigate the processing of names that have literal or metonymic interpretations. The duration of eye fixation for 42 native British English-speaking participants was measured on familiar and unfamiliar PRODUCER FOR PRODUCT metonymies, like *Dickens* and *Needham* as authors’ names referencing books/works they produced. A longer duration of *eye fixation* was interpreted here as the result of longer processing time. The first experiment evaluated the speed at which familiar and unfamiliar names were read. Familiar names were all read faster than unfamiliar names. The second experiment evaluated whether minimal contextual information, e.g. *read Dickens* and *read Needham*, would result in a different duration of fixation; this was done for both metonymic and literal senses. The familiar senses, both metonymic and literal, showed no significant difference; however, the unfamiliar literal sense was statistically shorter than the metaphoric sense, suggesting a longer processing time for an unfamiliar PRODUCER FOR PRODUCT metonym. The third experiment placed the target items in contexts that either assisted in disambiguating the target item or were ambiguous; it also measured the effect of familiar and unfamiliar items. The

disambiguating context resulted in fewer re-readings for novel metonymic uses as well as for unfamiliar name conditions. However, familiar names and conventional metonyms showed no benefit from a disambiguating context. In other words, “context rendered the unfamiliar metonymic sense familiar” (p. 605). The same effect is anticipated for the present study.

Jiang & He (2010) argues that Chinese sentences like (24) – (26) below require a context to interpret it as a PART FOR WHOLE metonymy.

24. wo xihuan da huzi  
I like big beard.  
Literal: I like large beards.  
Metonymic: I like the large bearded man.
25. chuang hongdeng  
rush redlight  
“to run a red light”
26. ni xihuan ting gangqin haishi xiaotiqin?  
you like listen piano or violin  
“do you prefer to listen to the piano or the violin?”<sup>22</sup>

In all three cases, context would be needed to determine the intended referent, deictic context for (24) and linguistic for (25)-(26). Jiang & He argue that, even though there is a conceptual relationship between the literal and metonymic concepts, the metonymic sense cannot be explained solely as arising through the source term itself: there should be a contextual constraint to the explanation. As such, they propose three categories for where the contextual constraint comes from: anaphoric, cataphoric, and anaphoric/cataphoric metonymies (p. 414). These would refer to the activation of conceptual schemas before and/or after the metonymic item. Other research has already revealed that polysemous words show the activation of multiple senses at the time the metonymy in a sentence is reached (see Lauro & Schwartz, 2017, below), so unless the cataphoric categorization assumes that the listener/reader will suspend interpretation until a referent or referential schema reveals itself or that the listener/reader will have to

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<sup>22</sup> The translations of these examples are mine and are metonymic. Jiang & He provide additional examples that would show a similar point, for example, *chi dawan* (‘eat big bowl,’ ‘to eat a large bowl of something’) and *xie shoubi* (‘write skill,’ ‘to write/paint something in a skillful way’). However, these may be more contentious about what way they are metonymic or if they even are metonymic.

repair a misunderstood referent, then a cataphoric category isn't particularly useful. A listener/reader would already have a schema in mind before arriving at what Jiang & He would categorize as cataphoric, which would render cataphoric metonymies as momentarily unspecified or as the referential equivalent of garden-path sentences. In (24)-(26), there was no further context from which to identify a referent, yet the intended source and target senses for each are relatively unambiguous. Even if the intent to provide categories of contextual constraint is less than complete, the examples themselves and the need for contextual constraint are very much real.

Lauro & Schwartz (2017) conducted a meta-analysis of studies that looked at bilingual lexical activation of cognates; 28 were experiments on the participants' L2 (English), and 15 on the L1 of bilingual participants: Dutch, French, or Spanish. The original studies were divided by task: active response to stimuli (translation, lexical decision, etc.) vs. passive response (eye-tracking). Active response studies were further divided into tasks that required top-down processing (translation; meaning to form processing) vs. bottom-up processing (e.g., lexical decision; form to meaning processing). The studies that were selected focused on fully bilingual participants such that they excluded intermediate learners; proficiency could not be evaluated in these studies since each used a different measure of bilingual proficiency. All original studies compared cognate lexical items and non-cognate controls and included contexts with either high- (19 studies) or low-constraint (22 studies) on the target sense(s). Samples were drawn from these studies such that 26 independent samples were available for low-constraint analysis and 18 independent samples were available for high-constraint analysis. The two meta-analyses tested low-constraint and high-constraint facilitation and resulted in reinforcing previous claims that "a linguistic context, in and of itself, does not provide sufficient linguistic information (whether semantically or syntactically) to selectively access only those lexical candidates from the appropriate language" (231). In other words, neither a heavily-restrictive nor loose linguistic context constrains the literal and figurative sense enough to ensure that the brain will access only the target sense. But, even though linguistic information from the context doesn't restrict activation to only the target item, higher constraints in the

linguistic environment do limit the pool of lexical items that are activated. A decrease in the pool of lexical items was especially true when the sentences were highly constrained in the L1, as opposed to in the L2. Though the present study isn't contrasting literal and figurative uses, it does propose that metonymic processes will be triggered if the context makes the relationship between the source and target lexical item salient.

### 2.3 The influence of bare plurals on meaning creation

Because the interpretation and acceptability test items in the present experiment might also be influenced by whether the test items are in a bare noun form or in a determiner phrase (in this case, a classifier construction), it is worth exploring why bare nouns in Chinese can cause different acceptability judgments.

Krifka (1995) identifies bare nouns in Chinese as kind-denoting nouns. His primary illustration lays out how *xiong* ('bear'), as a prototypical example of a Chinese noun, requires a classifier construction to refer to an entity, specifically (27) below taken from Krifka (1995: pp. 398-399). (27) is understood as "the bear as a genus is extinct;" (28) is understood as "I saw some specimens of the genus *Ursus*;" (29) is understood as "three groups composed of specimens of the genus *Ursus*;" (30) is understood as "three individual specimens of the genus *Ursus*;" and (31) is understood as "three species of the genus *Ursus*."

27. *xiong jue zhong le.*  
bear vanish kind ASP  
'the bear is extinct'
28. *wo kanjian xiong le.*  
I see bear ASP  
'I saw (some) bears.'
29. *san qun xiong*  
three herds bear  
'three herds of bears'

30. san zhi xiong  
three CL bear  
'three bears' (object)

31. san zhong xiong  
three CL bear  
'three bears' (species)

Krifka claims, citing Dölling (1992) and Gerstner-Link (1988), that the uses of *xiong* in (27)-(29) are derived from the base, kind-denoting form, as seen in (28) and (29). He further claims that the kind-referring use for bare nouns should be considered basic because “in every language which allows for NPs at all uses them as expressions referring to kinds” (p. 399).

Krifka (2003) is more concerned with bare NPs in English, but the discussion has some implications for Chinese more broadly even though it doesn't ultimately change the conclusions in Krifka (1995) in regards to Chinese. Krifka (2003) argues against the idea that bare NPs are uniformly kind-denoting, which was argued by Carlson (1977), and in favor of bare NPs being polysemous: either kind-denoting or plural indefinite. Examples (32) – (33) are taken from Krifka (2003: p. 181), corresponding respectively with the polysemy dichotomy.

32. Potatoes contain vitamin C.

33. Potatoes rolled out of the bag.

This, however, doesn't pose a problem to the analysis of the Chinese sentences in (27) – (31) since a noun in a preverbal position must be interpreted as a definite or kind-denoting noun phrase. That is, in Chinese a plural indefinite “potatoes” could not occur in a preverbal position as it does in (33) for English.

Consider (34) – (37) below, taken from Li & Thompson (1981: p. 86 & 129), which illustrate preverbal bare nouns (34) – (36) and one case of both pre- and post-verbal bare nouns (37):

34. gou wo yijing kan guo le  
dog I already see PRT PRT  
(a) The dog, I have already seen.  
(b) Dogs (kind-denoting) I have already seen

35. nei zhi gou wo yijing kan guo le  
that CL dog I already see PRT PRT  
That dog, I have already seen.
36. \*yi zhi gou wo yijing kan guo le  
one CL dog I already see PRT PRT  
A dog, I have already seen.
37. mao xihuan he niunai  
cat like drink milk  
Cats (kind-denoting) like to drink milk (kind-denoting).

In contrast, bare noun objects in a postverbal position may receive kind interpretation may receive definite or indefinite interpretation, as in (38) below from Li & Thompson (1981: p. 131).

38. wo mai le shuiguo le  
I buy PRT fruit PRT  
I bought (the fruit/some fruit).

In the present experiment, therefore, having the non-canonical objects in a post-verbal position should allow either definite or indefinite interpretations as in (38) or a kind interpretations as in (37); and if forcing a definite interpretation through a determiner results in a lower acceptability, it should confirm that non-canonical objects are being interpreted as kind-denoting or indefinite rather than as specific entities.

## 2.4 Mass/Count distinctions, Bare Nouns, and definiteness

Mass and count distinctions, bare noun reference, and definiteness are related to metonymy because of type-shifting/-coercion. Cross-linguistic comparison with languages that do not have count/mass morphology, like Mandarin, allow metonymy as type-shifting/-coercion to be checked. The mass/count distinction in Chinese is a matter of debate because of Chierchia's (1998) argument that Mandarin doesn't have count nouns. In it he claims that nouns for some languages are of type <e> (i.e., arguments/entities), nouns for other languages are of type <e,t> (i.e., predicates), and others have both. Mandarin is claimed to be of the first type, French of the second, and English of the third; therefore, theoretically, Mandarin does not need or have determiners to create arguments from nouns, French needs

determiners for all nouns, and English needs them for some but not others. This leads to an argument that all Mandarin bare nouns are kind-referring<sup>23</sup>. Though there is much more to this debate, examples (39) - (42) illustrate simple support for this feature. (39) does not allow the type-shifting discussed in Pustojevsky (2011), because it is already kind-referencing. It cannot type-shift to mean ‘I like [to drink] water.’ The equivalent of the type-shifted meaning would require the verb to show purpose as in (40), (41), and (42). The determiners in those examples allow a purposive interpretation.

39. Wo xihuan shui  
 I like water  
 I like water [as a type of substance]; NOT ‘I like [to drink] water’
40. Wo xihuan he shui  
 I like drink water  
 I like drinking/to drink water
41. Wo xihuan nei ping shui  
 I like that bottle water  
 I like that bottle of water [for the purpose of drinking]
42. Wo xihuan nei zhong shui  
 I like that kind/type water  
 I like that kind/type/brand of water [for the purpose of drinking]

Sigurðsson (2014) believes a major gap in generative approaches to linguistics is the connection between “context-free” syntax that allows one to claim a sentence is well-formed – e.g., *colorless green ideas sleep furiously* – and “context-sensitive” linguistic elements, like *you*; in other words, he claims there is a gap in the connection between what Chomsky has called I-language and E-language (Chomsky, 1986, cited in Sigurðsson 2014). Though Sigurðsson concerns himself with personal pronouns and mapping contextual elements to the left periphery, he makes it clear that he believes reference to be a syntactic phenomenon that is “decided under control across phase boundaries” and that “the relations [between the lexical item and its referent] so established are independent of lexical ‘material’” (p. 182). While it might be true that one could explode the left periphery such that it includes much of the information previously attributed to semantic and pragmatic processes, it still doesn’t answer whether that

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<sup>23</sup> Also proposed and argued by Krifka (1995)

is genuinely what's happening in the mind of either the speaker or hearer. Many of the examples given would require more robust experimental data to reinforce the further-exploded left periphery proposed here that is more readily explained through semantics and pragmatics.

## 2.5 Graded Saliency Hypothesis

With these problems in mind, there is a need for a theory that relates contextual information to the target sense and how that sense would be selected out of all possible senses. The Graded Saliency Hypothesis (Giora, 1997) seems the best fit for the current investigation.

The Graded Saliency Hypothesis was proposed by Giora (1997) and explored in later studies (Giora, 2002; Giora et al., 2007; Giora, Gazal, Goldstein, Fein, & Stringaris, 2012; Giora, Raphaely, Fein, & Livnat, 2014). It hypothesizes that all salient meanings in any given context are initially activated and processed. Saliency of a word or sentence is defined as “a function of its conventionality, familiarity, frequency, and givenness status in a certain (linguistic and nonlinguistic) context” (p. 185). Following Giora (1997) in example 43 below, the joke premise “two men walk into a bar” intentionally makes the “pub” interpretation for the lexical item “bar” more salient so that the “rod” interpretation for “bar” becomes surprising when the final clause necessitates a separate sense.

43. Two men walk into a bar, and a third man ducks.

Several studies have supported this hypothesis for figurative language (e.g., Ahrens et al., 2007; Heredia & Cieślicka, 2016; Laurent, Denhières, Passerieux, Iakimova, & Hardy-Baylé, 2006; Turcan & Filik, 2016; partial support in Diaz, Barrett, & Hogstrom, 2011), notably Heredia & Muñoz (2015), whose findings confirmed that a salient meaning is activated regardless of whether it would be considered figurative or literal and that processing of a sentence does not always preference literal senses. They conducted two experiments on literal/figurative meaning activation in highly proficient bilinguals, with heterogeneous L1s. The results of the first experiment showed that highly proficient bilinguals do directly access both figurative and literal senses from 0ms after onset of stimuli. When the figurative meaning was



primed, the literal sense remained activated at 1000ms from stimuli onset even after the linguistic ambiguity had been resolved. The results of the second experiment suggested an equal accessibility/processing for both literal and non-literal senses at both the 0ms and 300ms probe positions (106). Heredia & Muñoz (2015) argue that this supports a Graded Salience Hypothesis (Giora, 1997, 2002; Giora et al., 2012), where given a polysemous lexical item all “*salient* meanings in the mental lexicon [for that lexical item] are processed initially, regardless of either their literality or contextual fit” (93, emphases mine). Also, differences between degrees of aptness in the metaphor produce different results in what seems to be accessed initially and later on. In the same vein but with English monolingual speakers, Blasko & Connine (1993) found that metaphors which were highly apt for the referent but have low familiarity to the participants activated both literal and non-literal senses initially, but moderately apt metaphors but with low familiarity only activated the literal sense at onset. These two studies and the Graded Salience Hypothesis would suggest that if the literal meaning is salient but the non-literal meaning has hasn’t been made so, then the literal has to be processed and rejected before a non-literal meaning can be considered.

The literature above leads to the following questions:

1. To what degree can native speakers of Mandarin recover the intended interpretations for novel uses of non-canonical arguments?
2. How acceptable or unacceptable do they view both conventional and novel uses?
3. To what degree do judgments relate to the saliency of associations between the target and the source in the metonymy?

The literature would seem to suggest that if the associations between the source and target in a metonym are weak, a sentence in Mandarin with a non-canonical argument will be rejected even with rich context. If the associations are strong, the intended meaning will at least be semantically recoverable even if the

sentence is ruled as odd. I hypothesize the following will happen with non-canonical arguments that achieve metonymic association:

- a. Participants who have rich context and have heard the sentence before will find it at least somewhat acceptable and will be able to recover the intended meaning.
- b. Participants who have no context but have heard the sentence before will find it less acceptable and may be able to recover the intended meaning, though to a lesser degree than the sentences in situation 1.
- c. Participants who have rich context but have never heard the sentence before will find it at least a little acceptable after being told the intended meaning.
- d. Participants who have no context and have never heard the sentence before will not find it acceptable at all and will not be able to interpret it. Even with prompting, the sentence will not be found acceptable.

For the purpose of explaining the second experiment's results, preliminary response rate measurements will rank the saliency of each of target sentences to be used in the second experiment.

### **3. Experiment 1: Preliminary saliency ranking**

#### **3.1 Materials and Methods**

##### **3.1.1 Participants:**

22 native speakers of Mandarin were recruited from a university in the southwestern part of the United States. Demographic data was not collected for this experiment beyond the requirement that the participants were over the age of 18; due to the lack of any other identifying factors for participants, the Human Subjects Review Board agreed that consent could be given electronically.

### 3.1.2 Procedure:

Using the software *PsychoPy*, participants were shown paraphrases of the non-canonical sentences (18 target items) that were to be used with separate participants in the second experiment. An equal number of filler phrases of equivalent length were also inserted into the experiment. *PsychoPy* was programmed to display all 36 of the sentences in a random order; see Appendix A for the item list. Participants were instructed to identify with the left and right arrows whether they think they had or hadn't – respectively – seen the sentence before. Though the instructions were to indicate previous exposure, the underlying goal of the task was to record the reaction time for processing the sentence.

## 3.2 Results

*PsychoPy* measures responses in milliseconds; processing times for each item were averaged across participants, and items were ranked by overall processing time. The items that took longer to process were judged to be those whose conceptual associations are not as solid for the participants as those that were processed much faster. For example, the associations between 'knife' and 'cutting' in the sentence *yong dao qie rou* ('use a knife to cut meat') is more salient for a mainland Chinese speaker than *yong chazi qie rou* ('use a fork to cut meat'). Closer associations between concepts allow for faster response times. The metonymic explanation for non-canonical arguments assumes that closer associations between concepts are more likely to be judged acceptable or at least more interpretable; looser associations are less likely to be judged acceptable and for some may not even be interpretable. And, according to Giora (2002), "[S]alient meanings are assumed to be accessed immediately upon encounter of the linguistic stimulus via a direct lookup in the mental lexicon. Less-salient meanings will lag behind" (p. 491). The results here are intended to identify which associations are closer and which are looser, and these results will be used in confirming the analysis of the results of the main experiment.

As data collection occurred in less than optimal circumstances, a few participants became distracted at brief moments during the survey, leading to longer-than-normal reaction times on a few, isolated questions. Looking at the overall reaction times for each individual subject, it was clear which

responses from which participants were significantly out of the individual's normal reaction time range – near double the second longest reaction time. This was cross checked with the item at issue, and because there was no single question that elicited any other reaction times of such length, those responses were removed from the analysis. This resulted in the removal of 6 data points from 6 different individuals.

Table 1 below shows the rankings of salience as determined by the preliminary saliency test, the confidence in the degree of salience among the participants for the target conceptual associations, the mean response time, and the response time range (distance between highest and lowest recorded time); smaller range would mean similar lexical-conceptual experience, while a larger range would mean more diversity of experience. Similar experience would also be expected to result in faster response times over all participants for that item.

Target items	Ranking by Salience	Ranking by Confidence	Mean Response Time (ms)	Response Time Range (ms)
<i>yong feizao xi</i> use soap to wash	1	1	1.35	2.16
<i>yong shui pao</i> use water to boil (something)	2	3	1.45	3.00
<i>yong dao qie rou</i> use a knife to cut meat	3	2	1.60	2.65
<i>yong lengshui xi</i> use cold water to wash	4	5	1.61	3.65
<i>yong wanyuanjing kan</i> use a telescope to look (at something)	5	8	1.65	4.13
<i>zai guanzi chi</i> eat at a restaurant	6	9	1.65	4.68
<i>zai bangongshi chi</i> eat at a/the office	7	10	1.67	5.01
<i>zai yiyuan shui</i> sleep [stay overnight] at a/the hospital	8	7	1.83	4.03
<i>yong dao ge rou</i> use a knife to slice meat	9	4	1.95	3.30
<i>zai guanzi zuo</i> work at a restaurant	10	16	2.22	6.29
<i>zai huochezhan deng</i> wait at a/the train station	11	11	2.27	5.34
<i>yong yanjing kan</i> use glasses to see/look (at	12	13	2.28	5.96

something)				
<i>yong wangyuanjing guan</i> use a telescope to watch/observe	13	17	2.55	6.33
<i>zai gaosugonglu zisha</i> commit suicide at/on the highway	14	6	2.55	3.88
<i>zai saichechang kai</i> drive on the racetrack	15	18	2.59	7.21
<i>yong chazi qie rou</i> use a fork to cut meat	16	15	2.68	6.18
<i>zai huochezhan shui</i> sleep at the train station	17	14	2.99	6.01
<i>zai gaosugonglu kai</i> drive on the highway	18	12	3.25	5.51

**Table 1: Rankings of target items by salience and by confidence**

The top three items in the means list corresponds to the top three in range lists, though 2 and 3 are swapped: 1 – use soap to wash, 2 – use water to boil, and 3 – use a knife to cut meat.<sup>24</sup> In the rest of the lists, the items that have change places by more than 5 positions are as follows: 10 – work at a restaurant, 14 – commit suicide on the highway, and 18 – drive on the highway.

10 had a middle rank on the means list but a larger-than-expected range of response times (ranking 16 of 18). This may be because the verb *zuo* (do, work) has a wide range of meanings, some of which may not be immediately reconcilable with the location *guan* (restaurant). Another reason why 10 might have had such a large range of response times is that *guan* is more frequently used in Taiwan and less so in mainland China. Since the participants were from the mainland, the participants would be expected to have differing ranges of linguistic experience with regional variants of this kind. The choice to use *zuo* (work or do) or *guan* (restaurant) instead of the more usual *gongzuo* (work) or *fangan* (restaurant) respectively is based on the fact that the literature on non-canonical arguments uses *zuo* and *guan* rather than their alternatives.

14 and 18 (experiences involving highways) might have had differing positions on the two lists' wide ranges since driving personal cars in China – much less, on a highway – is not as ubiquitous as it is in the United States. It is unclear why 14 (committing suicide on the highway) had such a narrow range of

<sup>24</sup> References to target items in this first experiment will use the means list.

responses, ranking 6 of 18, compared to 18 (driving on the highway), which ranked 12<sup>th</sup>. Similar to the lexical choices for 10, *kai* (open, turn on, drive) has a wide range of meanings attached to it, which also may not be compatible with *zai gaosu gonglu* (on/at the highway). Additionally, *kai* would more frequently be expected to be followed by *che* (car); however, in order to maintain consistency with the presence or absence of lexical items in the second experiment, it was determined that *che* item should be excluded from analysis. Another experiment at another time may need to be used to determine whether *che* makes any significant difference to the analysis at hand. It is peculiar that 14 (commit suicide on the highway) did not result in a higher mean (slower) response time than 18 and that the range – the consistency with which the speech community ranks it as salient – was as small as it was. The smaller range of response rates may be due to the verb being unambiguous, as opposed to that in 14 (*kai*) or 10 (*zuo*). The relationship between a lack of ambiguity and a smaller range of response times seems consistent with the fact that the top 5 smallest ranges are among the least ambiguous verbs. Further study would be needed to tease out precise explanations for why specific items place in specific orders on the two lists. However, these results are analyzed later in correlation with the results of the next part of the experiment.

## 4. Experiment 2: Native-speaker interpretation and acceptability

### 4.1 Participants:

Surveys were distributed online to contacts in mainland China. The survey in its entirety was distributed in Mandarin. Consent limited respondents to 18 years of age and over, and consent was confirmed before proceeding to demographic data. 224 respondents gave consent and continued on to answer at least one question. Participants were asked two questions relating to languages spoken: (1) what language or dialect do you speak with your friends, and (2) what dialect do you speak at home? 93 participants responded to question (1), with 66 responding “Mandarin,” 11 responding “Mandarin and some dialect,” and 16 responding “some dialect.” The dialects represented here were varied. 99 participants responded to question (2), with 16 responding “Mandarin” and 83 responding “some dialect”.

Dialects here were also varied. 237 surveys were started, 83 completed (35% completion rate), and 224 had usable data.

## 4.2 Procedure:

Participants were shown 18 target sentences in Mandarin (characters) and asked whether the sentence is acceptable on a scale of 1-5. Following the ranking of each item, participants were requested to provide their own paraphrase of the sentence. 18 filler items were interspersed among the target items and followed the same procedure – ranking and paraphrase; the filler items used canonical objects. Since the survey program (*Qualtrics*) did not have a way to randomize items without also randomizing the paraphrase, the decision was made to distribute half of the surveys with the questions presented in reverse order. After all items have been ranked and paraphrased, the participant was then shown the non-canonical sentences along with an explanation of the intended meaning and then asked to rank acceptability again. For both the first and second rankings, the following scale was used:

1 = I don't understand this at all

2 = I understand this but I couldn't imagine my friends, family or myself saying this

3 = I understand this and I could imagine a friend or my family saying this

4 = I understand this and I've heard a friend or my family saying this, though I've never said it

5 = Interpretable and I've said this

In order to test the effect of context, half of the surveys provided a full sentence(s) in which to understand the sentences while half provided only the target sentence itself, as in (44) and (45) below. All participants received either a survey with contextual effects or one without.

44. baba wen mama: “jinnian hui jia zou shenme lu? kai shengdao?”

father ask mother: “this year return home go what road? drive provincial-road?”

Father asks mother, “What road are we going to use to return home this year? Are we going to drive on the provincial road(s)?

mama shuo: “shengdao taiman le, kai gaosugonglu.”

mother says: “provincial-road too-slow PRT, drive highway.”

Mother says, “The provincial road(s) are too slow. We’ll drive on the highway.”

45. kai gaosugonglu

drive highway

drive on the highway

In order to test the contrast between conventional and non-conventional sentences, 6 sentences taken from the literature on non-canonical objects were used as conventional, and those sentences were manipulated in either the verb or in the noun phrase following the verb – but not both at the same time. (46) – (48) below illustrate the types of manipulations. All participants received all three variations of each sentence, for a total of 18 target items.

46. kai gaosugonglu

drive highway

‘drive on the highway’

47. zisha            gaosugonglu

commit-suicide highway

‘commit suicide on the highway’

48. kai    saichechang

drive racetrack

‘drive on a/the racetrack’



In order to ensure that bare noun status would not interfere with acceptability judgments, half of the surveys were presented with the noun phrase as a bare noun phrase while the other half were attached to a determiner phrase, respectively (49) and (50) below.

49. kai gaosugonglu  
drive highway  
'drive on a/the highway'
50. kai zhe tiao gaosugonglu  
drive this CL highway  
'drive on this highway'

## 4.3 Analysis and Results

### 4.3.1 First acceptability Judgment

Because the survey completion rate was low (35%, 237 started – 83 completed), data collected were treated as individual observations in a generalized linear model. Data were analyzed in two stages. The first stage analyzed the initial acceptability judgment as a GLM (Generalized Linear Model) 5-factor ANOVA, with context (with-context, without-context), NP/DP (bare NP, DP), ordering (forward, reverse), convention (conventional, verb-change, noun-change) and Object Type (instrumental, location) as fixed factors. The ordering factor was used to reduce the possibility of a learning effect; and since so many surveys were incomplete, the effects and interactions from that factor are uninterpretable and, therefore, will not be reported.

Two of the four main effects were significant. Convention was significant at  $\chi^2 = 240.636$ ,  $df = 2$ ,  $p < .001$  and Context was significant at  $\chi^2 = 75.345$ ,  $df = 1$ ,  $p < .001$ ; see Figure 6: Acceptability Judgment 1, Interaction of Convention and Context. The main effect of NP/DP did not reach significance but was close ( $\chi^2 = 3.804$ ,  $df = 1$ ,  $p = .051$ ; see Figure 7: Acceptability Judgment 1, Interaction of NP/DP and Context). Five of the six two-way interactions were significant: Object Type \* Convention ( $\chi^2 = 47.813$ ,

df = 1,  $p < .001$ ; see Figure 8: Acceptability Judgment 1, Interaction of Object Type and Convention), Object Type \* NP/DP ( $\chi^2 = 6.102$ , df = 1,  $p < .05$ ; see Figure 9: Acceptability Judgment 1, Interaction of Object Type and NP/DP), Convention \* Context ( $\chi^2 = 10.975$ , df = 2,  $p < .005$ ; see Figure 6: Acceptability Judgment 1, Interaction of Convention and Context), Convention \* NP/DP ( $\chi^2 = 14.902$ , df = 2,  $p < .005$ ; see Figure 10: Acceptability Judgment 1, Interaction of Convention and NP/DP), and Context \* NP/DP ( $\chi^2 = 11.686$ , df = 1,  $p < .005$ ; see Figure 7: Acceptability Judgment 1, Interaction of NP/DP and Context). Three of the four three-way interactions were significant: Object Type \* Convention \* Context ( $\chi^2 = 23.052$ , df = 2,  $p < .001$ ; Figure 11: Acceptability Judgment 1, Interaction of Object Type by Convention by Context), Object Type \* Convention \* NP/DP ( $\chi^2 = 15.519$ , df = 2,  $p < .001$ ; Figure 12: Acceptability Judgment 1, Interaction of Object Type by Convention by NP/DP), and Object Type \* Context \* NP/DP ( $\chi^2 = 10.213$ ; Figure 13: Acceptability Judgment 1, Interaction of Object Type by Context by NP/DP). The four-way interaction was not significant.

#### 4.3.2 Collapsing over NP/DP

Since the interaction of Object Type \* Convention \* Context was significant, the data was collapsed over NP/DP and analyzed as a three-way ANOVA with Object Type, Convention, and Context as fixed factors. The main effects of Convention and Context were significant, respectively at  $\chi^2 = 238.654$ , df = 2,  $p < .001$ , and  $\chi^2 = 71.209$ , df = 1,  $p < .001$ ). The interactions of Object Type \* Convention and Convention \* Context were significant, respectively at  $\chi^2 = 47.130$ , df = 2,  $p < .001$  and  $\chi^2 = 11.266$ , df = 2,  $p < .005$ . The three-way interaction was still significant here at  $\chi^2 = 22.679$ , df = 2,  $p < .001$ .

Since the three-way interaction of Object Type \* Convention \* Context was significant here as well, 2 two-way ANOVAs were used to analyze the interaction of Convention \* Context at each condition of Object Type. At the condition of “Instrument”, the main effects for both Convention and Context were significant, respectively at  $\chi^2 = 109.343$ , df = 2,  $p < .001$  and  $\chi^2 = 36.994$ , df = 1,  $p < .001$ . The interaction of Convention \* Context at the condition of “Instrument” was significant at  $\chi^2 = 31.289$ , df = 2,  $p < .001$  (Figure 11: Acceptability Judgment 1, Interaction of Object Type by Convention by Context, left-hand

side). At the condition of “Location”, the main effects for both Context and Convention were significant, respectively, at  $\chi^2 = 34.214$ ,  $df = 1$ ,  $p < .001$  and  $\chi^2 = 179.570$ ,  $df = 2$ ,  $p < .001$  (Figure 11: Acceptability Judgment 1, Interaction of Object Type by Convention by Context, right-hand side). The interaction between Convention \* Context was not significant at the Object Type condition of “Location”. For an intended location meaning, context always improved the interpretability/ acceptability of the given sentence regardless of whether the sentence was conventional or whether there was change to the noun or verb. Each of the Convention conditions had clear distinctions in acceptability/interpretability from each other, with the ranges of the acceptability judgments not overlapping; conventional averaged 3.21, noun-change averaged 2.48, and verb-change averaged 2.03. This last rating strongly suggests that even though meaning is recoverable from a verb change, they are clearly not acceptable sentences; the others – especially the conventional sentences – are at least somewhat acceptable.

Since the two-way interaction of Convention \* Context was significant at the Object Type condition of “Instrument”, 3 one-way ANOVAs were used to analyze the simple effects of Context at each condition of Convention at the condition of “Instrument” (Object Type). The simple effects of Context at the condition of “conventional” at the condition “Instrument” were significant ( $\chi^2 = 48.965$ ,  $df = 1$ ,  $p < .001$ ) such that the introduction of context makes the sentence not only more understandable but more acceptable. The mean of an intended instrument-meaning without context stands at 2.58, whereas with context the mean of an intended instrument-meaning with context stands as 3.55. The simple effects of Context at the condition of “noun-change” at the condition of “Instrument” were significant ( $\chi^2 = 12.734$ ,  $df = 1$ ,  $p < .001$ ) such that the introduction of context here also makes the sentence slightly, but significantly, more acceptable. The mean of an intended instrument-meaning without context averaged 1.90, whereas with context, it averaged 2.34; since a rating of 2 is a claim that the sentence is understandable but completely unacceptable, the fact that context moved its acceptability beyond that marker suggests that the context introduces saliency AND acceptability. Even if that acceptability is barely beyond a 2 rating, it is a statistically significant change. The simple effects of Context at the

condition of “verb-change” at the condition of “Instrument” were not significant. Both the conventional expression and the noun change for intended instrument-meanings were positively affected by the introduction of context, but the introduction of context when the verb was changed from the conventional expression did not result in an improved acceptance of the phrase. It should be noted that no-context resulted in an understanding of the intended meaning but a rejection of the phrase – a rating of 2 or lower is a rejection of the sentence even if the meaning is semantically recoverable; however, with context it become slightly acceptable

### 4.3.3 Collapsing over Context

Since the three-way interaction of Object Type \* Convention \* NP/DP was significant, the data was collapsed over Context and analyzed as a three-way ANOVA with Object Type, Convention, and NP/DP as fixed factors. The main effects of Convention and NP/DP were significant, respectively as  $\chi^2 = 232.495$ ,  $df = 2$ ,  $p < .001$  and  $\chi^2 = 3.924$ ,  $df = 1$ ,  $p < .05$ . The main effect of Object Type was not significant. All interactions were significant: Object Type \* Convention at  $\chi^2 = 42.798$ ,  $df = 2$ ,  $p < .001$ ; Object Type \* NP/DP at  $\chi^2 = 6.121$ ,  $df = 1$ ,  $p < .05$ ; Convention \* NP/DP at  $\chi^2 = 14.510$ ,  $df = 2$ ,  $p < .005$ ; and Object Type \* Convention \* NP/DP at  $\chi^2 = 14.527$ ,  $df = 2$ ,  $p < .005$ . See Figure 14: Acceptability Judgment 1, Interaction of Convention and NP/DP at each condition of Object Type.

Since the three way interaction of Object Type \* Convention \* NP/DP was significant here as well, 2 two-way ANOVAs were used to analyze the interaction of Convention \* NP/DP at each condition of Object Type (see Figure 14: Acceptability Judgment 1, Interaction of Convention and NP/DP at each condition of Object Type). At the condition of “Instrument”, the main effect of Convention was significant at  $\chi^2 = 104.268$ ,  $df = 2$ ,  $p < .001$ , but the main effect of NP/DP was not significant. The interaction of Convention \* NP/DP was significant at  $\chi^2 = 28.340$ ,  $df = 2$ ,  $p < .001$ . For this reason, 2 one-way ANOVAs were used to analyze the simple effects of Convention at each condition of NP/DP at the “Instrument” condition of Object Type. The simple effect of Convention at the “Bare NP” condition of NP/DP was significant at  $\chi^2 = 123.839$ ,  $df = 2$ ,  $p < .001$ . For instrument meanings, the mean rating for the

use of the NP with conventional sentences (3.28) shows more acceptability than for the use of the NP with a change of either the verb (2.53) or the noun (1.86); the fact that the mean of noun-change is below 2 shows that with an NP the instrument meaning is not even interpretable by the majority of the participants here. The simple effect of Convention at the “DP” condition of NP/DP was also significant at  $\chi^2 = 13.366$ ,  $df = 2$ ,  $p < .005$ . Two post hoc tests between conventional sentences and the noun- and verb-changes respectively were conducted to determine whether the difference was significant. The conventional sentence was found to be statistically more acceptable than either at  $\chi^2 = 9.895$ ,  $df = 1$ ,  $p < .005$  and  $\chi^2 = 8.650$ ,  $df = 1$ ,  $p < .005$  respectively. Since the range of judgments for noun- and verb-changes heavily overlapped, it was determined not to pursue further tests. At the condition of “Location”, the main effects of Convention and NP/DP were significant, respectively, at  $\chi^2 = 174.553$ ,  $df = 2$ ,  $p < .001$  and  $\chi^2 = 10.280$ ,  $df = 1$ ,  $p < .005$ . The interaction between Convention and NP/DP at the condition of “Location” for Object Type was not significant. In other words, when given a location meaning, an NP always resulted in greater acceptability regardless of conventionality. Since the difference between the noun-change and the verb-change sentences was smallest, a post hoc test was conducted to determine whether the noun-change was significantly more acceptable than the verb-change. This test also resulted in a significant finding ( $\chi^2 = 27.963$ ,  $df = 1$ ,  $p < .001$ ) with noun-change being more acceptable than verb-change. The conventional sentences were always significantly more acceptable, but the fact that the mean for verb-change straddled the acceptability threshold and the fact that the range for verb-change dips below that threshold suggests that there is something about the conventional verbs that are allowing a location argument to be more acceptable. If one will recall, however, this is not the case with the instrument meaning.

#### 4.3.4 Collapsing over Convention

Since the three-way interaction of Object Type \* Context \* NP/DP was significant, the data was collapsed over Convention and analyzed as a three-way ANOVA with Object Type, Context, and NP/DP as fixed factors. The main effect of Context was significant at  $\chi^2 = 65.531$ ,  $df = 1$ ,  $p < .001$ ; the other main

effects were not significant. The interactions of Object Type \* NP/DP and Context \* NP/DP were both significant respectively at  $\chi^2 = 4.957$ ,  $df = 1$ ,  $p < .05$  and  $\chi^2 = 9.847$ ,  $df = 1$ ,  $p < .005$ . The three-way interaction was significant here at  $\chi^2 = 9.090$ ,  $df = 1$ ,  $p < .005$ .

Since the three-way interaction of Object Type \* Context \* NP/DP was significant here as well, 2 two-way ANOVAs were used to analyze the interaction of Context \* NP/DP at each condition of Object Type; see Figure 13: Acceptability Judgment 1, Interaction of Object Type by Context by NP/DP. At the condition of “Instrument”, the main effect of Context was significant at  $\chi^2 = 36.597$ ,  $df = 1$ ,  $p < .001$ ; the main effect of NP/DP was not significant. The interaction of Context \* NP/DP was significant at  $\chi^2 = 18.775$ ,  $df = 1$ ,  $p < .001$ . Because the interaction was significant, the simple effects of Context at each condition of NP/DP (at the “Instrument” condition of Object Type) using two one-way ANOVAs. At the NP condition, the simple effect of Context was not significant ( $p > .05$ ); that is, context did not make a significant difference to acceptability when the noun at issue was in an NP. At the DP condition, the simple effect of Context was significant at  $\chi^2 = 60.817$ ,  $df = 1$ ,  $p < .001$ . At the condition of “Location”, the main effects of Context and NP/DP were both significant, respectively, at  $\chi^2 = 29.118$ ,  $df = 1$ ,  $p < .001$  and  $\chi^2 = 8.114$ ,  $df = 1$ ,  $p < .005$ . Context, as always, made the sentence more acceptable. Whether with or without context, the noun in an NP phrase was always more acceptable when the intended meaning was location. The interaction of Context \* NP/DP at the condition of “Location” was not significant.

#### 4.4 Second Acceptability Judgment

The second stage of analysis looked at the second acceptability rating that was given after being informed of the target meaning. A four-factor ANOVA was conducted in a Generalized Linear Model with context (with-context, without-context), NP/DP (bare NP, DP), convention (conventional, verb-change, noun-change) and Object Type (instrumental, location) as fixed factors. Three of the four main effects were significant (See Figure 15: Acceptability Judgment 2, main effect object type, Figure 16: Acceptability Judgment 2, main effect Convention, and Figure 17: Acceptability Judgment 2, main effect Context): Object Type at  $\chi^2 = 7.346$ ,  $df = 1$ ,  $p < .01$ , Convention at  $\chi^2 = 71.790$ ,  $df = 2$ ,  $p < .001$ , and Context

at  $\chi^2 = 18.669$ ,  $df = 1$ ,  $p < .001$ . The two-way interactions of Object Type \* Convention, Object Type \* NP/DP, and Convention \* Context were significant (respectively,  $\chi^2 = 26.699$ ,  $df = 2$ ,  $p < .001$ ;  $\chi^2 = 14.218$ ,  $df = 1$ ,  $p < .001$ ; and  $\chi^2 = 7.919$ ,  $df = 2$ ,  $p < .05$ ). Only one three-way interaction was significant: Object Type \* Convention \* NP/DP at  $\chi^2 = 6.943$ ,  $df = 2$ ,  $p < .05$ . The interaction of Object Type \* Context \* NP/DP was not significant. The four-way interaction was not significant.

#### 4.4.1 Collapsing over Context

Since the three-way interaction of Object Type \* Convention \* NP/DP was significant, the data was collapsed over Context and analyzed as a three factor ANOVA. The main effects of Object Type and Convention were significant at, respectively,  $\chi^2 = 8.375$ ,  $df = 1$ ,  $p < .005$  and  $\chi^2 = 65.027$ ,  $df = 2$ ,  $p < .001$ . The main effect of NP/DP was not significant. The two-way interactions with Object Type were both significant: Object Type \* Convention,  $\chi^2 = 35.911$ ,  $df = 2$ ,  $p < .001$  and Object Type \* NP/DP,  $\chi^2 = 16.583$ ,  $df = 1$ ,  $p < .001$ . The three-way interaction was still significant at  $\chi^2 = 6.333$ ,  $df = 2$ ,  $p < .05$ . See Figure 20: Acceptability Judgment 2, 3-way interaction Object Type, Convention, NP/DP.

Because the three-way interaction of Object Type \* Convention \* NP/DP was also significant here, 2 two-way ANOVAs were conducted to analyze the interaction of Convention \* NP/DP at each condition of Object Type. At the condition of “Instrument”, both main effects were significant, with Convention at  $\chi^2 = 11.276$ ,  $df = 2$ ,  $p < .005$  and NP/DP at  $\chi^2 = 13.262$ ,  $df = 1$ ,  $p < .001$ . The interaction was also significant at  $\chi^2 = 8.837$ ,  $df = 2$ ,  $p < .05$ . Since the two way interaction of Convention \* NP/DP was significant, 2 one-way ANOVAs were conducted to look at the simple effects of NP/DP at each condition of Convention at the condition “Instrument” (Object Type). At the condition of “Conventional”, the simple effects of NP/DP were not significant. At the condition of “noun-change”, the simple effects of NP/DP were significant at  $\chi^2 = 17.998$ ,  $df = 1$ ,  $p < .001$  where DP (mean = 2.81) was more acceptable than NP (mean = 2.10). At the condition of “verb-change”, the simple effects of NP/DP were significant at  $\chi^2 = 4.857$ ,  $df = 2$ ,  $p < .05$ , where DP was again more acceptable than an NP. At the Object Type condition “Location,” both main effects of Convention and NP/DP were significant, respectively, at  $\chi^2 = 81.774$ ,  $df =$

= 2,  $p < .001$  and  $\chi^2 = 4.377$ ,  $df = 1$ ,  $p < .05$ . The interaction of Convention \* NP/DP was not significant at the condition of “Location”. In the case of Convention, the conventional sentences scored highest in acceptability (mean = 3.42), followed by noun-change (mean = 2.74), and leaving verb-change (2.39) as the lowest in acceptability.

#### 4.5 Correlations between saliency and acceptability judgments

The mean saliency rankings were run in a correlation analysis against the first acceptability judgments and then against the second acceptability judgments. The initial acceptability judgments negatively correlated with the mean saliency rankings,  $r(2114) = -.115$ ,  $p < .001$ , meaning that the acceptability for each item decreased as the response times for that item increased. However, the second acceptability judgments did not correlate at all,  $r(1391) = -.034$ ,  $p > .05$ , suggesting no significant relationship between the second acceptability judgments and the item’s degree of saliency. These two results would suggest that greater saliency does, in fact, correlate with greater acceptability (see Figure 21: Correlation with Saliency Judgments). 6 post hoc correlation tests were conducted between the saliency response times and each condition of Convention for both acceptability judgments. The “conventional” for the first judgment did not correlate with the mean saliency rankings of the conventional items,  $r(703) = -.016$ ,  $p > .05$  (Figure 22: Correlation with Saliency Judgments (Conventional items only)). The conventional items of the second judgment positively correlated with the mean saliency rankings of the conventional items,  $r(459) = .121$ ,  $p < .01$ . The “noun-change” for the first judgment negatively correlated with the mean saliency rankings,  $r(706) = -.207$ ,  $p < .001$  (Figure 23: Correlation with Saliency judgments (“noun-change” items only)). The “noun-change” for the second judgment negatively correlated with the mean saliency rankings,  $r(467) = -.168$ ,  $p < .001$ . The “verb-change” for the first judgment was negatively correlated,  $r(705) = -.240$ ,  $p < .001$  (Figure 24: Correlation with Saliency Judgments (“verb-change” items only)). The “verb-change” for the second judgment was negatively correlated,  $r(465) = -.168$ ,  $p < .001$ .



Qualitative responses, where given, did not differ from the intended meanings.

## 5. Discussion

### 5.1 First judgment

#### 5.1.1 Ignoring NP/DP and Highlighting Context

In the first judgment task, the present study found that – ignoring the NP/DP division – a target location argument cleanly seemed to bear out the prediction that having context and being conventional would separately result in higher acceptability.

The issue with the instrument argument was a little more messy (see Figure 11: Acceptability Judgment 1, Interaction of Object Type by Convention by Context); the data shows that there was a significant interaction between convention and context; but looking at what the interaction was seems to show that conventionality behaved the same as with the location argument: a context being present resulted in higher acceptability rating. The differences between instrument and location lay in two places: (1) whether the noun changes were more acceptable overall than the verb changes and (2) whether the context mattered to acceptability. Regarding the latter difference, only the verb change in the instrument condition seemed to confound the prediction that context would render the sentence more acceptable, and even in this case, context simply didn't matter to judgement – both with and without context the sentence received in the same essential score. All other conditions regarding context were what was predicted. The former difference –whether noun changes or verb changes were more acceptable – might be explained by appealing to light verb structure and the fact that a location argument isn't tied to event relationships further up the syntactic tree in the same way that instrument arguments might be.

In other words, for the initial judgment the salience of the specific verb-object relationship increased the possibility that speakers in this study would identify the sentence as acceptable, and similarly the presence of a context in which the sentence could be understood also increased the same possibility.

### 5.1.2 Ignoring Context and Highlighting Bare Noun Phrases

Ignoring context, instrument as a target meaning seemed to rely heavily on conventionality for acceptability. At the risk of sounding redundant with what was noted in the analysis section, the mean ratings for the Bare NP were acceptable for the conventional sentences at much higher levels (3.28) than for either the change of verb or change of noun (2.53 and 1.86, respectively); the fact that the mean of noun-change is below 2 shows that with an NP the instrument meaning should not be expected to be interpreted or interpretable. This rejection of NP instrument meanings, however, should be tempered by the fact that the context/no-context factor was collapsed and that context made a significant difference in acceptability. It should also be tempered with the understanding that conventionality was always – and significantly – more acceptable than either changes for both NP and DP, so much so that the difference in even the closest ranking (Instrument at DP) was still statistically significant. See Figure 14: Acceptability Judgment 1, Interaction of Convention and NP/DP at each condition of Object Type.

When given a location meaning, an NP always resulted in greater acceptability regardless of whether the sentence was conventional or not. This pattern contrasts with what happened with the instrument object type for the NP/DP factor, where the addition of a determiner resulted in a worse acceptability rating for the conventional sentence but better for the noun change. The consistency of the NP/DP factor in location might be explained by appealing to the fact that NPs denote types, not entities. But the instrument condition seems to confound that. Further experiments would need to evaluate the difference between how NPs and DPs behave with instrument and location objects. In the literature on light verb structure, only instrument objects are analyzed as having a light verb structure (e.g., Lin, 2014, p. 77-78). But if light verb structure has influence on the acceptability, one would expect more consistent acceptability ratings for conditions with the change between the NP and DP: either no statistical difference between any NP/DP in all cases or one (NP or DP) is consistently more acceptable. However, with instrument arguments we find both situations happening: (1) no statistically significant difference between NP and DP for the verb change, (2a) NP is better than DP for the conventional situation, and (2b)

DP is better than NP for the noun change. It might be that noun change for instrument is so odd that it doesn't make sense without imagining a specific entity with which one might carry out the action indicated (e.g., using *that* telescope to observe something); and the conventional has become so conventionalized as to be idiomatic (e.g., He was treading water vs. He was treading the water). Because an instrument argument could not be conceptually achieved except in the cases of context as mentioned earlier (conceptual achievement results in a rating of 2), the results for the simple effect of NP/DP at instrument\*noun-change might justifiably be ignored. It may also be justifiable to ignore the simple effect of NP/DP at location\*verb-change since the mean for verb-change straddled the acceptability threshold and since the range of responses dips below the threshold of 2, suggesting that there is something about the conventional verbs that are allowing a location argument to be more acceptable.

### 5.1.3 Ignoring Convention and Highlighting Context

The least surprising finding here, and one that was predicted, was that context made the sentence significantly more acceptable. Except in one case. The most surprising finding when collapsing the analysis over convention was that context for an NP did not result in a significant difference as an instrument argument, whereas for a DP the spread between context and no context was nearly a full point (.81) – “with context”, of course, being the more acceptable sentences. Nothing in the current theory being posited predict that why context would seem to matter so little to NP conditions but matter so much to DP conditions. The other oddity, unexplained by the current theory, was that with context an instrument DP was more acceptable than an NP; this is contrary to all other conditions, where the DP resulted in lower acceptability ratings. For location, the patterning was much more regular than with instrument; the Bare NP was significantly more acceptable whether there was context or not. One issue to note is that the means of these results are happening within the 2 to 3 range. To recall the ranking, 2 was interpreted as understandable but unacceptable, and 3 was interpreted as understandable and at least somewhat acceptable.

## 5.2 Second judgment

Context was already a significant factor in the first judgment task and it remained the same here. Since the second judgment task told the participant what the intended meaning was, the context factor was less interesting to the evaluation of the second judgment.

### 5.2.1 Ignoring Context and Highlighting Bare Noun Phrases (see Chart 15)

In the second judgment task, several of the findings showed interesting results. For conventional instrument arguments, there were no significant differences between NP and DP sentences, but the noun and verb changes showed different patterns. The means for the NP at Noun Change were so close to the “2” mark that one could easily say that this is definitely not acceptable; the DP of the same change, however, was just under the “3” mark – a .7 point difference (2.81 compared to 2.10). The 2.10 mean for NP here would suggest that even having been informed of the intended meaning did not help acceptability for an NP phrase. To a lesser extent, the verb-change also showed that DP was more acceptable than NP sentences, and though the difference was not as stark as the noun-change, it was significant nonetheless. It is also curious that here the conventional sentence didn’t matter as to whether the noun was in an NP or a DP.

For location arguments, the pattern again was regular in the same way the NP/DP condition was for location in the first judgment task. There was no interaction between Conventional and NP/DP in the same way there was with the Instrument argument. Both main effects were significant, with the NP being more acceptable than the DP – contrary to the Instrument situation. However, the measurable difference within the location conditions were not as large as for those in the instrument condition. Convention also showed what would have been predicted anyway with regards to the conventional sentences being more acceptable than the noun or verb changes, though it should be noted that the mean for NP noun-change with location (2.74) was barely lower than that of the highest mean for instrument in any of the Convention conditions (2.81).

Ultimately, it seems the Instrument argument hovers just under the acceptability line in its conventional iterations but the Location argument seems entirely acceptable in its conventional iterations. This might support the idea that there is a light verb structure that applies to instrument arguments in a way that doesn't apply to location arguments.

### 5.3 Correlation

The correlation analysis showed that for the first acceptability ranking – but not the second ranking – there was a negative correlation ( $r(2114) = -.115, p < .001$ ) between the first acceptability ranking (1-5) and the speed of response to the target senses in canonical structure. Though the correlation between the acceptability ranking for the first judgment and the speed (i.e., saliency) ranking was negative, the first and final two items in the list – that is, the ones that received the highest and lowest respective saliency rankings – seemed to go against the general theory being proposed. The highest ranked item for saliency might not have been determined using a tool powerful enough to detect processing speed and, perhaps, another faster tool would have identified it as slower than they were. This would partially be suggested by the fact that all of the acceptability judgments show the second as more acceptable than the first except below the 7<sup>th</sup> (of 18) items, where 3 of judgment 1's rankings are above and 2 of judgment 2's rankings are above. It's, of course, also possible that the two fastest reaction times – “use soap to wash” and “use a knife to cut meat” – are so often encountered in other grammatical structures that the use of them in non-canonical relationships were immediately written off as ungrammatical. It should be noted that both sentences ranked higher in the second judgment than in the first. Still, the lower rankings make less certain the correlation between saliency and grammaticality. A similar situation may be true with the slowest items, “use a telescope to observe (something)” and “drive on a racetrack”: the lower frequency of the items “telescope” and “racetrack” may themselves have been the cause of the slower reaction time; this, however, doesn't explain why those two items were also ranked so highly as non-canonical arguments in both acceptability judgments. It should also be noted that the second acceptability judgments for both were higher than the 1<sup>st</sup> acceptability judgments. The problem

may be that there were too few participants in the saliency rankings, and future studies may need to identify relationships between verbs and their non-canonical objects that have statistically significant differences in speed with a separate, large test group before the speed rankings can be reliably compared with acceptability judgments. There may also need to be more items to be sure the negative correlation between acceptability and speed (positive correlation between acceptability and saliency) is accurate.

Isolating just the conventional items, the first judgment rankings did not result in correlation but the second did. However, the number of items is so small and the pattern unpattern-like that it would suggest the need to be skeptical of these correlations until more conventional items can be evaluated and either a similar unpattern-like pattern disabuses the present researcher of the presence of a relationship or a clearer pattern shows a positive or negative correlation. It should also be noted that the three items where the second judgment were not considered more acceptable than the first judgment were in the conventional items. None of the noun-changed or verb-changed items had sentences that were ruled more acceptable in the first judgment than in the second judgment. And in both the noun-changed and verb-changed items, the correlation was negative – the same as with the second judgment of the conventional items. The verb-change especially in the second judgment doesn't show the up-down movement that all the other charts show. It's also curious that the second judgment was always slightly less steep of a correlation than the first judgment.

Given these caveats, the general theory still seemed to explain the correlation.

## 5.4 Limits of the study

Low survey completion rate necessitated using a Generalized Linear Model instead of a General Linear Model. In a general linear model, the data is assumed to be normally distributed, which means participants only completing part of the survey would have required throwing out every survey that wasn't complete. However, in a generalized linear model, each response counts as its own separate data point separate from the participant who gave it. In a generalized linear model, "goodness-of-fit measures

rely on sufficiently large samples, where a heuristic rule is that not more than 20% of the expected cells counts are less than 5” (Pennsylvania State University, 2017). In other words, as long as each expected measurement has no less than 5 entries, the model will still have goodness-of-fit. This will explain why in the next experiment some of the smaller effects in the non-native speaker data can’t be interpreted.

Future studies will need to include corpus data in an evaluation of response time with frequency and to match those against the acceptability rankings given here.

Context is nebulously defined here and doesn’t take into account other types of context (see discussion in Gibbs & Colston, 2012); some of the pairs above might result in higher speed of response for those pairs if they were encountered in a richer context. This assumption would flow from the Graded Saliency Hypothesis: richer context results in stronger activation.

## Chapter 4: Non-Native speaker acceptability of non-canonical arguments

### 1. Introduction

Noncanonical arguments are the use of lexical items as arguments for the verb other than actor/experiencer or theme. These types of arguments might appear as location, time, reason, instrumental use, etc. (Lin 2014, Li 2014, Tai 2008, Tao 2000). The use of *Lake Michigan* in the sentence *I fished Lake Michigan* would be an example of the location use of a noncanonical argument, where *Lake Michigan* is a location where the event is happening rather than the theme of the verb.<sup>25</sup> However, whereas in English *Lake Michigan* as a direct object can be deconstructed as having come from the denominalization of *fish* in some facsimile of the phrase *catch fish in/at Lake Michigan*, sentences that use noncanonical objects in Chinese are not able to be deconstructed in the same way. In sentence (1) below, the verb *chi* (“eat”) is not derived in the same way that *fish* is argued to be in English.

1. Zhangsan chi zhe shuang kuaizi  
Zhangsan eat this pair chopsticks  
Zhangsan ate using this pair of chopsticks.

Native speakers do not all agree about the acceptability of this sentence. In the different studies that have addressed the phenomenon, consultants and the writers themselves agree that these are somewhat odd for many native speakers. However, authors within Chinese linguistics proceed with their analyses as though the sentence is acceptable and analyze it as though the verb-object combination is not simply a non-decomposable idiom.<sup>26</sup> The discussion and experiment that follows will also assume the same.

As the previous experiment showed, native speakers understood what was meant by the non-canonical constructions, both conventional and novel, even if the participants didn’t always accept

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<sup>25</sup> See Hale & Keyser (1993), Kiparsky (1997), Culicover & Jackendoff (2005), Tai (2008 & 2013), . However, this “feels” as much like a theme as a location, as though I am doing something to the lake as much as doing something at the lake.

<sup>26</sup> See Lin (2010 & 2014), Lin & Liu (2004), T. H. J. Lin (2001), C.-T. James Huang, Li, & Li (2009), Y.-H. A. Li (2014), J. H. Tai (2013), J. H. Tai (2008), Tao (2000), and Barrie & Li (2012).



specific instantiations of it. The previous study also indicated that a minimal context was enough to increase the degree of acceptability for the construction overall. In both the present and previous study, context refers to any element not encoded in the lexeme when accessed by the lexical form; cognitive domains would be considered part of the context.<sup>27</sup> The increase in acceptability in the previous study was attributed to the claim that noncanonical objects are interpreted figuratively – at least on first encounter – and that the interpretability of that sentence is contingent on how salient the conceptual relationship is between the target lexical item as an entity and its other qualia.<sup>28</sup> In the case of *chi kuaizi* (“eat chopsticks”), the target lexical item *kuaizi* (“chopsticks”) provides access to its teleological qualia as an eating utensil. The association between the entity and its teleology is made more acceptable by way of cultural associations linking those two concepts. The fact that replacing *kuaizi* with *chazi* (“fork”) results in even lower acceptability lends credence to the hypothesis that syntax alone can’t explain the production and constraint of the phenomenon, as some studies in footnote 2 have acknowledged.

The present study looks at whether non-native speakers have the same sensitivity to the metonymic processes that are available to native speakers. The same factors – conventional vs. novel, NP vs. DP, context vs. no-context, and instrument/location conditions – are analyzed here along with an additional demographic measurement of self-reported years of study. The literature review will summarize some of the studies that relate directly to L2 processing of metonymy.

## 2. Literature Review

### 2.1. Saliency and Interpretability

The correlations between saliency and interpretability for metonymy were discussed as early as Papafragou (1996) who proposed using Sperber & Wilson’s (1986) Relevance Theory to explain the online processing of metonymy (see also Clark, 2013; Sperber & Wilson, 2002; Wilson, 2010; Wilson &

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<sup>27</sup> cf. Roberts 2005 for discussion of context generally.

<sup>28</sup> Cf. Bergler (2013), Pustejovsky (2011), and Pustejovsky, Isahara, & Lee (2013) on qualia theory and coercion.

Sperber, 2005). Papafragou (1996) criticizes the cognitive linguistic tendency to generalize metonymic concepts like OBJECT USED FOR USER (see 2 below) ala Nunberg (1978), Fauconnier (1985), and Lakoff & Johnson (1980) by pointing out that, in order to account for differing degrees of acceptability, the cognitive linguistic explanations refer to associations when confronted with conventional and non-conventional examples; that is, according to Papafragou the generalized stand-for relationships can't distinguish differences in acceptability between conventional and novel uses of the relationships. The examples below, from Papafragou (1996: 174), show a range of differing acceptability judgments for metonymy from more acceptable (2) to less acceptable (4):

2. The buses are on strike
3. Are you the cab parked outside?
4. I wouldn't marry a Mercedes, but I could live with a Volvo.

Relevance Theory holds that it is a universal tendency of the human cognitive system to recognize and maximize information relevant to the situation in which it occurs and to ignore and minimize any information that isn't relevant to said context. The theory proposes degrees of relevance as necessary to bringing about a successful interpretation. As such, input is controlled by two pragmatic principles (Sperber & Wilson, 2002):

- i. Other things being equal, the greater the positive<sup>29</sup> cognitive effects achieved by processing and input, the greater the relevance of the input to the individual at that time.
- ii. Other things being equal, the greater the processing effort expended, the lower the relevance of the input to the individual at that time.

Differing senses of a polysemous item are provided by the lexicon and then restricted by context. For metonymy, when there is a potential conflict over what the target referent might be, context may value

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<sup>29</sup> The "positive" here refers to an effect that's beneficial for that mind.

one referent over others in order to resolve it. This has been challenged through experimental research by the discovery that multiple senses can be active at the same time (e.g., Heredia & Muñoz, 2015).

World knowledge and context influences which sense(s) is salient. In investigations of place-for-institution or place-for-event metonymies, both Frisson & Pickering (1999) and Gibbs (2007) found a significant relationship between faster processing and familiarity with institutions/events referenced by metonymies: those participants who had a greater knowledge of the institution/event being referenced responded to stimuli faster. The reverse was also true: participants who had little knowledge of the institution/event responded to stimuli slower. (5) below would be an example of a metonymy that is more familiar to the participants in their study, and (6) below is an example of a metonymy that was less familiar to participants.

5. A lot of Americans protested during Vietnam

6. A lot of Americans protested during Finland (retrieved from Bierwiazzonek, 2013: 237)

When the mind needs to fill in perceptual gaps (visual/auditory/etc.), it uses “what is known and entrenched” (ibid., 241). In a study on memory, participants who were tasked with retelling stories did so by supplying their own frameworks and conceptualizations than by solely relying on the information in the texts alone (Bower et al., 1979). Research on the effect of context and framing shows that activation of neural networks is dependent on and constrained by world knowledge, context, and active frames. The literature and arguments considered so far would lead one to hypothesize that experimental studies would confirm the conclusion that stronger associations between two concepts would lead to higher ratings of acceptability, even if the construction those concepts are situated in are less common. Conventional associations would elicit higher acceptability than unconventional associations.

Familiarity with conceptual relationships results in faster processing of metonymies. The first experiment of Frisson & Pickering (2007) tracked the eye movement of 42 native British English-speaking participants while the participants read names embedded in sentences; the names in these cases

had literal or metonymic interpretations, specifically PRODUCER FOR PRODUCT metonymies, like *Dickens* and *Needham*. Familiar names elicited less eye fixation than unfamiliar names; this was interpreted as requiring less processing to enable comprehension. The second experiment in Frisson & Pickering (2007) addressed the influence of context on processing speed for both literal and metonymic senses, using minimal contexts like *read Dickens* and *read Needham*. As long as the senses were already familiar, the literal and metonymic senses showed no processing difference. But for the unfamiliar metonymic sense, participants fixated longer on the name, suggesting more processing was needed to interpret the metonymy. In the final experiment, disambiguating contexts were added to evaluate whether this influenced the duration of eye fixation, but this only helped novel metonymies and unfamiliar names with literal interpretations. Such contexts did not improve processing speeds for the conventional and familiar lexical items.

Figurative language processing is acquired early in language acquisition. Rabagliati, et al. (2010) discovered that even though children might produce fewer metonymic tokens, they accept more lexical shifts. In other words, children are already wired at an early age to process non-literal meaning. Adults, on the other hand, produce more types of lexical shifts than children but accept fewer than children might accept. As children interact more with their surrounding speech communities, their acceptance of certain lexical shifts contracts while their knowledge of possible sense relationships expands. That is, as the gaps in the child's lexicon shrink, she or he will not need to stretch as many of the semantic meanings that are in her or his lexicon. More exposure to certain sentences and associations will result in more acceptability of those sentences and associations; less/no exposure to those sentences and associations will result in lower acceptability. For adult English speakers in certain situations, the fact that "a movie" is less commonly a metonymic reference for "a DVD" would explain why the adults found the question "could a movie be round?" to be less acceptable; but for children in the same situation and them not having had the same linguistic exposure as the adults, "a movie" and "a DVD" would have fewer restrictions on interchangeability. Rabagliati et al. (2010) argue that adults' background knowledge of conventionality

influences what is or isn't acceptable; as a speech community juxtaposes specific conceptualizations and constructions, the adults in that speech community come to accept some constructions/collocations as conventional and, therefore, more acceptable than other constructions/collocations; children, on the other hand, are less constrained regarding what is or isn't acceptable since their exposure to those juxtaposed concepts/constructions hasn't reached a discriminating level. So, as long as there is any salient conceptual association, children are more likely regard the sentence as acceptable, whereas adults are more constrained by their background exposure. Robenalt & Goldberg (2016) found similar results with regards to statistical learning, but in their study the results were for adult native vs. non-native speakers instead of adult vs. child speakers. These findings will be overviewed later in the section that follows.

## **2.2. Second Language Figurative Language Processing**

Studies of bilingual processing have rejected separate storage for both literal and figurative meanings and have also rejected a requirement that the literal meaning be accessed first; the former was supported by Nelson (1992) and the latter by Swinney & Osterhout (1990). The question, then, returns to how the lexicon accesses both and how it distinguishes one sense from another. One approach, the Graded Saliency Hypothesis (Giora, 2003; Heredia & Muñoz, 2015), based on Sperber & Wilson's (1986) Relevance Theory, argues that language dominance, proficiency, and environment increase the saliency of some meanings over others: "salient meanings [are] readily accessible and excitable with lower activation thresholds, and non-salient meanings [are] less accessible and less excitable" (Heredia & Muñoz, 2015: 109). A study on the reaction time for highly proficient bilinguals showed that bilinguals have direct access to figurative interpretations but that they are activating both the literal and non-literal meanings (Heredia & Muñoz, 2015: 110). Kecskes (2015), Vaid et al. (2015), and Yang et al. (2013) found similar results.

Though the number of participants in Chen & Lai (2012) was small, their results suggest that L2 users in many cases do recognize figurative language as figurative language, instead of as separate and literal lexical entries. By extension, recognizing figurative language would result in L2 users attempting

to process a given figurative sentence in non-literal ways. In sentences where participants were uncertain about a sentence's figurativeness, Chen & Lai attributed participants' uncertainty to unfamiliarity with key words in the sentence. Since the present study provides a gloss for all terms that would be taught beyond a basic first-semester university course, this should not be a source for confusion. Chen and Lai also claim that participants were better able to identify metaphoric expressions than metonymic expressions, an issue that may be a problem for the present study since it will be looking at metonymy instead of metaphor. Chen & Lai's categorization of metaphor to metonymy spanned four groups: metaphor (e.g., ANGER IS A BURDEN: 'After I lost my temper, I felt lighter' [emphases theirs]), metonymic-metaphor (e.g., BODILY RESPONSES TO ANGER STAND FOR ANGER: 'You make my blood boil'), metaphoric-metonymy (e.g., INSANE BEHAVIOR STANDS FOR ANGER: 'Billy started foaming at the mouth'), and metonymy (e.g., PHYSICAL EFFECTS OF AN EMOTION STAND FOR THE EMOTION: 'don't get hot under the collar'). What is unclear in some of their test items is whether those target items are perceived to stand along one side of the continuum or the other. For example, in the test item "When the judge threw him out of the game, Billy started foaming at the mouth," there are two figurative uses: "threw him out of the game" and "foaming at the mouth." The first figurative phrase alone can be classified on either side of the metaphor-metonymy spectrum, for example, EXCESSIVE ACTION FOR LESSER ACTION (THROWING OUT OF A PLACE STANDS FOR PHYSICALLY REMOVING FROM THE PLACE) or as a metaphor PERSON IS A THROWABLE OBJECT (the person is a thing that can be thrown). What should also be considered in this example is whether "game" also should be considered metonymic and whether its figurativeness has to be included in the L2 processing – game being metonymic/polysemic for the place where the game takes place and for the game itself. There would be a need to identify how the participants conceptualize the target item, not how the researchers conceptualize it.

The linguistic environment restricts both the literal and metonymic senses that are activated. The two meta-analyses conducted by Lauro & Schwartz (2017) evaluated 43 studies on the activation of

cognates in both high- and low-constraint contexts for highly-proficient European-language bilinguals. Testing low-constraint and high-constraint facilitation, the two meta-analyses reinforced claims by the previous studies that neither a semantic nor syntactic linguistic context can restrict access to only the target sense; however, linguistic contexts can reduce the set of senses that are activated, especially in the L1. L2 access to a variety of senses was broader than that of L1. These results are also expected to manifest in the present study on the variety of interpretations that L2 Chinese users report.

Robenalt & Goldberg (2016) is a replication and expansion of their earlier 2015, English-monolingual study; in the 2016 study, they examined 157 native speakers of English and 276 English learners. Both studies measured the level of acceptability that participants perceived in pairs of sentences where the structure was manipulated by two factors: statistical frequency of the verb (high vs. low) and the availability of an alternative VP construction. The VP constructions with competing alternations were a mix of alternation types.

Description	High frequency verb	Low frequency verb
Has competing alternative formulation (in parentheses)	(a) Amber explained Zack the answer (cf. Amber explained to Zack the answer)	(b) Amber recited Zack the answer (cf. Amber recited the answer to Zack)
No readily available competing alternative formulation	(c) Megan smiled her boyfriend out the door	(d) Megan grinned her boyfriend out the door

Table 2: Robenalt & Goldberg (2016: 69) conditions and examples

In the 2016 study, they found that native speakers were much more likely than non-native speakers to rate test items on the extreme ends of a 5-point scale. Frequency correlated with acceptability for both groups, both for the frequency of the construction and the frequency of the verb. Baseline sentences (not pictured above) were judged as more acceptable than sentences with novel verb use, but baseline sentences with high-frequency verbs were judged more acceptable than baseline low-frequency verbs. In the novel

sentences (non-baseline), native and non-native speakers behaved differently. Native speakers treated sentences with non-alternating constructions as more acceptable than those with alternating constructions. The sentences with alternating constructions were subject to verb-frequency effects, wherein verbs that are more frequently encountered were more likely to be judged acceptable in these constructions as opposed to those verbs that are less frequently encountered. In contrast, the sentences without alternating constructions weren't affected by verb-frequency – they were treated as equally acceptable regardless of frequency. Non-native speakers, on the other hand, seem to ignore frequency in judging novel sentences, regardless of whether there was a competing alternative construction. Assuming these findings are generalizable to the present experiment, the frequency of individual Mandarin verbs should be nearly irrelevant for the non-native participants.

Proficiency in Robenalt & Goldberg was divided into quartiles based on self-reporting. The judgments of L2 speakers with higher proficiencies were correlated more closely with native speaker judgments than were those of lower proficiencies. All L2 speakers judged sentences with high-frequency verbs similarly, though as the frequency decreased, so too did the correlation between the judgments of lower proficiencies and those of native speakers. Particularly relevant to the present study, participants with lower proficiencies found novel constructions, especially polysemous sentences, more acceptable than native and near-native speakers. This latter result is attributed to the idea that L2 users at early proficiencies may not have the statistical knowledge to rule out novel, alternative phrasing when a conventional phrasing is readily available: “L2 learners... are less aware that such novel formulations are actually particularly disfavored” (86). Native speakers anticipate a particular form through regular interaction and expect such conventional forms to appear; early L2 learners, on the other hand, have not had consistent encounters with the preferred form to reject the alternatives. Robenalt & Goldberg argue that over time “incorrect prediction is weakened and replaced by a competitor.” This assumes that learners will notice and incorporate the data into their lexicon.



Slabakova et al. (2013) similarly looked at the differences in acceptability for novel and conventional metonymies in native speakers of English, Korean, and Spanish, the participants numbering 36, 19, and 23 respectively. Two experiments, paraphrase and acceptability judgment, were conducted in the participants' native languages. In the first, the participants were expected to choose between 4 possible paraphrases of a sentence that contained a metonymy. One paraphrase would be a literal interpretation and the other a figurative interpretation; the other two options allowed the participant to choose both literal and figurative or neither. The second experiment required participants to rate – from unacceptable to perfectly acceptable – sentences containing a metonymy when preceded by a sentence intended to disambiguate the target referents. The notable findings were that responses varied highly among individuals even within the same L1, though some patterns were still statistically significant. The conventional metonymies did not differ among each other in acceptability across languages. But the novel metonymies did. Slabakova et al. attribute higher acceptance of novel PRODUCER FOR PRODUCT metonymies by Korean speakers to these speakers being "more liberal in the treatment of loosely contextually associated, novel metonymic shifts" (290). English speakers distinguished novel and conventional metonymies more definitively, and Spanish speakers were less tolerant of even conventional metonymies than English speakers were. Though their experiment attempts to "stay away from culturally-specific knowledge" and to try to use "metonymic mappings that are part of global culture nowadays," it is likely that some sentences were not as global as it might have been assumed; for example, sentences including "violin" as a metonymy for "violinist" may be influenced by the fact that the concept as a part of "global culture" is still a phonetically-transcribed loan word in Korean, making its foreignness more salient for Korean L1 speakers – unlike, for example, it would be in Chinese where *violin* is conceptually rendered and sounds nothing like its European-language instantiations (*xiaotiqin*, conceptually 'little raised instrument'). Other test items might have similar biases, though the effect of foreignness on acceptability would need to be investigated further.

Slabakova et al. (2016) follows their 2013 experiments with an investigation on L1 speakers of English, Spanish, and Korean, dividing up the latter two into three proficiency levels for English as an L2. The study compared the acceptability of conventional and non-conventional metonymies in the first language with their judgments in the L2. Two tasks were run: the first involved paraphrasing a given sentence and indicating whether more than one interpretation (literal and/or figurative) was possible; and the second involved acceptability judgments on a scale of 1-5 (unacceptable to perfectly acceptable) for sentences that contained no metonymy (baseline), conventional metonymy, novel metonymy, or a filler. These tasks were meant to test whether acceptable metonymic patterns transfer from the L1 to the L2; if a sentence was acceptable in the L1, it should be acceptable in the L2. The Bottleneck Hypothesis (Slabakova 2008) predicts that "universal meanings" - in this case, universal metonymic patterns - are ultimately accessible to L2 learners, though the patterns may be less accessible to intermediate proficiencies and would result in different judgments than native speakers would give.

Similar results for Slabakova et al. (2016) follow the 2013 study with individual results being highly variable even among the native speaker control group. English and Spanish native speakers patterned similarly and might instead have been the result of the test items again being not quite as culturally global as hoped. Slabakova et al. conclude that Korean speakers were more accepting of novel metonymy with a LOOSE ASSOCIATION pattern but less so for a PRODUCER FOR PRODUCT pattern. The fact that Spanish native speakers were less accepting of patterns where a novel metonymy was created might point to a problem with the test items, a point they had also acknowledged, claiming a lack of research data on conventional and novel metonymy in Spanish and Korean. The metonymies used in L1 Spanish and L1 Korean situations were translated from L1 English, albeit "into idiomatic, natural Spanish and Korean by native speakers of those languages." As with the 2013 experiment, these items are assuming a global culture with relatively equal salience between the metonymic vehicle and the target sense for native speakers of English, Spanish, and Korean. The L2 users found conventional metonymies as acceptable as baseline sentences, attributing this at least partly to learner input. Transfer was argued to

happen for INSTRUMENT FOR AGENT metonymy such that none of the L1 or L2 groups found this acceptable: e.g., ‘the workbench was sick today,’ where ‘workbench’ stands for ‘the person who is using or works at the workbench’. Slabakova et al. also argued that because the Spanish, advanced English-L2 judgments were the same as the English L1 (which were different from the Spanish L1), the advanced learners had acquired native patterning for their English. Again, there was a concern with sampling such that only 16 intermediate L2 English learners were available for evaluation, all of which were L1 Korean speakers. This may highlight another concern about creating metonymy categories that may be more convenient to researchers than are necessarily categories being accessed/processed by an interlocutor. If these categories are emergent artifacts of the culture or metacultures rather than cognitive processes flowing from analogous reasoning and association-making, then one would expect inconsistency between cultures or metacultures but consistency within cultures/metacultures rather than significant variations within those cultures/metacultures. If what’s happening is a cognitive process, the processing is as much emergent from the individual brain as it is emergent from the culture/metaculture.

### 2.3. English and Chinese Bare Nouns

Because the acceptability judgments for English-users of Chinese are likely to be influenced by L1 transfer of English bare nouns,<sup>30</sup> the following will briefly overview the work on Chinese bare nouns.

Bare nouns in Chinese denote either kinds or indefinite plurals rather than entities (Carlson 1977; Krifka 1995, 2003). Krifka (1995) argues for this by using the noun *xiong* (‘bear’), stating that it must have a classifier construction to reference an entity. Examples 7-11 below illustrate this, where in (7) “the bear” can only refer to a genus, in (8) “bears” can only refer to several indefinite samples of the genus, and in (9) “bears” can only refer to groups of indefinite samples of the genus. With the classifier construction, “bear” is able to single out entities, such as in (10) where it singles out three specific entities

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<sup>30</sup> Cf. Kobayashi & Rinnert (2008) and Rinnert, Kobayashi, & Katayama (2015) on transfer of discourse features in Japanese as a foreign language; Slabakova (2015) on transfer of syntax-discourse features in Spanish-English bilinguals.

from the genus and in (11) where it singles out three specific kinds of species of bear. (Krifka 1995: pp. 398-399)<sup>31</sup>

7. xiong jue zhong le.  
bear vanish kind ASP  
'the bear is extinct'
  
8. wo kanjian xiong le.  
I see bear ASP  
'I saw (some) bears.'
  
9. san qun xiong  
three herds bear  
'three herds of bears'
  
10. san zhi xiong  
three CL bear  
'three bears' (object)
  
11. san zhong xiong  
three CL bear  
'three bears' (species)

The only restriction on this is when the bare noun phrase is in the subject position. In such cases, a bare noun phrase can only have a kind denoting meaning, as in the contrasting examples below from Li & Thompson (1981: p. 86 & 129). The restriction requires a determiner to coerce the noun phrase from a phrase that denotes kinds to a phrase that denotes definite entities.

12. nei zhi gou wo yijing kan guo le  
that CL dog I already see PRT PRT  
That dog, I have already seen.
  
13. \*yi zhi gou wo yijing kan guo le  
one CL dog I already see PRT PRT  
A dog, I have already seen.
  
14. mao xihuan he niunai

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<sup>31</sup> See also Dölling (1992) and Gerstner-Link (1988)

cat like drink milk  
Cats (kind-denoting) like to drink milk (kind-denoting).

15. wo mai le shuiguo le  
I buy PRT fruit PRT  
I bought (the fruit/some fruit).

Because of this confound in the subject or topic position, the previous experiment and the present experiment avoid non-canonical subjects, focusing instead on non-canonical objects. As such, a post-verbal position should allow testing on whether contrasting determiner phrases and bare noun phrases influence the acceptability judgements of L2 users of Chinese.

In the previous experiment on native speakers, the results from the analysis of the experimental data showed that native speakers were unambiguous about whether or not they understood what was meant by the non-canonical constructions, both conventional and novel. The analysis also revealed that native speakers found sentences more acceptable when the concepts had at least a minimal context in which to interpret it. The present study will look at whether the same factors influence the acceptability judgments of L2 users of Chinese for the purposes of seeing whether non-native speakers are able to access the intended interpretations of noncanonical constructions. The specific questions addressed here are the following:

1. Are L2 learners of Mandarin sensitive to the same metonymic processes as native speakers?
2. To what degree can non-native speakers of Mandarin recover the intended interpretations for novel uses of non-canonical arguments in Mandarin?

### **3. Materials and Methods**

#### **3.1. Participants**

Surveys were distributed online to contacts primarily at a southwestern university in the United States, though others were solicited through contacts in other parts of the US. The survey in its entirety was distributed in English with the test sentences given in Mandarin. Consent limited respondents to 18

years of age and over, and consent was confirmed before proceeding to demographic data. 44 respondents gave consent and continued on to answer at least one question. Participants were asked two questions relating to languages spoken: (1) Do you speak any languages besides English at home? If so, which one(s), and (2) Do you regularly speak any languages besides English with your friends? If so, which language(s)? 27 participants responded to question (1) saying only English at home, 3 responded Cantonese, 2 each responded Mandarin, and one each responded Arabic, Spanish, Korean, and Vietnamese. Some did not answer at all. To question (2), 15 responded only English spoken regularly with friends, 15 responded Mandarin/Chinese, 2 responded Cantonese, 1 each for Korean, German, Japanese, Spanish, French, Italian, and Arabic. Some answered more than one language in each category; some did not answer at all.

### 3.2. Procedure:

Participants were shown 18 target sentences and asked whether the sentence is acceptable on a scale of 1-5. A English gloss of each lexical item was given so that learners with only one year of study could still participate; the gloss only included the literal meaning for target items. For example, in the item 做馆子 (*zuo guanzi* – intended meaning ‘work at/in the restaurant’), the verb was glossed as its most common meaning ‘to do’ and the noun was glossed as ‘restaurant,’ not as ‘at/in the restaurant’. Following the ranking of each item, participants were requested to provide their own paraphrase of the sentence. 18 filler items were interspersed among the target items and followed the same procedure – ranking and paraphrase; the filler items used canonical objects. Since the survey program (*Qualtrics*) did not have a way to randomize items without also randomizing the paraphrases for those items, the decision was made to distribute half of the surveys with the questions presented in reverse order. After all items had been ranked and paraphrased, the participant was then shown the non-canonical sentences along with an explanation of the intended meaning and then asked to rank acceptability again. For both the first and second rankings, the following scale was used:

1 = I don't understand this at all

- 2 = I understand this but I couldn't imagine my friends, family or myself saying this  
 3 = I understand this and I could imagine a friend or my family saying this  
 4 = I understand this and I've heard a friend or my family saying this, though I've never said it  
 5 = Interpretable and I've said this

In order to test the effect of context, half of the surveys provided a full sentence(s) in which to understand the sentences while half provided only the target sentence itself, as in (16) and (17) below. All participants received either a survey with contextual effects or one without.

- 16 爸爸问妈妈：“今年回家走什么路？开省道？”  
 baba wen mama: “jinnian hui jia zou shenme lu? kai shengdao?”  
 Father ask mother: “this year return home go what road? drive provincial road?”  
*Father asks mother: “What road are we going to drive home on this year? Are we driving on the provincial road?”*
- 妈妈说：“省道太慢了，开高速公路。”  
 mama shuo: “shengdao tai man le, kai gaosugonglu”  
 mother say: “provincial road too slow PRT, drive highway”  
*Mother says: “The provincial road is too slow. We will drive on a/the highway.”*

- 17 开高速公路  
 kai gaosugonglu  
 drive highway  
*Drive on a/the highway*

In order to test the contrast between conventional and non-conventional sentences, 6 sentences taken from the literature on non-canonical objects were used as conventional, and those sentences were manipulated in either the verb or in the noun phrase following the verb – but not both at the same time. (18) – (20) below illustrate the types of manipulations. All participants received all three variations of each sentence, for a total of 18 target items.

- 18 开高速公路  
 kai gaosugonglu  
 drive highway  
*drive on a/the highway*
- 19 自杀高速公路  
 zisha gaosugonglu  
 commit suicide highway  
*commit suicide on a/the highway*
- 20 开赛车场

kai saichechang  
drive racetrack  
*drive on a/the racetrack*

In order to ensure bare noun status would not interfere with acceptability judgments, half of the surveys presented with the noun phrase as a bare noun phrase while the other half were presented with a determiner phrase, respectively (21) and (22) below.

21 开高速公路  
kai gaosugonglu  
drive highway  
*drive on a/the highway*

22 开这条高速公路  
kai zhe tiao gaosugonglu  
drive this CL highway  
*drive on this highway*

#### 4. Analysis & Results

Because the survey completion rate was lower than could be used with a General Linear Model (57% completion, 44 started – 25 completed, 34 usable surveys with data), the data collected was treated as individual observations in a Generalized Linear Model. This completion rate was larger than for the native speakers (35%) but with a smaller number of usable surveys. Data was analyzed in two stages. The first stage analyzed the initial acceptability judgment as a 6-factor ANOVA, with Years-Studied (1, 2, 3, 4, 5+) context (with-context, without-context), NP/DP (bare NP, DP), ordering (forward, reverse) convention (conventional, verb-change, noun-change) and Object Type (instrumental, location) as fixed factors. The ordering factor was used to reduce the possibility of a learning effect; and since so many surveys were incomplete, the effects and interactions from that factor are uninterpretable and, therefore, will not be reported. Of the 34 usable surveys, 5 identified themselves as having 1 year of study in Chinese, 8 as 2 years, 11 as 3 years, 7 as 4 years, and 9 as 5 or more years of study.



#### 4.1. First Acceptability Judgment

For the first acceptability judgment, three of the five main effects were significant. Object Type was significant at  $\chi^2 = 20.166$ ,  $df = 1$ ,  $p < .001$ , Convention was significant at  $\chi^2 = 27.770$ ,  $df = 2$ ,  $p < .001$ , and Context was significant at  $\chi^2 = 27.117$ ,  $df = 1$ ,  $p < .001$ . Four two-way interactions were significant: Years Studied \* Context at  $\chi^2 = 46.46.676$ ,  $df = 4$ ,  $p < .001$ ; Years Studied \* NPDP at  $\chi^2 = 35.649$ ,  $df = 3$ ,  $p < .001$ ; and Object Type \* NPDP at  $\chi^2 = 8.416$ ,  $df = 1$ ,  $p < .005$ ; and Context\*NPDP at  $\chi^2 = 6.026$ ,  $df = 1$ ,  $p < .05$ . Two 3-way interactions were significant: Years Studied \* Object Type \* NPDP was significant at  $\chi^2 = 18.459$ ,  $df = 3$ ,  $p < .001$ , and Convention \* Context \* NPDP at  $\chi^2 = 8.298$ ,  $df = 2$ ,  $p < .05$ . And one 4-way interaction (Years Studied \* Object Type \* Context \* NPDP) was significant at  $\chi^2 = 9.688$ ,  $df = 3$ ,  $p < .05$ .

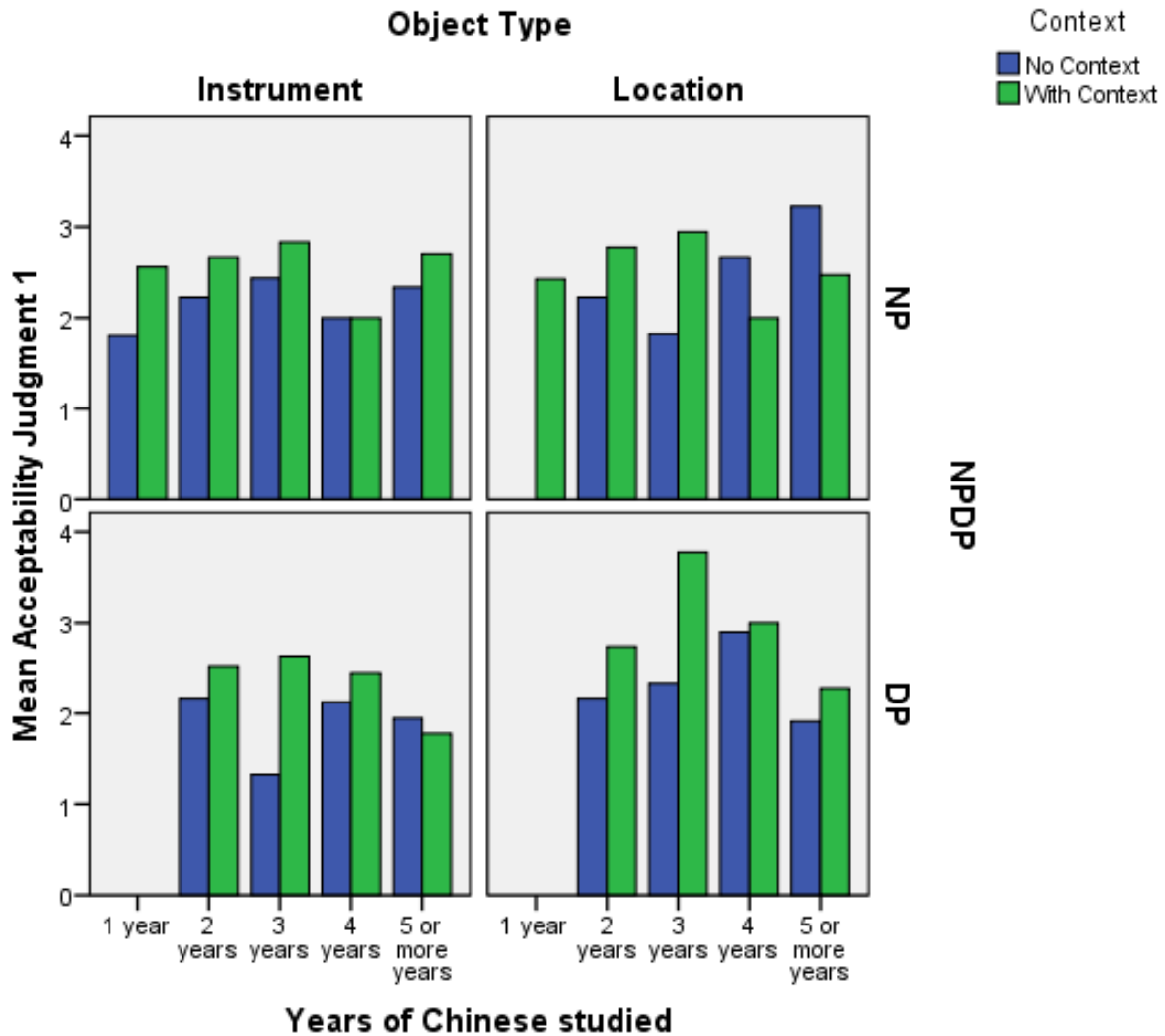


Figure 3: Judgment 1 Mean Acceptability by Years of Study, NPDP, Object Type, and Context

Since the interaction of Years Studied \* Object Type \* Context \* NPDP was significant, the data was collapsed across Convention and analyzed as a 4 factor ANOVA. The main effects of Object Type and Context were significant, respectively, at  $\chi^2 = 16.905$ ,  $df = 1$ ,  $p < .001$  and  $\chi^2 = 26.835$ ,  $df = 1$ ,  $p < .001$ . Four 2-way interactions were significant: Years-Studied \* Context at  $\chi^2 = 44.060$ ,  $df = 4$ ,  $p < .001$ , Years-Studied \* NPDP at  $\chi^2 = 15.451$ ,  $df = 3$ ,  $p < .005$ , Object Type \* NPDP at  $\chi^2 = 5.474$ ,  $df = 1$ ,  $p < .05$ , and Context \* NPDP at  $\chi^2 = 5.357$ ,  $df = 1$ ,  $p < .05$ . One 3-way interaction (Years-Studied\*Object Type \*NPDP)

was significant at  $\chi^2 = 15.005$ ,  $df = 3$ ,  $p < .005$ . And the four-way interaction was significant at  $\chi^2 = 8.359$ ,  $df = 3$ ,  $p < .05$ .

Since the four-way interaction of Years Studied \* Object Type \* Context \* NPDP was significant here also, the data was split at Object Type and analyzed as a three-way ANOVA at each condition of Object Type with Years-Studied, Context, and NPDP as fixed factors. At the “Instrument” condition of Object Type condition of “Instrument,” the main effects of Context and NPDP were significant, respectively, at  $\chi^2 = 17.234$ ,  $df = 1$ ,  $p < .001$  and  $\chi^2 = 6.900$ ,  $df = 1$ ,  $p < .01$ . The 2-way interaction of Years Studied \* NPDP was significant at  $\chi^2 = 12.623$ ,  $df = 3$ ,  $p < .01$ . The 3-way interaction of Years Studied \* Context \* NPDP was not significant. Since the 2-way interaction of Years Studied \* NPDP was significant the data was further split at Years Studied and analyzed as one-way ANOVAs at each condition of Years Studied with NPDP as the Fixed Factor. There was not enough 1<sup>st</sup> year data to analyze, so the simple effects of 1 year of study were inconclusive. Neither two, three, nor four years of study showed significant difference between NP and DP as a factor. However, the simple effects of five years of study showed significance at  $\chi^2 = 12.408$ ,  $df = 1$ ,  $p < .001$  where an NP elicited minor acceptability and a DP elicited no acceptability. The mean for NP was 2.58, and the mean for DP was 1.86. This is reflected in the fact that the paraphrases for the Instrument condition had more variety than the same for the Location condition.

At the “Location” condition of Object Type, the main effect of Context was significant at  $\chi^2 = 10.438$ ,  $df = 1$ ,  $p < .005$ . The other main effects were not significant. The three 2-way interactions were all significant: Years Studied \* Context at  $\chi^2 = 36.674$ ,  $df = 3$ ,  $p < .001$ ; Years Studied \* NPDP at  $\chi^2 = 32.481$ ,  $df = 3$ ,  $p < .001$ ; and Context \* NPDP at  $\chi^2 = 6.818$ ,  $df = 1$ ,  $p < .01$ . The three-way interaction was not significant at the “Location” condition of Object Type. Since the three 2-way interactions were significant, each were split and analyzed. Regarding the interaction of Years Studied \* Context, 2-factor ANOVAs were conducted at each condition of NPDP with Context and Years Studied as fixed factors. At the NP condition, neither of the main effects of Years Studied nor Context was significant, but the interaction

was significant at  $\chi^2 = 39.268$ ,  $df = 3$ ,  $p < .001$ . Since the interaction was significant, the simple effects of Context were analyzed at each condition of Years Studied as 1-way ANOVAs. The simple effects of Context at 1 year of study did not have enough valid cases to be analyzed. The simple effects of Context at 2 years of study was significant at  $\chi^2 = 4.891$ ,  $df = 1$ ,  $p < .05$  with context resulting in greater acceptability, though not above a judgment of 3; the mean for No-Context was 2.22 and the mean for context was 2.78. The simple effects of Context at 3 years of study was significant at  $\chi^2 = 25.239$ ,  $df = 1$ ,  $p < .001$  with context also resulting in greater acceptability, though again not above a judgment of 3; the mean for No-Context was 1.82 and for context 2.94. The simple effects of Context at 4 years of study was significant at  $\chi^2 = 4.500$ ,  $df = 1$ ,  $p < .05$  with No-Context resulting in a higher acceptability rating (mean = 2.67) than Context (mean = 2.00). And the simple effects of Context at 5 years of study was also significant at  $\chi^2 = 5.474$ ,  $df = 1$ ,  $p < .05$  with No-Context resulting in a higher acceptability rating (mean = 3.22) than context (mean = 2.47). These latter two results are rather curious since the theory being put forward would argue that context should make a sentence more acceptable; advanced stages of learning might encourage greater skepticism. This is curious also because native speakers had similar variety at the intersections of Instrument and Context/ No-Context. At the DP condition, both main effects of Context and Years Studied were significant, respectively, at  $\chi^2 = 15.940$ ,  $df = 1$ ,  $p < .001$  and  $\chi^2 = 26.065$ ,  $df = 3$ ,  $p < .001$ . The interaction of Context \* Years Studied was also significant at  $\chi^2 = 7.922$ ,  $df = 3$ ,  $p < .05$ . Since the interaction was significant, the simple effects of Context was analyzed at each condition of Years Studied as 1-way ANOVAs. The simple effects of Context at 1 year of study did not have enough valid cases to be analyzed. The simple effects of Context at two years of study were significant at  $\chi^2 = 6.890$ ,  $df = 1$ ,  $p < .01$  with context resulting in greater acceptability (mean = 2.73) than no-context (mean = 2.17). The simple effects of Context at three years of study was also significant at  $\chi^2 = 14.625$ ,  $df = 1$ ,  $p < .001$  with Context resulting in a much greater rate of acceptability (mean = 3.78) than no-context (mean = 2.33). The simple effects of Context at 4 years of study was not statistically significant, though it should be noted that both Context and No-Context resulted in a mean of 3.00 and 2.89 respectively. The simple effects of Context at five years of study was not significant, though the ranges should be noted, since the

No-Context condition shows rejection of the sentence and the Context condition shows slight acceptability: 1.99-2.56 (Context) and 1.66-2.16 (No-Context).

## 4.2. Second Acceptability Judgment

For the second acceptability judgment, four of the five main effects were significant: Years Studied at  $\chi^2 = 13.803$ ,  $df = 4$ ,  $p < .008$ ; Convention at  $\chi^2 = 6.854$ ,  $df = 2$ ,  $p < .05$ ; Context at  $\chi^2 = 20.757$ ,  $df = 1$ ,  $p < .001$ ; and NPDP at  $\chi^2 = 31.351$ ,  $df = 1$ ,  $p < .001$ . Four of the two-way effects were significant: Years Studied \* Object Type at  $\chi^2 = 11.884$ ,  $df = 4$ ,  $p < .05$ ; Years Studied \* Context at  $\chi^2 = 12.368$ ,  $df = 3$ ,  $p < .01$ ; Object Type \* Convention at  $\chi^2 = 6.762$ ,  $df = 2$ ,  $p < .05$ ; and Context \* NPDP at  $\chi^2 = 51.480$ ,  $df = 1$ ,  $p < .001$ . And one three-way interaction – Year Studied \* Context \* NPDP – was significant at  $\chi^2 = 18.749$ ,  $df = 3$ ,  $p < .001$ .

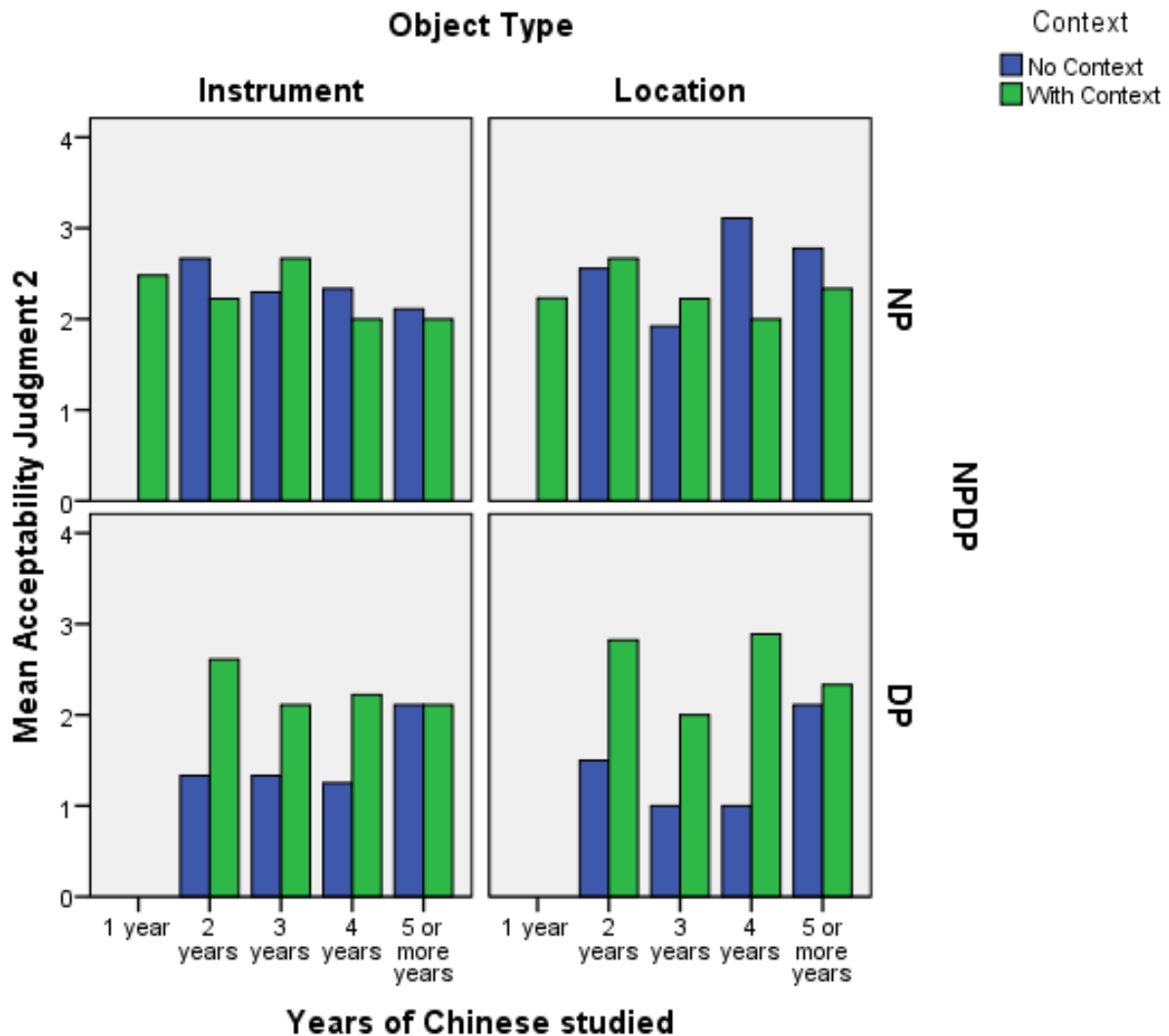


Figure 4: Judgment 2 Mean Acceptability by Years of Study, NPDP, Object Type, and Context

Since the three-way interaction of Years Studied \* Context \* NPDP was significant, the data was collapsed across Convention and Object Type and analyzed as a three-way ANOVA with Years Studied, Context, and NPDP as fixed factors. All three main effects were significant: Years Studied at  $\chi^2 = 12.050$ ,  $df = 4$ ,  $p < .05$ ; Context at  $\chi^2 = 17.898$ ,  $df = 1$ ,  $p < .001$ ; and NPDP at  $\chi^2 = 27.332$ ,  $df = 1$ ,  $p < .001$ . Two of the two-way interactions were significant: Years Studied \* Context at  $\chi^2 = 10.515$ ,  $df = 3$ ,  $p < .05$ , and Context \* NPDP at  $\chi^2 = 44.201$ ,  $df = 1$ ,  $p < .001$ . The three-way interaction was also significant at  $\chi^2 = 15.592$ ,  $df = 3$ ,  $p < .005$ .

Since the three-way interaction was significant here as well, the data was split and two two-way ANOVAs were conducted at each condition of NPDP with Years Studied and Context as fixed factors. At the NP condition, neither of the main effects were significant, but the interaction was:  $\chi^2 = 11.556$ ,  $df = 3$ ,  $p < .01$ . The figure 2 above shows the responses bouncing around between the different years of study; what exactly is happening here at the NP condition is uncertain. Native speakers were much more accepting of the sentences overall than the non-native speakers were; NP and DP did not show as large of a difference in the second acceptability judgment as the non-native speakers here. At the DP condition for non-native speakers, both main effects were significant: Years Studied at  $\chi^2 = 13.013$ ,  $df = 3$ ,  $p < .01$ , and Context at  $\chi^2 = 63.474$ ,  $df = 1$ ,  $p < .001$ . The interaction was also significant at  $\chi^2 = 21.315$ ,  $df = 3$ ,  $p < .001$ . Since the interaction was significant, Context was analyzed at each condition of Years Studied as a one-way ANOVA. One year of study did not have enough cases to be analyzed. Two years of study was significant at  $\chi^2 = 59.109$ ,  $df = 1$ ,  $p < .001$  with context resulting in much greater acceptability (mean = 2.71) than no-context (mean = 1.42). Three years of study was also significant at  $\chi^2 = 49.090$ ,  $df = 1$ ,  $p < .001$  with context (mean = 2.06) resulting in greater ability to interpret than No-Context (mean = 1.13), though even then unacceptable. Four years of study was also significant at  $\chi^2 = 11.671$ ,  $df = 1$ ,  $p < .005$  with context (mean = 2.56) resulting in much greater acceptability than no-context (mean = 1.12). Five years of study was not statistically significant; the mean for context was 2.22 and for No-Context was 2.11.

The three-way interaction of Years Studied \* Context \* NPDP was also split and analyzed as two 2-way ANOVAs at each condition of Context with Years Studied and NPDP as fixed factors. At the condition of “no-context”, both main effects were significant: Years Studied at  $\chi^2 = 14.977$ ,  $df = 3$ ,  $p < .005$  and NPDP at  $\chi^2 = 71.190$ ,  $df = 1$ ,  $p < .001$ . The interaction was also significant at  $\chi^2 = 12.624$ ,  $df = 3$ ,  $p < .01$ . The simple effects of NPDP was analyzed at each condition of Years of Study: The first year of study did not have enough data to analyze; two years of study was significant at  $\chi^2 = 61.519$ ,  $df = 1$ ,  $p < .001$  with NP (mean = 2.61) having greater acceptability than DP (mean = 1.42); three years of study

was also significant at  $\chi^2 = 15.339$ ,  $df = 1$ ,  $p < .001$  with NP (mean = 2.12) being more interpretable than DP (mean = 1.13), though neither of them being particularly acceptable; four years of study was also significant at  $\chi^2 = 36.857$ ,  $df = 1$ ,  $p < .001$  with NP (mean = 2.72) being more acceptable than DP (mean = 1.12) which was barely interpretable; and five years of study was not significant, though it should be noted that the mean for NP was 2.44 and DP was 2.11, both above the interpretability threshold. At the condition of Context, neither the main effects nor the interaction of Years Studied and NPDP were significant.

### 4.3. Qualitative responses

Instrument condition item 1 – conventional (*qie caidao* – ‘cut vegetable knife’) – had 16 responses for the bare noun condition, 9 of which did not match the target response (‘use a vegetable knife to cut’). 8 of those 9 interpreted the construction as a noun phrase instead of a verb phrase: “vegetable-cutting knife” or a similar instantiation. Only one of those 9 was interpreted as a verb phrase: “cut up the vegetables”. The determiner condition had 10 responses, all of which used verb phrases or full sentences. 3 of these were misinterpretations<sup>32</sup> where either “knife” was the direct object, as in “cut this vegetable knife,” or was omitted, as in “I cut the vegetable.”

Instrument condition item 1 – noun change (*qie chazi* – ‘cut fork’) – had 19 responses for the bare noun condition, 11 of which did not match the target response. 1 of those that did not match the target response omitted “cut” and simply responded with “use your fork.” All but 4 of the responses interpreted the stimuli as a verb phrase or a sentence. The other four participants interpreted it as a noun phrase, trying various constructions to make it work. Some of these were literal, as in “cutting fork” and “a fork meant for cutting,” while the others tried figurative interpretations, like “bite sized” and “a sharp fork.” The determiner condition had only 4 responses, all of which interpreted the sentence as verb phrases or

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<sup>32</sup> The term “misinterpretation” is used here for lack of a better term. The intent behind the term “misinterpretation” is solely that the response did not match the intended target meaning/response, not that the participant should have somehow known what the target meaning/response should have been.



sentences. The two responses that were different from the target response interpreted “fork” as a theme: “cut this/the fork”.

Instrument condition item 1 – verb change (*ge dao* – ‘cut knife’) – had 16 responses for the bare noun condition, 10 of which did not match the target response. 7 were misinterpreted as noun phrases and 3 as verb phrases. Two of the verb phrase misinterpretations omitted “knife” from the paraphrase; of the noun phrase creations, one simply responded “knife” without any further elaborations, but two others interpreted it as a “chopping knife”, two interpreted it as a “cutting knife”, and the other two extended the sense of ‘cut/chop’ to a ‘sharp’ in “sharp knife.” The final misinterpretation simply responded “strength”. Where this latter interpretation arose from is unclear. The determiner condition had 10 responses, all of which were verb phrases or sentences. 4 responses did not match the target. One of the misinterpretations might have been a typo – “not with this knife.” The other 3 misinterpretations took “the/this knife” as a literal theme.

Instrument condition item 2 – conventional (*kan wangyuanjing* – ‘look telescope’) – had 17 responses for the bare noun condition, all but 2 of which interpreted the stimulus as a verb phrase or sentence. The other two interpreted it as a noun phrase. 3 of the 17 were precise paraphrases; 8 interpreted “telescope” as a tool, using “through the telescope” instead of “with a telescope” or “using a telescope.” 6 interpreted “telescope” in some other manner: 3 of the 6 interpreted it as a theme – “look at/into the telescope”; 1 reinterpreted the term “telescope” as “the observatory”, though still interpreting it as a theme – “see the observatory.” The two that interpreted it as noun phrases used “telescope” as the head noun: “stargazing telescope” and “a telescope for stargazing”. The determiner condition had 10 responses, all of which were verb phrases or sentences. Only 1 was a precise paraphrase. Three other paraphrases interpreted “this telescope” as a tool – “through this telescope.” 1 paraphrase indicated that the stimulus probably means for “this telescope” to be a tool, but that participant wrote the item means “the stars look at the telescope.” 5 misinterpreted “this telescope” as a theme: “look at this telescope” or “see this telescope.”

Instrument condition item 2 – noun change (*kan yanjing* – ‘look glasses’) – had 15 responses for the bare noun condition. 7 responses did not match the target stimulus, and all but 4 of the 15 responses interpreted the stimulus as a verb phrase or sentence. The 3 noun phrase responses were a variation of “newspaper reading glasses.” Among the misinterpreted verb phrases, one interpreted “newspaper” as a location and “glasses” as the theme (“look at the glasses in the newspaper”); another interpreted “newspaper” as an agent (“the newspaper is looking at you”); and the final noun phrase interpreted the stimulus metaphorically: “need eyeglasses to see the paper.” The determiner condition had 10 responses, all of which were verb phrases or sentences. 1 used “through the glasses” instead of “with glasses” or “using glasses,” though the context is uncertain whether this is an instrument or an incidental theme: “you can see through the newspaper through your glasses.” 2 responses clearly did not match the intended target meaning, both using “at” to indicate theme intention: “look at the glasses”.

Instrument condition item 2 – verb change (*jiancha wangyuanjing* – ‘observe telescope’) – had 16 responses. All but 2 were verb phrases or sentences. 5 were precise paraphrases and 5 were close paraphrases that used “through the telescope” instead of “with” or “using.” There were 6 responses that missed the target meaning. Two of the misinterpretations were noun phrases where telescope was the root noun: “stargazing telescope” and “a telescope meant for watching stars.” The other 4 misinterpretations included 3 that used “telescope” as a theme (“watch the telescope”), though one changed the meaning of “telescope” to “observatory” and the other changed the verb “watch” to “take care”: “take care of the telescope”. The other misinterpretation used “telescope” as a location: “the stars are in the telescope.” The determiner condition had 10 responses, all but 1 of which were verb phrases or sentences. 6 were precise paraphrases, and 1 was close paraphrase: “though the telescope.” 3 were misinterpretations. 2 of the misinterpretations used “telescope” as a theme. The last misinterpretation used a gerund/participle and omitted “telescope” entirely: “stargazing.”

Instrument condition item 3 – conventional (*xi lengshui* – ‘wash cold water’) – had 16 responses; all but 1 used verb phrases or sentences. 11 were precise paraphrases and 3 were close paraphrases, as in

“wash in cold water.” 2 did not match the target response; 1 was likely a typo: “wish using cold water.” The other misinterpretation was a close to the meaning, though it interpreted the stimulus as a noun phrase rather than a verb phrase: “cold water wash.” The determiner phrase condition had 10 responses; all but 1 used verb phrases or sentences; 6 were precise paraphrases; 2 were close verb paraphrases: “wash in three buckets of cold water” and “wash three times in cold water.” 1 paraphrase was a close noun paraphrase: “three buckets of cold water to wash.” The one clear misinterpretation used “three buckets of water” as a theme.

Instrument condition item 3 – noun change (*xi feizao* – ‘wash soap’) – had 16 responses; 8 were precise paraphrases; 8 were misinterpretations. 4 of the misinterpretations were clearly verb phrases and used “soap” as a theme – “wash the soap.” 1 of the misinterpretations was a noun phrase with “soap” as the root noun – “soap meant for washing.” The other 3 responses were ambiguous as to whether they were verb phrases or noun phrases, but they all used “soap” as a theme – “washing soap” or “wash soap.” The determiner phrase condition had 7 responses. All were interpreted as verb phrases. 3 of the responses were misinterpretations using “soap” as a theme.

Instrument condition item 3 – verb change (*pao shui* – ‘steep water’) – had 16 responses; all but three were verb phrases. Two of the noun phrases were close interpretations: “that medicine soaking in water,” but they used “water” as a location rather than an instrument. This is interesting in light of our current discussion and would suggest that the speakers are making the metonymic jump from ‘water’ to ‘in water’ rather than ‘using/with water,’ though there may be a need to reinvestigate the native speaker interpretations for whether they interpret this as a location or as an instrument. 6 of the 16 did not match the target response. 5 of those 6 implied location or instrument by the verb “steep” or “soak,” as in “that steeped Chinese medicine,” but this may be irrelevant if the interlocutor is not processing either meaning and is simply collapsing the sense of “water” into the verb itself. The determiner phrase condition had 8 responses. All were verb phrases, and only 1 was a partial misinterpretation with the same problems as

the bare noun condition for the verb change: “water” was omitted from the paraphrase, presumably conflated into “steep.”

Location condition item 1 – conventional (*shui huochezhan* – ‘sleep train station’) – had 15 responses, all of which were verb phrases. Only one exception to these substituted ‘train’ for ‘train station.’ This mistake can probably be ignored since ‘train’ was still interpreted as a location. The determiner phrase condition had 9 responses, all of which were also verb phrases, though in many cases “this” was substituted by “the.”

Location condition item 1 – noun change (*shui yiyuan* – ‘sleep hospital’) – had 15 responses, all of which were verb phrases. There were no responses that differed from the target meaning. The determiner phrase condition had 10 responses, all of which were also verb phrases. All were precise or close paraphrases of the target meaning. This set of conditions and the conventional version of the same were one of the few that had no significant misunderstandings.

Location condition item 1 – verb change (*deng huochezhan* – ‘wait train station’) – had 15 responses, all of which were verb phrases. Similar to the conventional condition for the same item, the one misinterpretation was where ‘train’ was substituted for ‘train station,’ resulting in “wait for the next train” instead of “wait at/in the train station.” The determiner phrase condition had 10 responses; all were verb phrases. Two misinterpretations both interpreted ‘train station’ as ‘train’ – “wait for the train.” It may be that in this condition a further metonymic stretch was used to create a theme rather than to coerce a location out of ‘train station.’

Location condition item 2 – conventional (*chi guanzi* – ‘eat restaurant’) – had 15 responses; only one wasn’t interpreted as a verb phrase, but the noun phrase that was created gives the same location meaning rather than a theme meaning: “a restaurant meant for eating.” The determiner phrase condition had 10 responses, all of which were verb phrases. This condition had two paraphrases that did not match

the target response: the first was a literal interpretation with the restaurant as a theme “eat the restaurant;” and the second was a question: “where do you want to eat.” This latter still preserves a location meaning.

Location condition item 2 – noun change (*chi bangongshi* – ‘eat office’) – had 14 responses, all of which were verb phrases. 10 were precise interpretations, and 2 misinterpreted “office” as a theme. The other 2 tried to interpret the stimulus figuratively: “do grueling and stressful work in an office” and “let’s eat as a company”. The former still identifies ‘office’ as a location. The determiner phrase condition had 8 responses, all but one of which was a verb phrase. 6 were precise interpretations; 1 misinterpretation put “office” as a theme and the other misinterpretation tried to extend the meaning to refer to a specific meal – “lunch break at work” – though ‘office’ here is still a location.

Location condition item 2 – verb change (*zuo guanzi* – ‘work restaurant’) – had 12 responses; all except 1 was clearly a verb phrase. The one exception simply paraphrased the stimulus as “work.” Only 4 of 12 were precise paraphrases; 7 of the misinterpretations interpreted it as “operating” or “running” a restaurant, where restaurant is still the theme rather than a location. The determiner phrase condition had 10 responses. 9 of the responses identified the stimulus as a verb phrase or sentence. Only 2 of 10 were inaccurate; one of the inaccuracies simply said the stimulus was “incomprehensible;” the other interpreted the stimulus as “do this major.” Since there was a gloss for each test item, it’s possible that the participant was interpreting “restaurant” as a field of study, hence theme, rather than a location.

Location condition item 3 – conventional (*kai gaosugonglu* – ‘drive highway’) – had 14 responses. One of 14 interpreted this as “take the freeway” rather than paraphrasing it as a location. The determiner phrase condition had 10 responses. 2 of 10 interpreted this as “take the/this highway” rather than paraphrasing it using a preposition indicating location. It’s possible that these two participants were imagining a metonymic interpretation, but that would need to be determined through further questioning.

Location condition item 3 – noun change (*kai saichechang* – ‘drive racetrack’) – had 14 responses, 12 of which were precise paraphrases. 2 of the 14 interpreted the stimulus as “to drive really

fast” and “to kill the fear of traffic accident.” 6 interpreted it as an end point location on a path “take someone to the racetrack,” though this still seems to be a location. The other 6 interpreted it as a location “on the racetrack”. The determiner condition had 10 responses, all of which interpreted the test item as a verb phrase and identified it as a location, though 5 interpreted it as an end point location on a path “take someone to the racetrack” and 5 interpreted it as a location “on the racetrack.”

Location condition item 3 – verb change (*zisha gaosugonglu* – ‘commit-suicide highway’) – had 11 responses. Of the 11, 4 were inaccurate, with 3 trying to create a noun phrase out of it. The other misinterpretation stretched the meaning to create “Driving too fast is suicidal.” The determiner condition had 10 responses, 5 of which differed from the target meaning. One of those five interpreted it as a noun phrase “This Suicide Highway,” stating that this is very unclear and not native quality. Another interpreted it as a figure of speech: “driving way too fast.” Another interpreted it as “to kill yourself by crossing the highway.” The final two interpreted it as “this highway is suicide.”

#### 4.3.1. Discussion of Qualitative responses

The way the test items were presented to the participants likely biased them in favor of paraphrasing as a verb phrase or as a full sentence; this may be because the distractor items were full sentences themselves. This may have unduly encouraged participants to look at the direct object NP/DP as a complement in a VP rather than to look at the V/VP as a complement for a stand-alone NP/DP where the originally-intended object instead functions as the head of the NP/DP. For example, instead of interpreting 自杀高速公路 (*zisha gaosugonglu* – “commit-suicide highway”) as  $[[commit\ suicide]_{ADJP}\ highway]_{NP}$ , they may have been primed to interpret it as  $[commit\ suicide\ [highway]_{NP}]_{VP}$ . Unlike the native speaker data where there were no conditions in which interpretable sentences differed from the intended meaning, there were fewer non-native qualitative responses that matched the exact intended meaning in such a way as to show that the participant was overtly perceiving an instrument or location interpretation. That being said, the Location conditions comprised the majority of conditions in which the whole set of responses were matching interpretations. This would seem to suggest that location arguments

are more salient than instrument arguments for this set of participants. Also, for all of the items that had a complete set of matching responses, the DP condition was always a complete set of matching responses; there were no items where the NP condition had a complete set of matching responses without also having a complete set of matching responses for the DP condition – for example, 吃馆子 (*chi guanzi* – “eat restaurant”) with context had a complete set of matching responses for both the NP and DP condition, but 吃办公室 (*chi bangongshi* – “eat office”) with context had a complete set of matching responses for only the DP condition. The qualitative data that were no different from the target meaning are listed below. Note that no “instrument” arguments were without misinterpretations.

Some of the sentences that included bare noun phrases resulted in attempts to interpret the whole sentence as a noun phrase instead of as a verb phrase. For example, the sentence 切菜刀 (*qie caidao* – cut vegetable knife), which was supposed to receive the reading “cut using a/the vegetable knife,” was interpreted in some cases as “vegetable knife for cutting” or “vegetable-cutting knife.” Or in the case of 自杀高速公路 (*zisha gaosugonglu* – commit-suicide highway) which had the intended meaning of “commit suicide on the highway,” one interpretation attempted to create the noun phrase “a scary highway.” Because the determiner in the DPs was between the verb and the NP it heads, it was perhaps not surprising that determiner phrases resulted in nearly no interpretation of determiner/noun phrases; the one exception was for 自杀这条高速公路 (*zisha zhe tiao gaosugonglu* – commit-suicide this CL highway) without context where it was interpreted as “this suicide highway.” There was, however, an acknowledgement from that participant that this phrase was “very strange and not native quality,” so this interpretation can be discarded. Of the 36 sentences that included noun phrases (72 target sentences total), 20 had no attempts to interpret the sentence as an NP/DP, 7 had 1 attempt, 5 had 2 attempts, 2 had 3, and 2 had 5. The latter two are interesting because they were both sentences involving the noun ‘knife’; when the noun was changed from ‘knife’ to ‘fork’, there were fewer noun phrases created compared to verb phrases (2 of 4 responses with fork compared to 5 of 6 and 5 of 7 with knife, conventional verb and altered verb respectively).

Most of the attempts to interpret differently from the intended meaning were given when no context was a factor. There were 5 exceptions when context was present: the conventional 切菜刀 (*qie caidao* – cut vegetable-knife, intended “cut using a/the vegetable knife”) had three out of ten responses that tried to create a noun phrase out of the entire sentence – e.g., “veggie-cutting knife”; 切叉子 (*qie chazi* – cut fork, intended “cut using a/the fork”) had one attempt – “cutting fork”; 洗肥皂 (*xi feizao* – wash soap, intended “wash using soap”) had one attempt – “washing soap”; 割刀 (*ge dao* – cut knife, intended “cut using a/the knife”) had one attempt – “cutting knife”; and 看眼镜 (*kan yanjing* – look/read glasses, intended “look/read using glasses”) had one attempt – “reading glasses”. However, all of these items that had only one attempt to interpret the whole sentence as an NP/DP were by the same participant; this participant claimed to have had at least 3 years of Chinese study, so it would be a reasonable assumption that the response cannot be attributed to insufficient exposure to Chinese syntax and lexical composition. Excluding that participant’s responses, the only sentence that seemed to evoke an NP/DP interpretation from more than one participant even in a context was 切菜刀 (*qie caidao* – cut vegetable-knife). The interpretation can be attributed to constituency divisions as a confounding factor. It’s perhaps easier in this item to see [[切菜]<sub>ADJP</sub> 刀]<sub>NP</sub> ([[*qie cai*]<sub>ADJP</sub> *dao*]<sub>NP</sub> – [[cut vegetable]<sub>ADJP</sub> knife]<sub>NP</sub>) as the intended constituent division rather than the intended [切[菜刀]<sub>NP</sub>]<sub>VP</sub> ([*qie*[*caidao*]<sub>NP</sub>]<sub>VP</sub> – [cut[vegetable knife]<sub>NP</sub>]<sub>VP</sub>). None of the other items seem to have this as a confound.

## 5. Conclusions and Limitations

### 5.1. Comparing Native and Non-Native Speakers

The first question asked whether L2 learners of Mandarin are sensitive to the same metonymic processes as native speakers. Native speakers were more accepting of the test items in all conditions except where the verb was changed. If the saliency of the verb-object relationships were similar for non-native speakers as for native speakers, similar patterning would be expected to emerge and would support



the idea that both native and non-native speakers are noticing the same conceptual relationships. Having similar relationships activated for these verb-object pairings would also support the methodology in Slabakova et al. (2013 & 2016) where the stimuli used for the experiment was proposed to be a part of global culture. How much to attribute saliency through sharing a global culture or through universal metonymic processing cannot be teased apart in the present study. Since data was not taken from non-native speakers on saliency, conclusions would be difficult to draw about whether the similar patterning is a result of salience through shared culture, universal metonymic processing itself, or both.

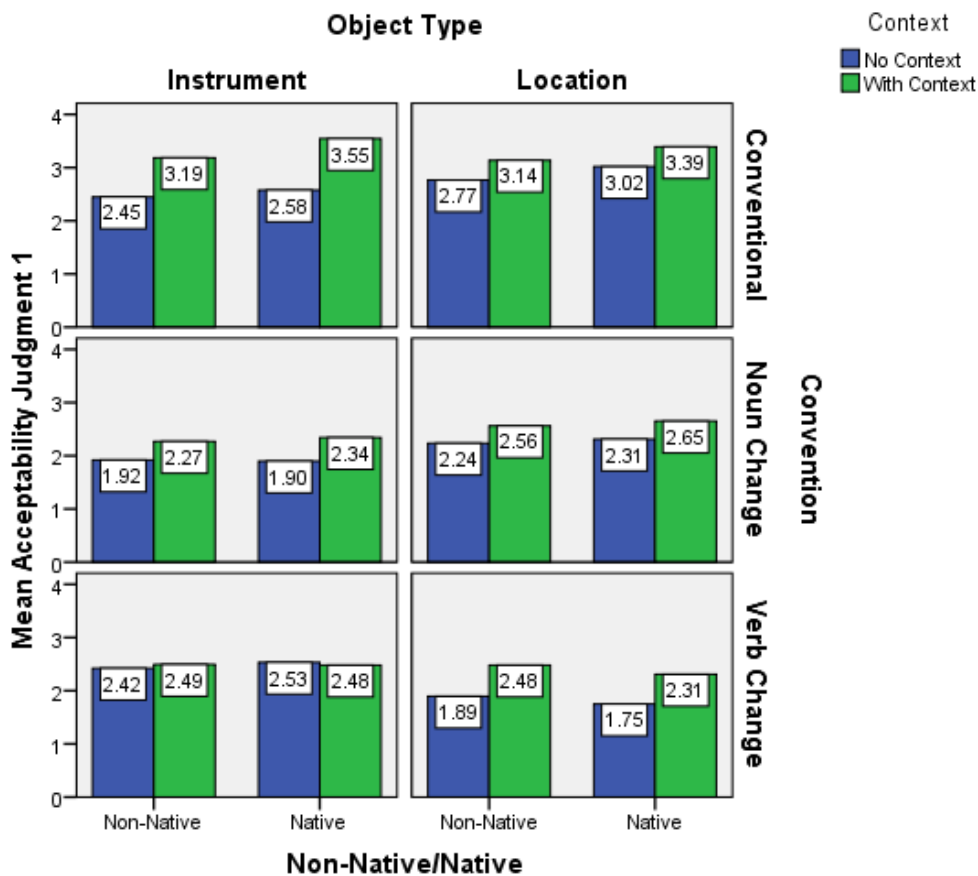


Figure 5: Comparison Native/Non-Native Mean Acceptabilities

The second question asked to what degree non-native speakers of Mandarin can recover the intended interpretations for novel uses of non-canonical arguments in Mandarin. It was hypothesized that

there would be more variety in answers based on Lauro & Schwartz (2017), and the qualitative responses showed that – unlike native-speaker responses – some conditions resulted in greater variety than others. For the Instrument condition, half of the responses were frequently different from the intended paraphrase, sometimes more than half. This stands in contrast to the Location condition where at most a quarter of the responses were different. The discrepancy between Location and Instrument might be attributable to location qualia being more salient in a non-canonical construction than teleological qualia are.

Non-native speakers also patterned similar to native speakers in acceptability rankings when considering contextual assistance and changes from the conventional sentence (see Figure 3). Context in general resulted in increased acceptability for both native and non-native speakers, the exception being the verb change under the Instrument condition. The verb change condition for both Instrument and Location is the only condition in which native speakers did not judge the test items as more acceptable than the non-native speakers did. Considering the results with children in Rabagliati et al. (2010), it may be that the participants in the present study are attempting to process the constructions like an adult user of the language rather than in the way a language learner in the pre-critical period would. However, evidence in the non-native responses show that participants were stretching for the best possible meaning in the limited context they had.

Non-native speaker responses had greater variety than native speaker responses. In none of the sets of the Instrument conditions did all participants accurately guess the intended meaning. However, in three sets of the Location conditions, all participants were accurate. Only in the case of ‘drive on the highway’ did the determiner ‘this’ result in the same accuracy:

(1) *shui huochezhan* (intended: ‘sleep in/at a/the train station’)

(2) *shui yiyuan* (intended: ‘sleep in/at a/the hospital’)

(3) *kai gaosugonglu* (intended: ‘drive on a/the highway’)

(4) *kai zhe tiao gaosugonglu* (intended: ‘drive on this highway’) The intended meaning in the Location conditions were more consistently recovered than those in the Instrument conditions, and especially without a determiner.

Robenalt & Goldberg (2016) suggested that non-native speakers ignore frequency in judging novel sentences, regardless of whether there is a competing alternative construction. It may be true that non-native speakers are ignoring frequency effects for individual Mandarin verbs, but the comparative results for acceptability showed similar patterning across the conditions. That is, if non-native speakers are ignoring the frequency of individual verbs, that isn’t showing up as random contrast to native speaker judgments. The small number of participants in the present study and the range of their Mandarin skills makes a closer comparison questionable. Future experiments will have to address how frequency affects acceptability with these constructions and conditions for non-native speakers.

## Chapter 5: Conclusion

### 1. Review of Chapters

#### 1.1. Chapter 1: An Argument on the Interaction of Metonymy and Non-Canonical Objects

The first chapter of this dissertation overviewed the approaches different researchers have taken towards the issues surrounding sentences and sentences that make use of non-canonical arguments, especially as they concern metonymic explanations. It began with a questionably felicitous *chi kuaizi* (“eat chopsticks”) and contrasted that with the infelicitous *\*chi chazi* (“eat fork”), the first of which occurs in Li (2014), though others have looked at this phenomenon in Mandarin as well (see Lin, 2010, 2014; Lin & Liu, 2004; Lin, 2001, C.-T. James Huang, Li, & Li, 2009, Li, 2014, Tai, 2013; Tai, 2008, Tao, 2000, and Barrie & Li, 2012).

I proposed that, even though light verb structure (Hale & Keyser, 1993; T. H. J. Lin, 2001) provides a systematic explanation for the underlying structure of non-canonical arguments in Mandarin, light verb structure does not provide a mechanism to constrain productivity. In other words, light verb structure on its own would produce *\*chi chazi* (“eat fork”) without being able to explain its unacceptability. I proposed that a semantic/pragmatic account of the phenomenon (Tai 2008 & 2013; Jackendoff 1992) could be integrated with the syntactic account to constrain overproduction through type-shifting polysemy – in this case, metonymy at the qualia level.

I explained metonymy as the activating of multiple-related senses within the same conceptual domain via a single lexical vehicle (Benczes, 2011; Ibáñez, 1999; K. Panther, 2005; Radden & Kovecses, 1999; Ruiz De Mendoza Ibáñez & Hernández, 2001); for example as it relates to *chi kuaizi* (“eat chopsticks”), the formal and telic quale of “chopsticks” are activated – “chopsticks as a kind of entity in the world that can be acted upon” and “chopsticks as a tool used for eating food” respectively (see

Pustejovsky, 2013 and Pustejovsky & Boguraev 1993 on qualia and type-coersion). I noted that knowledge relationships in the Lexical Conceptual Paradigm, put forward by Pustejovsky & Boguraev (1993), are explainable by metonymic relationships with the exception of count/mass alternations. I pointed to other research that shows these metonymic relationships are not limited to the lexical level and that they can be seen on discursual, semantic, syntactic, phonological and conceptual levels (see Bierwiazzonek, 2013b).

I further drew attention to Kiparsky's Canonical Use Constraint (1997) which stipulates encyclopedic knowledge as integral in constraining productivity in denominal verbs, in which non-canonical arguments occur for English. This coincides with the fact that, for a given discourse community, shared knowledge creates but also constrains emergent rules on what a given lexical item or phrase might mean in a particular context. The associations available to the individual through their various speech communities and their individual experiences work to constrain productivity. Context further constrains what senses are salient at any given time, with multiple senses often active simultaneously (Blasko & Connine, 1993; Heredia & Muñoz, 2015).

I then argued that context and world knowledge are necessary to make the metonymic relationship salient to the purpose of selecting the intended non-canonical interpretation. I reviewed the argument in Bergler (2013) who applies qualia to lexical metonymy. Her analysis points to the necessity of an extended sense to be salient before a metonymic interpretation can be available and that this saliency can be triggered by linguistic cues or extra-linguistic cues. I refined this point by overviewing other studies that claim both literal and figurative senses must have been made salient in order to be activated, and that if the "literal" sense isn't salient in a context, it might not be triggered (e.g., Blasko & Connine, 1993; Giora, 1997, 2002, 2003; Giora et al., 2012; Heredia & Muñoz, 2015). It was also argued that shifting, rather than direct access, happens when the most salient interpretation fails and the interlocutor must search for a meaning within other conceptual associations.

I claimed that this not just the case for lexical metonymy but also for non-canonical arguments. If the formal quale of “chopstick” fails to produce an acceptable interpretation in the context, it shifts through metonymy to a telic quale. If the telic quale is not salient enough in the context to be accessed, the interpretation will fail wholesale in this situation. In some cases, both the formal and telic quale may be activated at the same time. The features salient in the context (linguistic and extra-linguistic) determine whether the argument will be interpreted as a location, instrument, time, reason, or other thematic relationship. Several of these senses may be active at the same time.

I finished the first chapter by appealing to Sperber & Wilson’s Relevance Theory (Clark, 2013; Sperber & Wilson, 2002; Wilson, 2010; Wilson & Sperber, 2005) in order to claim that the degree of saliency will also influence how acceptable a sentence will be. This final appeal leads into the experiments of the second and third article.

## **1.2. Chapter 2: Mandarin native speaker acceptability of non-canonical arguments**

The second article reviewed the literature that is immediately relevant to metonymy and non-canonical arguments in Mandarin, including the definition of non-canonical arguments and the light-verb and semantic/pragmatic approaches to Mandarin non-canonical arguments. The literature review also included a synopsis of studies that highlight the dependent relationship of metonymy on context. Experiments have shown faster processing for familiar associations made salient through context and for conventional metonymies that the discourse community has used consistently (e.g., Frisson & Pickering, 2007; Lauro & Schwartz, 2017). Other literature emphasized the constraints context places on metonymy in Chinese (e.g., Jiang & He, 2010). Chinese nouns as kind-denoting (Krifka, 1995, 2003) was also reviewed alongside mass and count distinctions (Chierchia, 1998a, 1998b, 1998c). Finally, the Graded Salience Hypothesis (Giora, 1997) was reviewed, which claims that all salient meanings in any given context are initially activated and processed regardless of whether they are figurative or literal.

The experiment in article 2 was concerned with the following three questions:

1. To what degree can native speakers of Mandarin recover the intended interpretations for novel uses of non-canonical arguments?
2. How acceptable or unacceptable do they view both conventional and novel uses?
3. To what degree do judgments relate to the saliency of associations between the target and the source in the metonymy?

Based on the literature, it was hypothesized that (1) participants who had richer context would find the sentence at least somewhat acceptable and would be able to recover the intended meaning, (2) participants who had no context would find it less acceptable, but may still have been able to recover the intended meaning, (3) participants who had richer context but had never heard the sentence before would find the sentence at least a little acceptable after being told the intended meaning, and (4) that participants who had no context and had never heard the sentence before would not find it acceptable at all and would not be able to interpret it.

The experiment gauging saliency used the program *PsychoPy* to measure processing times in native Mandarin speakers for the paraphrased test items. The assumption underlying this test was that the concepts which have closer associations would be processed faster, resulting in faster response times. Each test item was then ranked by response time to be used as correlation data in the main experiment. The main experiment asked participants to provide acceptability judgments on a scale of 1-5, 1 being “I don’t understand this at all” and 5 being “I’ve said this.” Along with the acceptability judgments, participants were asked to paraphrase the test item. Once the test items were judged and paraphrased, participants were shown the 18 test items again along with the intended interpretation; they were then asked to give a final acceptability judgment with this additional information. The factors being tested in this experiment were Context vs. No-Context, Bare Noun Phrase vs. Determiner Phrase, Conventional vs. Verb-Change vs. Noun-Change, and Instrument vs. Location argument.

The results of the experiment found that Context resulted in higher acceptability ratings on the first judgment except in one situation: a change in the verb for the instrument condition. It also found that the Location condition was more acceptable as a non-canonical argument than the Instrument condition. The Conventional items were significantly more acceptable than those with changes in either the noun or verb. For the Instrument condition, bare noun phrases resulted in lower acceptability, but for the Location condition, the result was the higher acceptability. Why this result occurred is unclear and wasn't predicted by the reviewed literature.

The second judgment found the same result for Context where Context resulted in higher acceptability rankings. The Conventional sentences for the Instrument condition did not show a difference in acceptability between bare Noun Phrases and Determiner Phrases, but both the Noun- and Verb-change conditions showed the bare Noun Phrase condition to be more acceptable than the Determiner Phrase condition. The Location condition was similar to the first judgment task, where the NP condition was more acceptable than the DP condition and Conventional items were more acceptable than either the Noun- or Verb-change items. The Instrument condition was only slightly acceptable even in the conventional conditions, whereas the Location condition was comfortably acceptable.

There was a small negative correlation between the first acceptability ranking of the target senses in non-canonical structures and the speed of response to the target senses in canonical structures  $r(2114) = -.115, p < .001$ . But the second acceptability judgments did not correlate with the saliency rankings. However, when isolating just the conventional items, the first judgment rankings did not correlate, but the second judgments did. Further testing on saliency and on judgments may shed light on the mismatched results.

### **1.3. Chapter 3: Non-Native speaker acceptability of non-canonical arguments**

The third chapter reviewed the phenomenon and the results of the study in article 2. It elaborated Relevance Theory (see Clark, 2013; Sperber & Wilson, 1986, 2002; Wilson, 2010; Wilson & Sperber,



2005) through Papafragou's (1996) application to metonymy. The chapter further argued that world knowledge and context influences which senses are salient, using the experiments in Frisson & Pickering (1999), Gibbs (2007), and Frisson & Pickering (2007) who found that closer conceptual associations result in faster processing of metonymies that reference those concepts. These were followed with studies of bilingual figurative language processing and the rejection of both the literal-first processing model (proposed by Nelson, 1992) and the separate storage model (proposed by Swinney & Osterhout, 1990). The more recent studies had found that (1) bilinguals access both literal and non-literal meanings (Heredia & Muñoz, 2015; Kecskes, 2015; Vaid et al., 2015; Yang et al., 2013), (2) the linguistic environment restricts the senses that are available for bilinguals (Lauro & Schwartz, 2017), (3) non-native speakers ignore the statistical frequency of verbs when judging novel sentences (Robenalt & Goldberg, 2015, 2016), and (4) non-native speaker responses to acceptability judgments are highly variable (Slabakova, Cabrelli Amaro, & Kang, 2013; Slabakova et al., 2016). The literature review also overviewed Chinese bare nouns since determiners and bare noun phrases among English L1 users may have resulted in different judgments than native Chinese speakers.

The experiment for the non-native speakers involved nearly the same procedure except with an additional a factor: years of Chinese study (1-5+). The same test items were given to non-native speaking participants, though they were given glosses for each of the words that might not have been taught in first-year Chinese courses. The experiment intended to answer the following two questions: (1) Are L2 learners of Mandarin sensitive to the same metonymic processes as native speakers? (2) To what degree can non-native speakers of Mandarin recover the intended interpretations for novel uses of non-canonical arguments in Mandarin?

Overall, the non-native speakers accepted test items less than the native speakers did. The results showed that Context did result in greater acceptability among most participants on the first judgment, though for 4 and 5 years of study, the participants seemed to be less accepting of context when interaction with bare noun phrases and the location argument. The reason for this was unclear. On the second

judgment, the effect of context had a near opposite effect when bare noun phrases were involved; however, for determiner phrases the effect of context seemed to increase acceptability over no-context, even though determiner phrases overall were less acceptable than bare noun phrases.

The qualitative responses were varied, which contrasts with the lack of variation in the native speaker paraphrases. It was only in the location condition that there was more consistent matching of the target interpretation; instrument argument paraphrases had several sets of responses where few managed to match the target responses. Bare noun phrase conditions frequently had attempts to interpret the target sentence as a noun phrase instead of a verb phrase, some of which were attempts to interpret the test item as an idiom or metaphor. Finally, lack of context resulted in more deviations from the intended interpretation.

The third chapter concluded with a comparison to the native speaker data. Among the results of this comparison were that (1) context nearly always resulted in higher acceptability judgments, (2) native speakers were more likely to accept a test item than non-native speakers, except in the case of changing the verb, and (3) native and non-native speakers both found the conventional items more acceptable than either the noun- or verb-change items. Regarding the first question for this experiment, L2 users patterned similar to native speakers in their judgments, which lends credence to the argument that L2 users are as sensitive to the same metonymic processes as native speakers; however, the paraphrases of the Instrument condition might suggest a nuance that will require further study. Regarding the second question, non-native speakers did seem to be able to recover the location argument without much difficulty, but the instrument argument was not as successfully recovered.

## 2. Pedagogical Implications and Future Directions

### 2.1. A Few Pedagogical Implications

Mandarin learners who participated in the survey seemed to be more conservative than native speakers about what would be considered acceptable, especially among the more advanced learners. This may be due to the language in the textbooks that they learned from following more formal or semi-formal grammar and vocabulary (see Chan 2009, Cullen & Kuo, 2007, and Gilmore, 2004). Since the present study did not ask about learning materials nor tie the survey questions to the formality or informality of particular study materials, it would be difficult to identify whether the linguistic ecology limited what combinations of verb and noun were acceptable or unacceptable. It is likely that the formal nature of classrooms and textbooks predisposes a learner toward rigid perceptions of what is acceptable or unacceptable, skewing their learning toward formal varieties of the language. As such, it would be advisable for language instructors to begin raising awareness of formal and informal varieties at early stages of learning, more for promoting a wider range of language comprehension than necessarily for encouraging learners to produce these constructions.

That rigidity is especially apparent in the fact that learners with 4 and 5+ years of study behaved the opposite of native speakers in certain conditions. The advanced learners seemed to be less accepting of the test items with bare noun phrases in location arguments when given context than they were without context. This was the opposite of the judgements by native speakers for the same conditions and would be cause for concern if the goal was to achieve native-like proficiency. This native-like proficiency for these constructions may not, however, always be the goal. The ability to reconstruct the intended meaning of the sentence may be more important than recognizing whether a native speaker would judge it grammatically correct.

Though the necessity of encountering language data in context is already well-attested in research on language learning (e.g., Krashen, 1982; Long, 1990), the present study further highlights the need for

target language structures to be encountered in context. Cognitive frames need to be set up through contextually-situated language such that the frames limit the number of activated senses (Lauro & Schwartz, 2017) and solidify conceptual associations that the target speech community would collocate, whether that target speech community be native speakers generally or a specific subset of the target users (e.g., Chinese businessmen, expats, or international students). As a bolster to what is already part of much language teaching training, instructors would be advised to consider the linguistic needs of the language student regarding the speech communities they're likely to frequent. What is conventional for one speech community may not necessarily be so for another. This awareness needs to be raised in language learners because, when confronted with an odd construction that doesn't seem to match conventional Verb-Theme relationships, they will stretch for the nearest salient meaning(s) (Heredia & Muñoz, 2015; Kecskes, 2015; Vaid et al., 2015; Yang et al., 2013).

In all of this, though, application of SLA research should be cautiously approached. As Spada (2015) points to in her article "SLA research and L2 pedagogy: misapplications and questions of relevance," the issues that concern SLA researchers may not be directly applicable to those who teach or learn the L2.

## **2.2. Future Directions**

Regarding participants, the current number of non-native participants was too small in each division to be sure that there weren't at least a few false positives affecting the analysis. Future studies will need to recruit a more balanced sample of participants from the varying years of study and to conduct the survey in such a way as to ensure higher completion rates. Additionally, recruiting from a second language context rather than foreign language context might show closer judgments to native speakers than the present set of participants showed.

Future studies may also need to include test items that have conceptual pairings that contrast more between Sino-centric associations, global culture associations, and Anglo/Euro-centric associations:

respectively, for example Sino-centric concepts, like 住胡同 (zhu hutong – ‘live *hutong*<sup>33</sup>) or 躺炕 (tang kang – ‘lie *kang*<sup>34</sup>’); in contrast to more global concepts, like 住公寓 (zhu gongyu – ‘live apartment’) or 躺床 (tang chuang – ‘lie bed’); and in contrast to Anglo/Euro-centric concepts, like 住独户住宅 (duhuzhuzhai – ‘live single family house’) or 躺地上 (tang dishang – ‘lie floor’). These contrasts would more closely show whether the conceptual associations are influencing interpretability and acceptability.

Finally, future surveys might ask both native and non-native speakers about alternative meanings for the test item in the second judgment task. Some participants in this present study attempted to create noun phrases or idioms out of the sentences/phrases, and it might be revealing of how varied the interpreted answers are if further possibilities were offered. For example, in the case of 自杀高速公路 (zisha gaosugonglu – ‘commit suicide on the highway’), participants might be asked if this could mean ‘a highway on which people commit suicide’ (noun phrase) or ‘drive too fast’ (ad hoc idiom).

My hope is that the present study encourages closer evaluation of the way analogical reasoning, especially through metaphor and metonymy, influences lexico-grammatical processing and production.

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<sup>33</sup> A *hutong* is a traditional Beijing domicile with a central courtyard and rooms branching off from it.

<sup>34</sup> A *kang* is a traditional clay or brick sleeping platform

## Appendix A

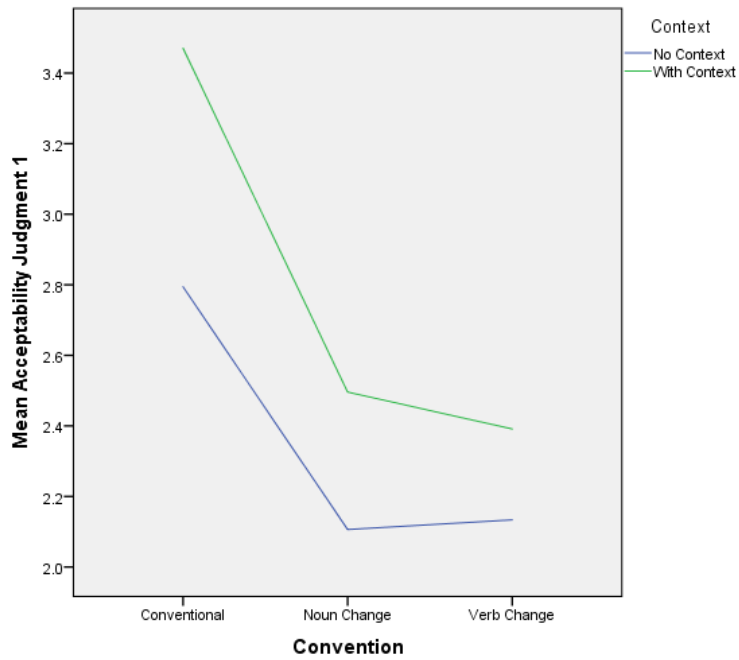


Figure 6: Acceptability Judgment 1, Interaction of Convention and Context

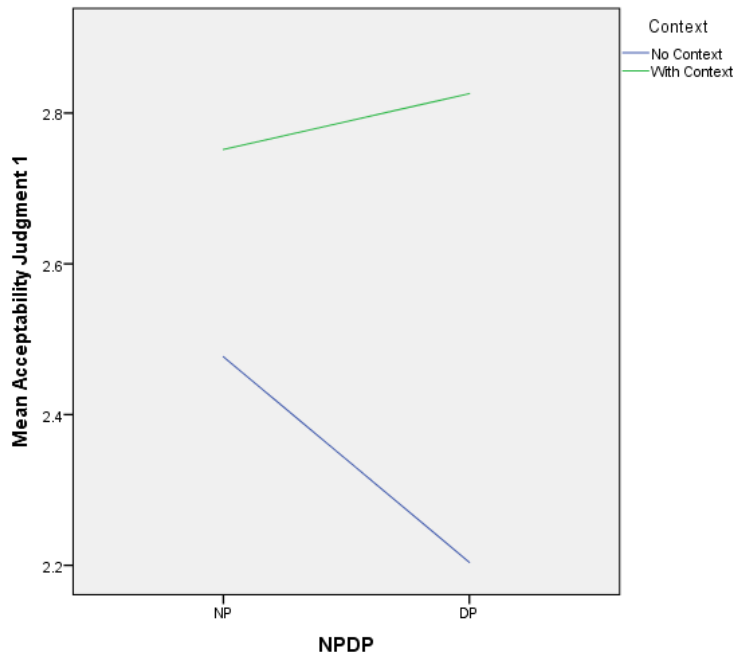


Figure 7: Acceptability Judgment 1, Interaction of NP/DP and Context

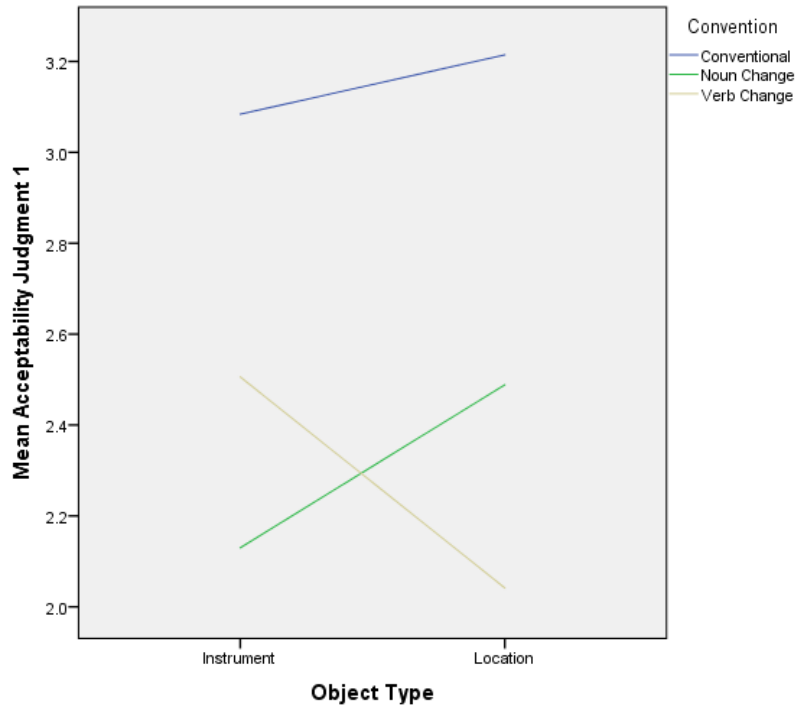


Figure 8: Acceptability Judgment 1, Interaction of Object Type and Convention

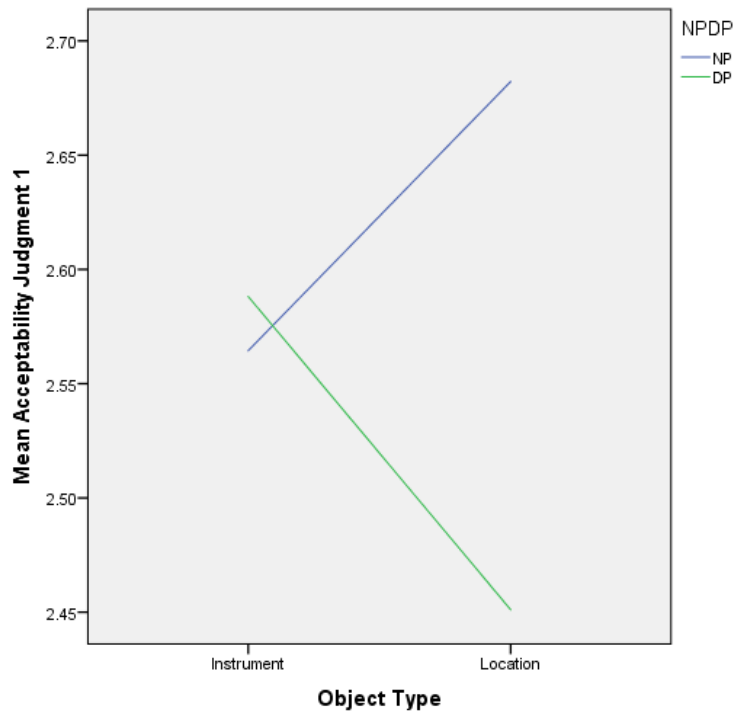


Figure 9: Acceptability Judgment 1, Interaction of Object Type and NP/DP

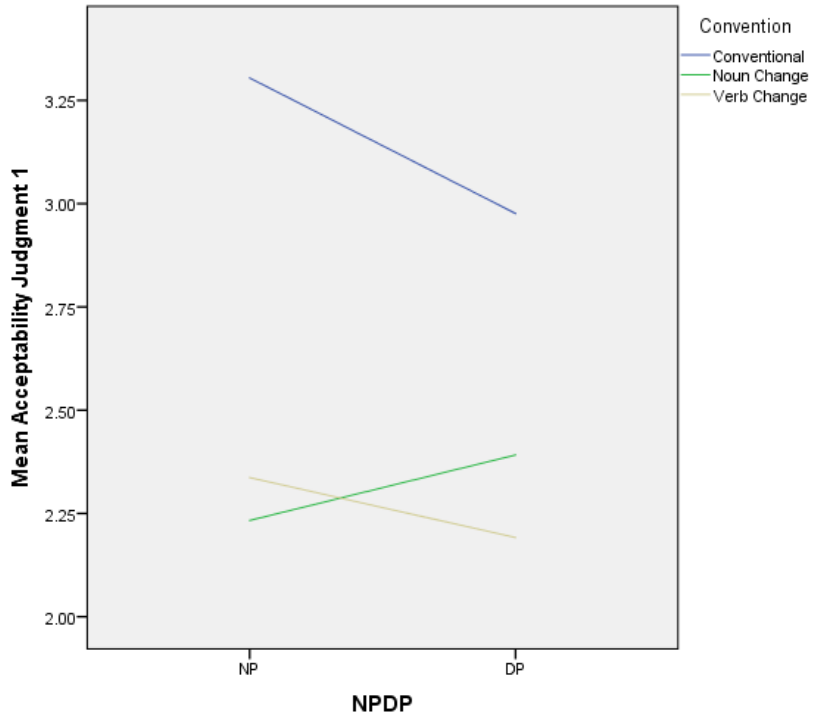


Figure 10: Acceptability Judgment 1, Interaction of Convention and NP/DP

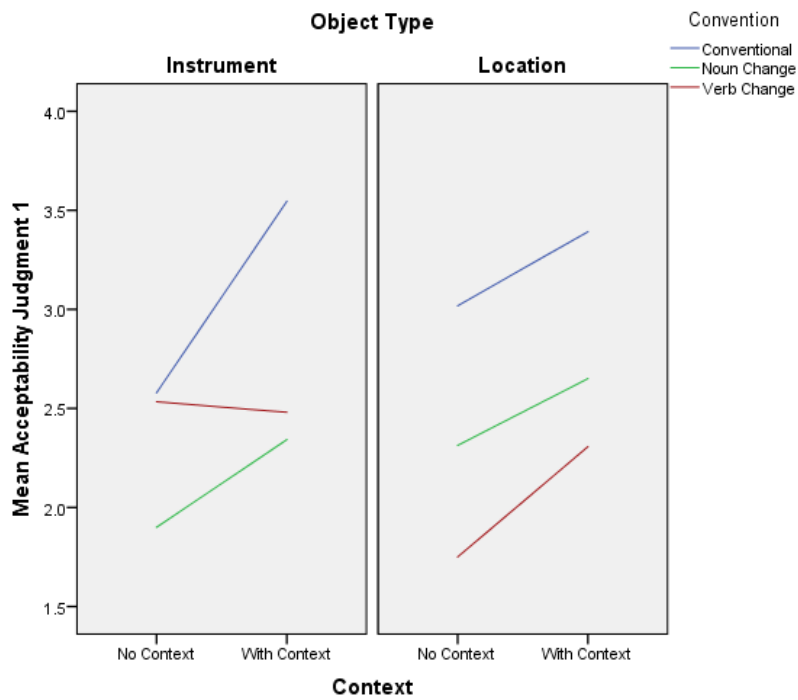


Figure 11: Acceptability Judgment 1, Interaction of Object Type by Convention by Context



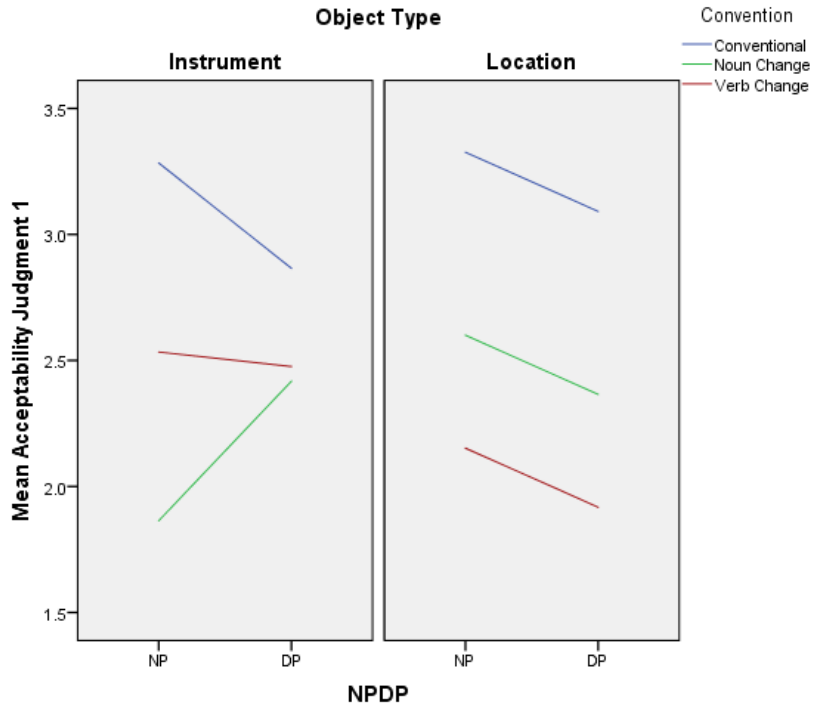


Figure 12: Acceptability Judgment 1, Interaction of Object Type by Convention by NP/DP

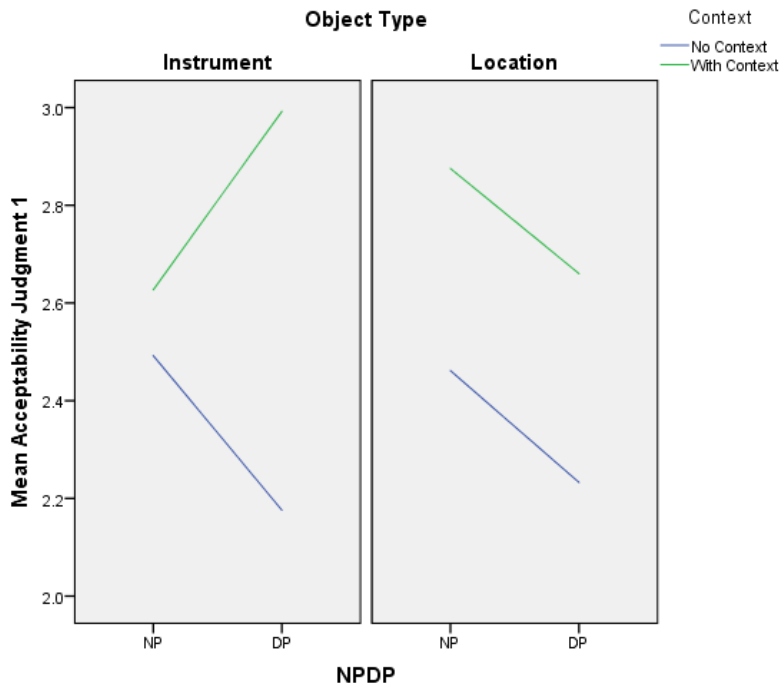


Figure 13: Acceptability Judgment 1, Interaction of Object Type by Context by NP/DP

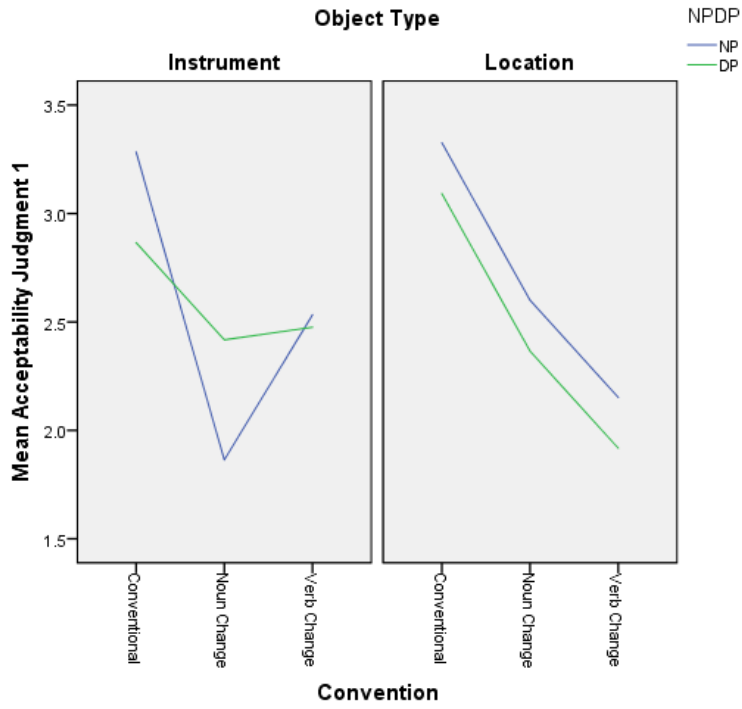


Figure 14: Acceptability Judgment 1, Interaction of Convention and NP/DP at each condition of Object Type

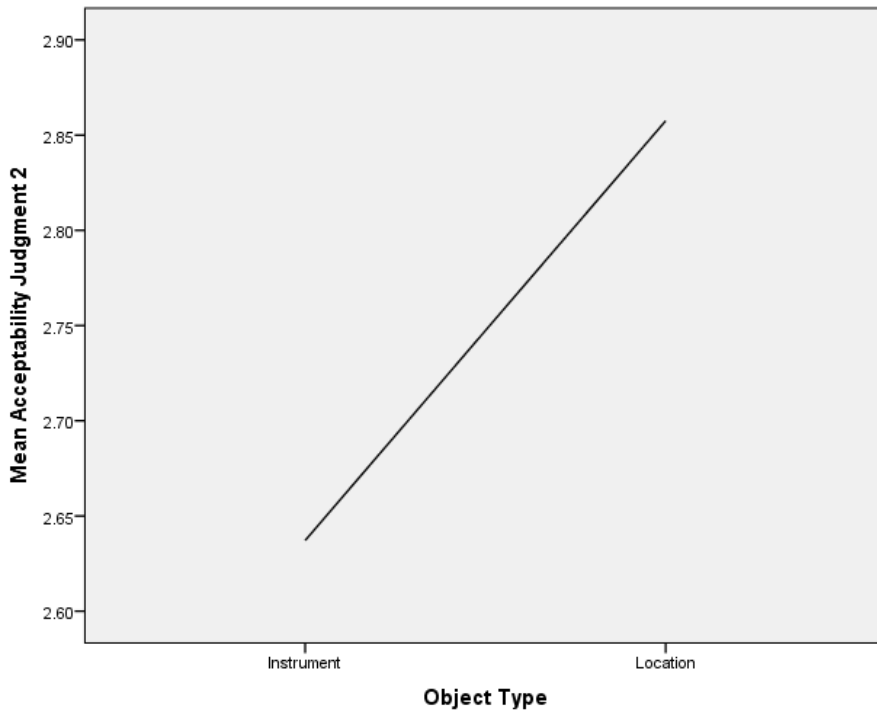


Figure 15: Acceptability Judgment 2, main effect object type

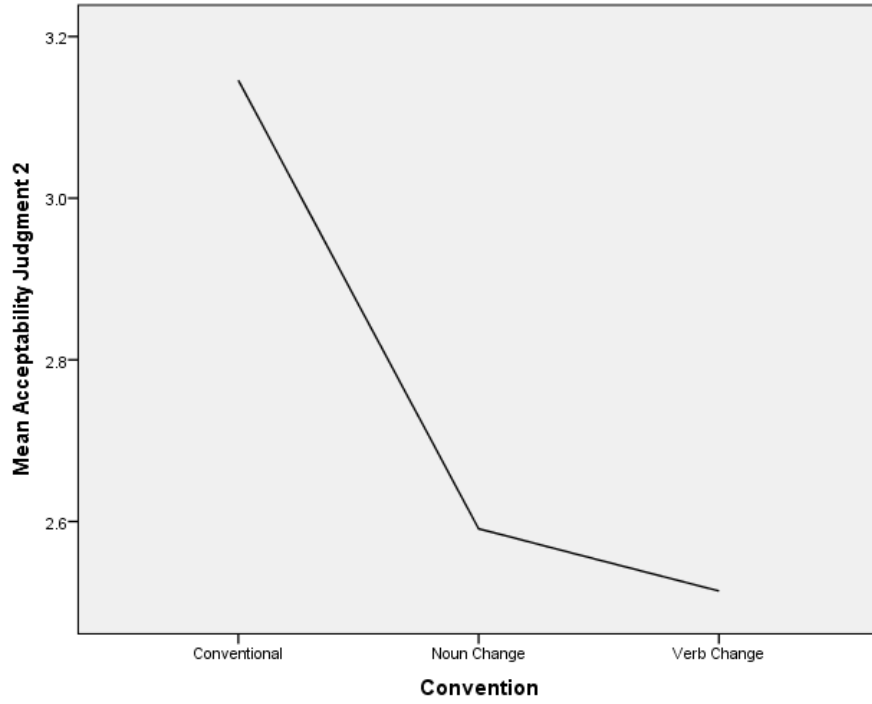


Figure 16: Acceptability Judgment 2, main effect Convention

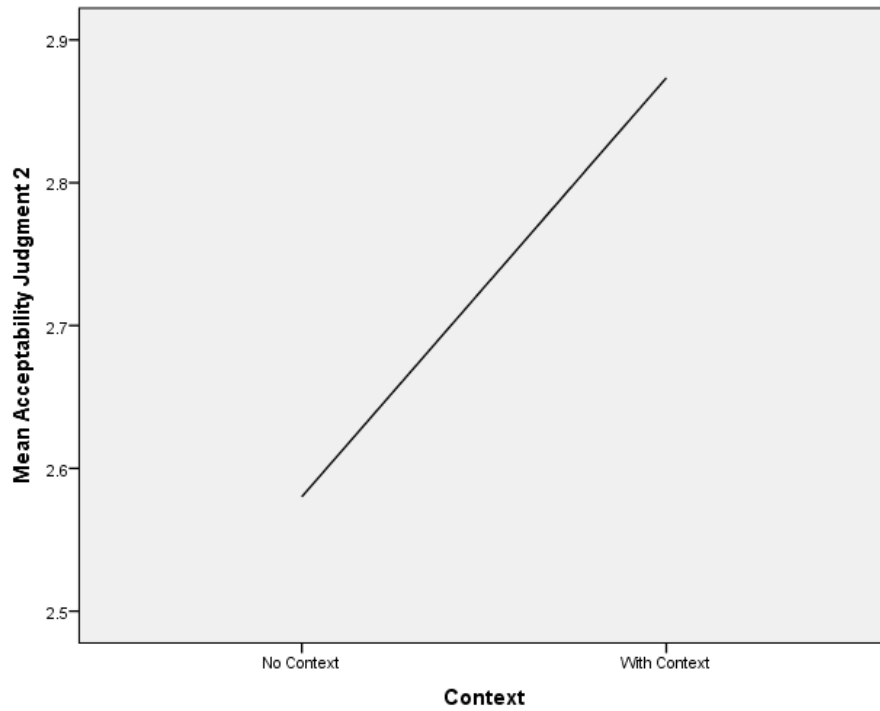


Figure 17: Acceptability Judgment 2, main effect Context

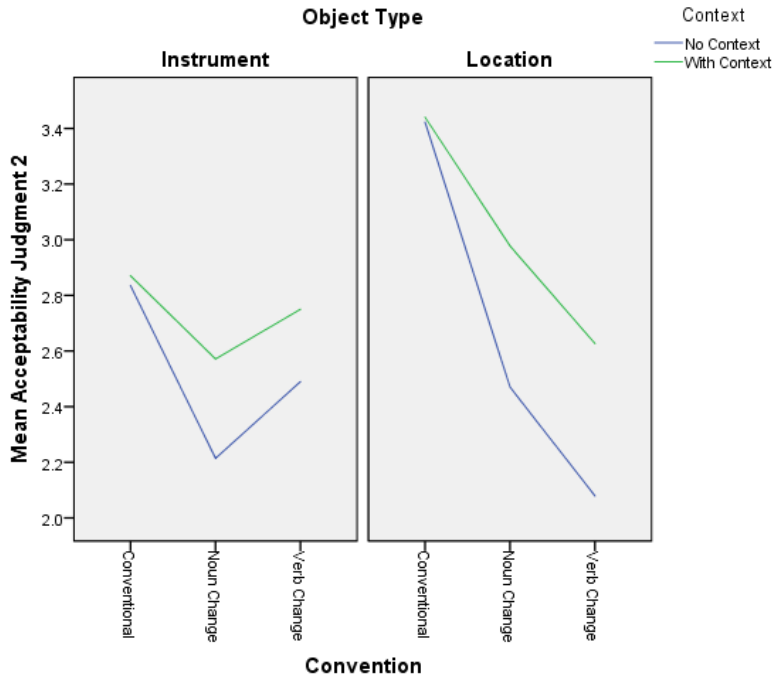


Figure 18: Acceptability Judgment 2 interactions between Object Type, Convention, and Context

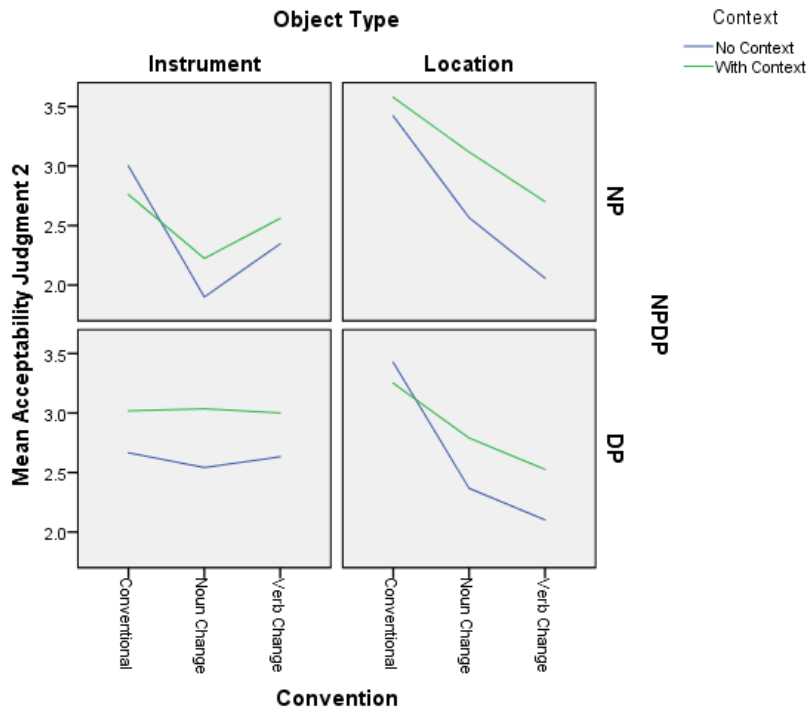


Figure 19: Acceptability Judgment 2, 4-way interaction (not significant) Object Type, Convention, NP/DP, and Context

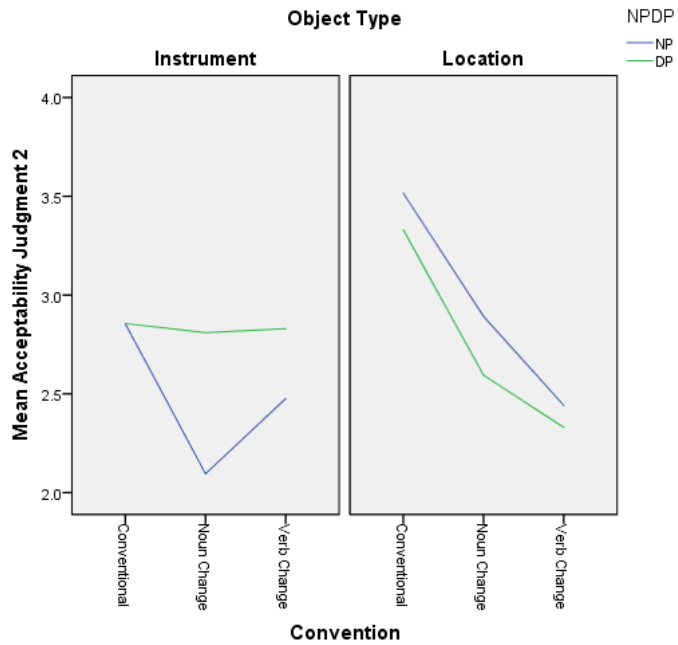


Figure 20: Acceptability Judgment 2, 3-way interaction Object Type, Convention, NP/DP

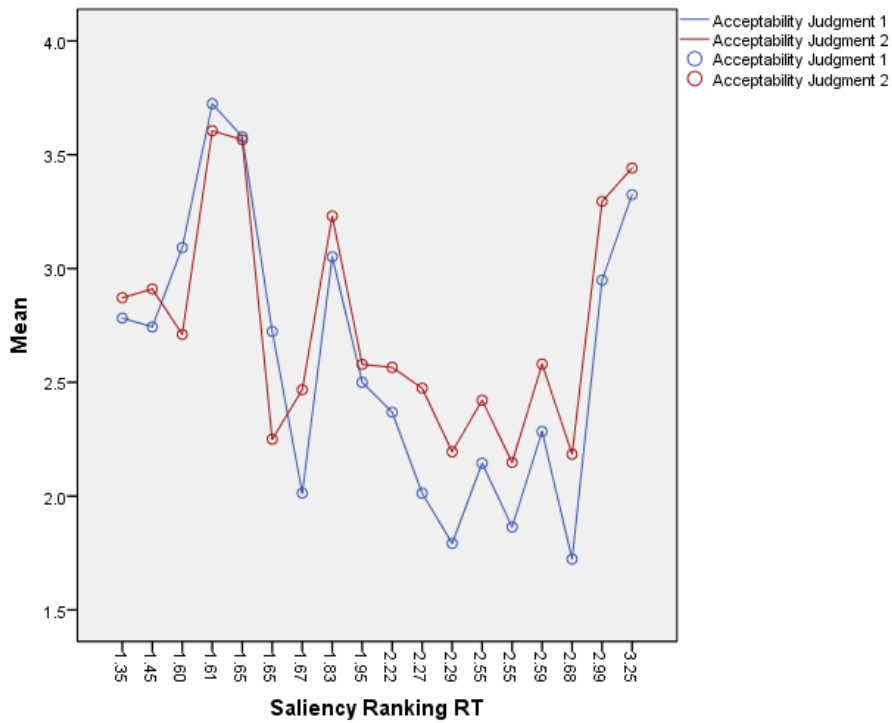


Figure 21: Correlation with Saliency Judgments

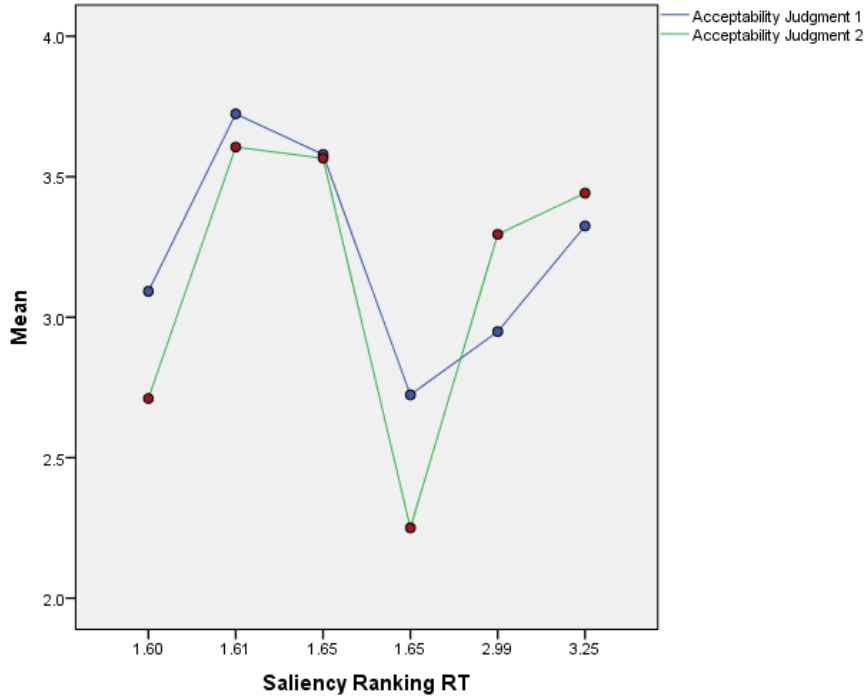


Figure 22: Correlation with Saliency Judgments (Conventional items only)

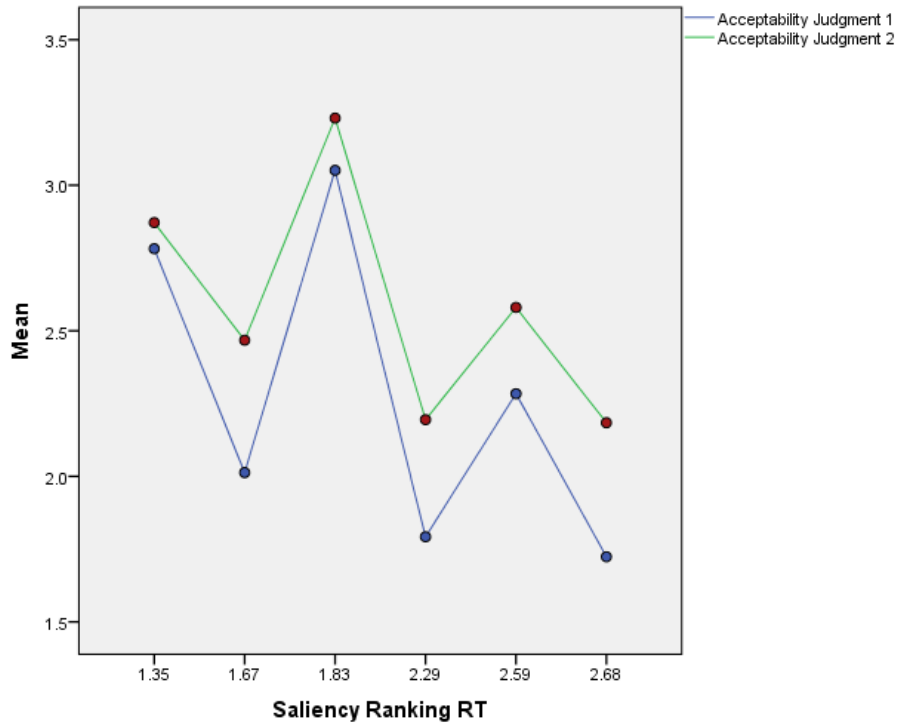


Figure 23: Correlation with Saliency judgments ("noun-change" items only)

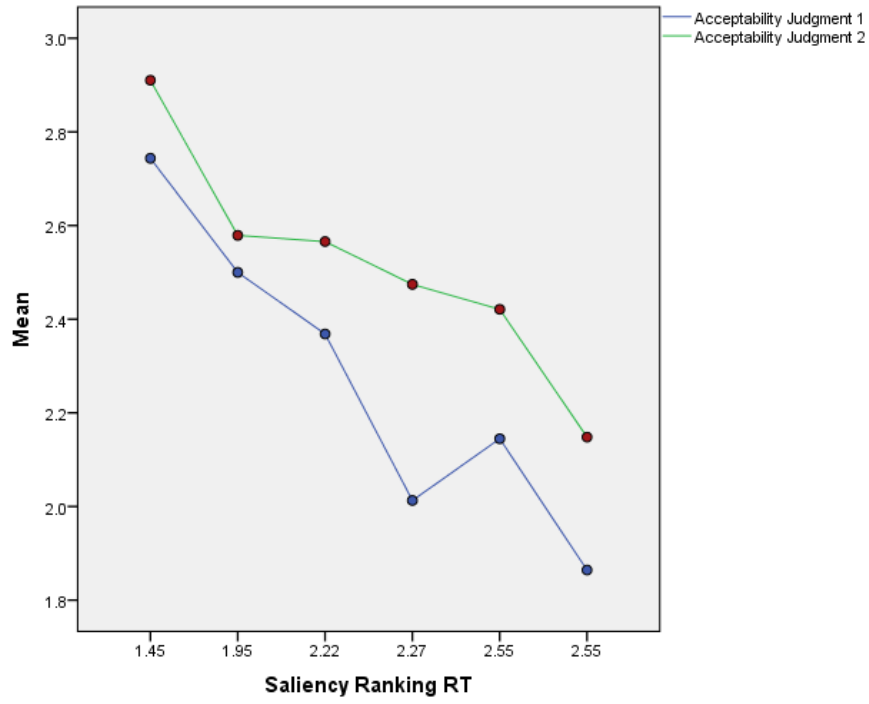


Figure 24: Correlation with Saliency Judgments ("verb-change" items only)

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