SPATIAL REFEERENCE IN RONGGA (ISO 639-3: ROR), BALINESE (ISO 639-3: BAN), AND INDONESIA (ISO 639-3: IND)

BY

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Chapter 1

Introduction

1.1. Preliminaries

1.1.1 Background

In our everyday communication, spatial thinking is frequently used. For example, we use spatial thinking to describe topological relations, i.e., relations that do not involve perspective or measurement (Bowerman, 1996: 388), e.g., *the book is on the table, the milk is in the glass*. Spatial thinking is also frequently used in non-topological relations or frames of reference, i.e., relations that require a coordinate system or perspective of speakers in describing spatial relations between objects (Levinson, 2003), e.g., *the man is standing to the right/left of the tree*, *the ball is north of the tree*. Furthermore, there is psychological effect when someone loses his spatial orientation. Geertz (1973: 446 cited in Wassmann and Dasen, 1998: 693), for example, writes 'Balinese regard the exact maintenance of spatial orientation ("not to know where the north" is to be crazy), balance, decorum, status relationships, and so forth, as fundamental to ordered of life (*karma*)".

There is diversity in expressing topological relations cross-linguistically. Conceptually, English topological relations are distinct from those in nine unrelated languages, i.e., Basque, Dutch, Ewe, Lao, Lavukaleve, Tiriyó, Trumai, Yélî Dnye, Yukatek studied by Levinson et al. (2003). In English, the concepts *containment*, e.g., *The milk is in the bowl*, *support* and *contiguity*, e.g., *The earring is on her ear*, and

coincidence, e.g., *They put up camps on strategic camps,* are basic (Herskovits, 1982, 1986), while Levinson points out that the concept *attachment*, e.g., *The earring attached on the ear, The ring on finger, The shoes on foot,* is primary in the nine unrelated languages. Neither of those concepts, however, is confirmed in Rongga. In this language, the concept that I propose calling the "expected relations" is crucial in the expression of topological relations. I will explore the determinants of the expected relations in three domains: artifact relations, part-whole relations, and juxtapositions in Chapter 4.

A diversity of non-topological relations, i.e., frames of reference, can also be observed in languages. In Guugu Yimithirr, for example, a speaker uses a fixed coordinate system, e.g., *north, south, east, west* to refer to the location of a located object, i.e., an entity being located, in relation to a reference object, i.e., a place where the located object is located. Cienki (1989: 1) calls the located object Spatial Entity (SpE) and the reference object Localizer (L-r). In this study, I will use the terms *Lo* to refer to the located object and *Ro* to refer to the reference object. To describe such a coordinate system in Guugu Yimithirr, the cardinal direction roots, which are spatial nominals, are used (taken from Levinson 2003: 116-117).

gungga- (northern edge)

jiba- (southern edge)

naga- (eastern edge)

guwa- (western edge)

However, unlike the Western tradition in determining the privileged position of north, which is based upon the magnetic-compass and their tradition of map-making (Levinson, 2003), there is no clear priority to any axis in this language.

Since there is no relative frame of reference, e.g., *to the left/to the right*, or intrinsic frame of reference, e.g., *in the front of/ in the back of* featured objects in Guugu Yimithirr, a speaker must use the absolute frame of reference, e.g., X is north of Y, X went north, etc. to describe a *Lo* in relation with a *Ro*. In this sense, the X's location or X direction is fixed irrespective of speaker's view point. This can create a serious problem to one who is unfamiliar with such a spatial system. To be able to point to X's location requires that a speaker identifies the fixed-coordinate system, e.g., *north, south,* etc. in such a language, which is usually based on natural landmarks such as sun position, a mountain, water drainage, etc. as the designated anchor.

Unlike Guugu Yimithirr, English speakers commonly use a relative or egocentric-based system. Instead of north/south, English speakers use a right/left, front/back orientation. In other words, X's location with respect to *Ro* is expressed with a right/left, front/back orientation depending on the speaker's perspective. In addition to the relative frame of reference, English speakers also use the intrinsic frame of reference, which relies upon the inherent features of a reference object, to specify X's location in terms of *Ro*, e.g., *The girl is in front of the chair*. The example is an instance of the intrinsic frame of reference because the location of the girl is described by referring to the inherent feature of the reference object *the chair*, i.e., the inherent feature of the chair is the chair's *front*, which is usually the part with an arm and the surface on which we sit.

In this study, I will analyze spatial reference in Rongga, Balinese, and Indonesian. The spatial reference that I investigate here includes the topological relations as well as the non-topological relations, i.e., frames of reference, in the three languages. Rongga (ISO 639-3: ror), a highly isolating language, is one of several small, undocumented

Austronesian languages clustered in the eastern part of the Manggarai regency, between Manggarai and Ngadha, Flores island, Indonesia (Arka, 2004b).

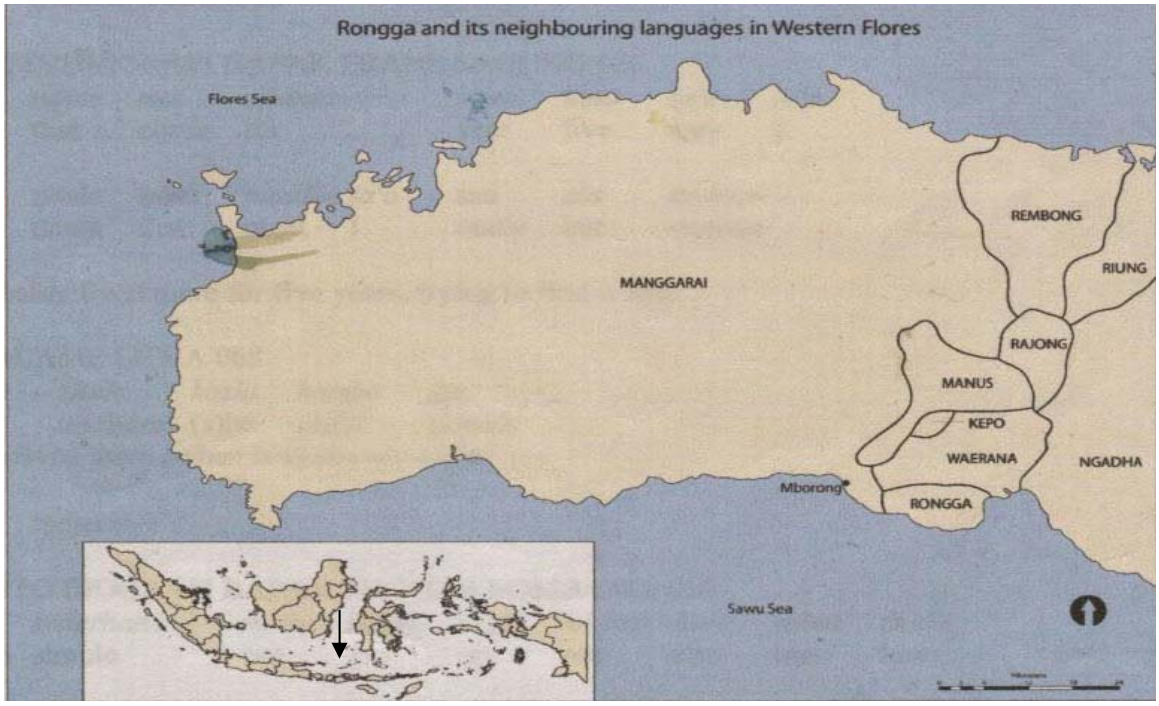


Figure 1.1: Map of Rongga (Arka, 2004b)

The language is spoken by around 4000 speakers mainly in the villages of Tanarata, Bamo, and Watunggene, Kota Komba sub-district, in the regency of West Flores or Manggarai (Arka, 2004b). The language is an endangered language. Its endangered status is not only affected by the relatively small number of speakers, but also by the fact that more and more young speakers switch to neighboring languages, e.g., Manggarai. Based on the studies reported by Baird (2000 in Arka 2003: 6), more and more young speakers of Keo, a neighboring language of Rongga, tend to switch to major neighboring languages like Manggarai. A similar tendency also occurs in Rongga. Young Rongga speakers have high level of fluency in Indonesian than in Rongga. This may be due to the Indonesianization policy established by the former regime Soeharto, in which

Indonesian is used as the teaching language in a classroom. Rongga's endangered status is worsened by the fact that Rongga does not have a written tradition, i.e., written texts.

The four million Balinese (ISO 639-3: ban) speakers mainly live on the main island of Bali and in Nusa Penida, a small island southeast of Bali. Balinese speakers are also found in the western part of Lombok island, an island in the east of Bali island and in the tip of eastern part of Jawa island, an island in the west of Bali island (SIL). Note that Balinese has various dialects, e.g., Gianyar, Tabanan, Karangasem, Badung, Buleleng etc.

Balinese has two scripts. Balinese script is commonly used in traditional texts written on palm leaves that generally deal with religious matters. The majority of Balinese speakers, especially the young speakers, are illiterate in Balinese script. Therefore, Balinese script is taught at schools now. But, in everyday oral and written communication, Balinese in Latin script is used.

Figure 1.2: Map of Bali (Google)

Unlike Rongga, the status of Balinese with around 4 millions speakers, i.e., if it is an endangered language or not, is still debatable among Balinese linguists. Some linguists

claimed that it is an endangered language because more and more Balinese speakers (especially the young speakers) tend to shift to Indonesian, or even English, for prestige and job seeking reasons. Other linguists acknowledge that the shifting to Indonesian or English is occuring, but believe that only happens in Denpasar, the capital city of Bali. The majority of Balinese people who live in villages still speak Balinese in their everyday contacts. But, the villagers also are shifting to Indonesian due to the massive presence of television programs, which are almost entirely in Indonesian.

Indonesian (ISO 639-3: ind), unlike Rongga and Balinese, is the official language in Indonesia. It is derived from Malay, an Austronesian language. In Indonesia there are around 250 distinct ethnic languages, e.g. Javanese, Maduranese, Acehnese, Balinese, Rongga, etc. (Mirpuri and Cooper, 2002). The language is spoken by more than 200 million speakers with various degrees of fluency. The language is now used in business, education, i.e., class room teaching, job market, family, and everyday contact.

Figure 1.3: Map of Indonesia (Google)

There are three research questions I am attempting to answer in this dissertation. First, what concepts underlie and inform the systems of spatial reference in these

languages? More specifically, do Balinese and Indonesian share the same spatial concepts as Rongga to encode topological and non-topological relations in a given context? Second, is there any effect of such spatial systems, i.e., frames of reference, on cognitive functioning, i.e., recall memory, of speakers in the three languages? Third, is there any evidence from spatial language acquisition that supports the findings in this study? If yes, what are the implications of such evidence to the previous studies of topological relations?

1.1.2 Domain of study

Topological relations and frames of reference have been of interest in linguistics and psychology for many decades. For much of this time, researchers assumed that all languages based spatial reference on a Euclidean, English-type reference system, e.g., Clark, 1973; Fillmore, 1975; Miller & Johnson-Laird, 1976; Herskovits, 1982; Talmy, 1983; Jackendoff, 1992. The recent investigations of Herskovits (1982, 1986), Cienki (1989), and Levinson et al. (2003) have revealed significant limitations in these assumptions through cross-linguistic comparisons of spatial reference. This investigation contributes to the cross-linguistic investigation in two ways: close comparison between three related Indonesian languages and contrast with English.

I am interested in the spatial reference system of Rongga, Balinese, and Indonesian for three main reasons. First, they help to reveal the diversity of spatial systems, i.e., both topological and non-topological relations, across languages. For example, the notions of *support* and *contiguity* are applicable to the use of the topological preposition *on* in English (Herskovits, 1982, 1986). In Polish, however, different notions,

e.g., *attachment* and *support* by horizontal surface, are the most relevant for *przy* "on" and *na* "on" respectively (Cienki, 1989). In contrast with English and Polish, the concept *expected* relation is crucial for topological relations in Rongga, Balinese, and Indonesian. A more detailed definition of the expected relation will be provided in Chapter 4. Note that Levinson (2006: 164-165) earlier used the term "expected", i.e., the characteristic or normal spatial relation between objects as in part-whole relations, clothing-body relations, etc. The priority that Rongga, Balinese, and Indonesian give to the expected relation over the unexpected relation has not been documented in other languages. This concept is, among other things, what I would like to highlight in this study.

To express non-topological relations, there are significant differences in the frames of reference used cross-linguistically, e.g., English employs relative and intrinsic frames of reference, while Guugu Yimithirr uses an absolute frame of reference exclusively. The distinct patterns seem to be related with different conceptual domains, which point to major differences in the cognitive perspective that speakers take in different languages.

Second, spatial reference can have either simple or complex interpretations. An interpretation is simple if it refers to the precise position of an object relative to another object. For example, in *the fruit in the dish* the interpretation is that the fruit is located within the volume of the dish. An interpretation is complex if what speakers express by a given locative construction does not correspond to a simple geometric relation implied by the relevant construction. For example, the locative expression in *the lady in red* cannot be understood in the same way as the previous locative construction. Rather, *in red*

entails other knowledge such as cultural information about the way human bodies are partly contained in clothing.

A simple interpretation of frames of reference can also be pointed out. For example, in describing the location of a man in terms of a tree using an absolute frame of reference, the arguments are the tree and the man. The origin of viewpoint here is on the reference object *the tree*. In an absolute frame of reference, the cardinal terms, e.g., *north, south,* etc., are used to describe the man's location, e.g., *the man is north/south of the tree*.

A complex interpretation of a frame of reference can also be observed. To describe the location of the man in terms of the tree using a relative frame of reference requires three arguments, i.e., the perceiver with his/her viewpoint, the *Ro tree*, and the *Lo man*. The man is to the left or right of the tree with respect to the perspective of the speaker. Thus, the relation between objects is ternary. In this sense, the use of relative frames of reference is complex.

Finally, the spatial domain is interesting since it can contribute to broader linguistic issues such as language comprehension and production processes, translation research, and Applied Linguistics. Its contribution to the process of language production and comprehension is evident from Herskovits's explanation (1982: 34) that once we have semantic regularities, for example through an encoding/decoding scheme, we can generate more pointed questions about what people may or may not do when they speak and understand languages. The exploration of meanings of spatial reference can also benefit research on translation both practically, i.e., pointing out adposition equivalents cross-linguistically, and theoretically, i.e., formulating constraints on conceptual

translation. Furthermore, understanding relevant semantic aspects of adpositions helps teachers to teach functional categories, e.g., adpositions in a classroom.

In addition to discussing the semantics of topological and non-topological relations, I will also address the topological constructions, especially in Balinese and Indonesian. Consider the following examples in Balinese.

1. a. iye n-tegak **di** kursi-e B
he/she act[1]-sit on chair-the
"He/she is sitting on the chair".

b. iye n-tegak-**in** kursi-e
he/she act-sit-appl.[2] chair-the
"He/she is sitting on the chair".

The examples show that the topological construction in 1a can be expressed in a different syntactic construction as in 1b, i.e., "locative" applicative constructions. More examples will be provided in Chapter 3 that deal with cross-linguistic grammar of topological relations and grammar of topological relations in Rongga, Balinese, and Indonesian. A more detailed explanation about the "locative" applicative constructions will be provided in Chapter 4. The purpose is to find out if the topological relations are syntactically constrained or they are purely semantically motivated.

1.2 The goal of study

There are two main reasons why I study spatial reference in Rongga, Balinese, and Indonesian. First, no study of Rongga exists, especially of its topological reference except preliminary studies on Rongga spatial systems by Arka (2004b). In those studies,

[1] act.= active verb marker
[2] appl.= applicative

he discusses the use of spatial terms mainly in connection to vertical planes, e.g., *zheta* "+up and +distant", *zhili* "+down and + distant", etc. In addition to the spatial terms used in the vertical plane, Arka also discusses Rongga spatial terms in the horizontal plane. However, since his discussion of this issue is brief and there are some points that need further clarification, Rongga frames of reference need further investigation.

For Balinese, there is a systematic study on its frames of reference by Wassmann and Dasen (1998). In their study, while they pointed out that the absolute frame of reference is dominantly used by Balinese speakers, they also found that Balinese speakers use a relative frame of reference in some contexts, e.g., giving directions related tasks. Since I, as a native speaker of Balinese, find their account rather difficult to accept, I think the Balinese frame of reference is still worth investigating. To the best my knowledge, no scholar has studied Balinese topological relations systematically.

Two scholars have analyzed topological relations in Indonesian. Mintz (1994: 110) in his *A Student's Grammar of Malay and Indonesian* explains that the use of *dalam* in *di dalam* "inside" is to "emphasize the container like nature of the locations indicated". However, he does not provide further explanation of when a speaker has to emphasize such a location. I agree with him that sometimes *di dalam* is used to emphasize that a located object is within the containment of a reference object. For example, if a friend of mine asks me where the book he wants to borrow is, I will say *buku itu di tas* "the book is in the bag". If that person looks at the bag and does not find the book there and asks me again where the book is, I say with emphasis (by giving high intonation to *di dalam*) *buku itu di dalam tas* "the book is inside the bag". But, this in fact rarely happens. When I say *buku di tas* "the book is in the bag" it expresses the fact that the book is inside the bag

since the book is normally in the bag, i.e., in this sense the spatial relation between the book and the bag is expected. Moreover, the emphasis can also be given to *di* when *di* is used in such a context, i.e., to emphasize that the book is inside the bag, also by giving high intonation to *di*. Mintz, nevertheless, does not discuss that the use of *di* in the later context can also be emphasized. Thus, "to emphasize", I think, does not seem to be the most salient aspect that separates the use of *di* from *di dalam* in Indonesian.

A rather different perspective of using *di* and *di dalam* is given by Sneddon (1996: 190) in his *Indonesian: a Comprehensive Grammar*. Sneddon says "*di* is used when a position is *normally* understood (my emphasis) as in *di laci* "in the drawer", instead of *di dalam laci* "inside the drawer". Unfortunately, he does not investigate the factors that determine the "normal" spatial relations in Indonesian. I agree with him that *di* is used for contexts where there is a "normal" relation between objects, and the "normal" relation is sufficient for interlocutors to understand the location of a located object in relation to a reference object. The normal relation between objects, in my opinion, appears to be more salient than "the emphasis" proposed by Mintz in distinguishing the use of *di* from *di dalam*. And this is the concept that I would like to explore in this study. As I said before, the term "expected relations" will be used to refer to the normal topological relations in my current study.

What seems to be missing from the two proposals is that they lack a wide range of contexts for eliciting the use of the topological prepositions, e.g., *di, di dalam, di atas,* etc. in Indonesian. In this study, I attempt to reveal such knowledge by conducting a systematic study by providing sufficient stimuli expressing locative relations between objects to native speakers using the topological relation picture series first used by

Bowerman (1996). In this fashion, topological relations can be probed systematically. I will also use another approach by looking at how children use the locative prepositions in Indonesian.

To find out other concepts related to the topological prepositions in Indonesian, I consulted the monolingual *Kamus Besar Bahasa Indonesia* "The Comprehensive Indonesian Dictionary". Unfortunately, the dictionary does not list the detailed senses of the preposition *di*. The only sense of *di* listed in the dictionary is *kata depan yang menunjukan tempat* "a preposition that indicates a place", e.g., *di restoran, di sekolah* "at a restaurant", "at a school". While this sense is true, the sense is not the only one releated to *di*. The other concept, i.e., the expectednees, of relation between objects, is relevant as well, as this study will explore. More surprisingly, the dictionary does not document the prepositions *di dalam* and *di atas*. Thus, I expect that the findings of this study will contribute to explaining entries in the dictionary relevant to the topological prepositions *di, di dalam, di atas* in Indonesian.

The second reason motivating me to study spatial reference in Rongga, Balinese and Indonesian is that the study will enable us to contrast how the spatial reference, i.e., the topological and frames of reference, are coded in Rongga, Balinese, and Indonesian. In other words, the present study will complement Herskovits (1982) or Levinson (2003).

The next four chapters deal with topological relations. I will review studies of topological relations both in English and across-languages relevant to my current study in Chapter 2. Chapters 3, 4, and 5 present the grammar of topological relations in Rongga, Balinese, and Indonesian, my study of topological relations in these languages, and evidence from children's acquisition of these relations.

Section 2 will then examine the non-topological relations in the three languages. Chapter 6 deals with studies on the non-topological relations. Chapter 7 discusses the grammar of frames of reference in Rongga, Balinese, and Indonesian. My study of non-topological relations will be presented in Chapter 8, and the final chapter presents conclusions, implications, and suggestions for future studies.

Chapter 2

Studies on Topological Relations

2.1 Introduction

I review studies on topological relations relevant to the current study. Section 2.2.1 reviews English topological relations by Herskovits (1982). Topological relations from cross-linguistic perspectives discussed by Cienki (1989) and Levinson et al. (2003) are respectively reviewed in sections 2.2.2 and 2.2.3. And my study of Rongga topological relations is reviewed in section 2.2.4. The chapter is concluded with a brief summary in section 2.3.

2.2 Topological relation studies

The semantics of topological prepositions has been addressed by many scholars. One set of prepositions is called "topological" because they do not involve perspective or measurement (Bowerman, 1996: 388). Herskovits (1982), for example, discusses the English topological prepositions in detail. Meanwhile, Cienki (1989) and Levinson (2003) approach the topic from a cross-linguistic perspective. Cienki compared the meanings of locative and adlative spatial expressions, i.e., the motion involved leads to a decrease in the distance of the *Lo* from *Ro*, e.g. *The swimmer dove into the pool*, in English, Polish, and Russian, while Levinson investigated the meanings of locative expressions in nine unrelated languages.

2.2.1 Herskovits's study in English

English topological relations have been discussed by many scholars (Lindkvist. 1950; Ljungren, 1951, Miller & Johnson-Laird, 1976; Herskovits, 1982, 1986; Talmy, 2000). Here I review Herskovits's study of English topological relations because of its comprehensiveness and systematicity. Herskovits (1982) explains that there are several aspects that should be taken into account when encoding a locative construction in English.

2.2.1.1 Normal situation types

A locative construction can have multiple interpretations depending upon its contexts of use. For example, *the man at the desk* can be interpreted as indicating the location of the man, i.e., he is very close to the desk, or as the man that is in a functional relation with the desk, i.e. he is working (Herskovits, 1982: 12). Given such a case, the appropriate interpretation of the utterance is based on the normal situation. Specifically, the locative construction above can be used to describe either a man is working at his desk or the location of a man near the desk. Contrast it for example to a situation where the man is in abnormal relation with the desk, e.g., the man is sitting or standing on top of the desk. In this situation, the normal interpretation of *at* is absent. Based on these examples, normal "purpose" of objects may affect the interpretation of locative constructions. However, the question that should be raised now is "How do we define the "normal" situation?"

Herskovits (1982: 18-19) defines "normal" with some precision. First, a normal situation conforms to the laws of physics -- the common sense physics of ordinary solid

objects, liquids and gaseous substances. For example, *The woman walked through the wall* implies that the wall has a gap that is big enough for the woman to walk through. Second, objects are where they belong -- most of them near the earth, within the field of gravity. Finally, objects are "normal", and *where the function is relevant, they behave according to their normal function*. For example, the interpretation of *The teapot is on the table* is that the table stands normally, with its top horizontal, and the teapot sits on it. Thus, the interpretation of a locative construction is based upon such "normal" situations. In the case where the teapot is on the stove, bed, etc. such spatial relations are still considered normal in English, in which the same preposition, i.e., *on*, is used to mark the *support* relation.

Nevertheless, one caveat should be pointed out here. The "normal" situation explicated by Herskovits is intended to describe the spatial relation of objects in English. This is one problem for her "normal" explanation because what is "normal" in English is not "normal" in other languages. How "normal" is defined in other languages, e.g., Rongga, Balinese, and Indonesian, remains to be investigated.

2.2.1.2 Core meaning

The normal interpretation of a locative construction is partly contributed by the characteristics of its preposition. The notion of core meaning attempts to capture this contribution.

Herskovits's discussion of the core meaning is related to the notion of "prototype" in the study of lexical meaning. The prototype approach looks at natural kinds from a psychological perspective. A prototypical bird for example is the best example of a bird

(Herskovits, 1982: 68). Most people will have similar descriptions of birds in size, color, habits, etc. However, the idea of core meaning is not in the strict sense the same as the notion of prototype. Herskovits explains that the core meaning of a preposition is the "ideal" meaning of a geometric description. She further explains if there are other uses, i.e., use types, of a particular preposition, they deviate from the core meaning through what she calls "transfer", e.g., approximation, resemblance. For example, Herskovits (1982: 69-70) explains that the core meaning of the preposition *on* is related to *support* and *contiguity*. However, the use of *on* in English can be extended beyond the strict sense of *support* and *contiguity* as in *The book is on the table* in which the book could be indirectly supported by the table, i.e., there could be another object like a magazine that comes between the book and the table. In different contexts, the spatial relation between the book and the table clearly shifts from the core meaning of *on*, i.e., direct *contiguity* and *support*. There is also a significant shift in the use of *on* in the example *the wrinkles on his forehead* since the wrinkles are embedded in the skin. Nevertheless, even though the shift is discontinuous here since support could be seen as irrelevant, the situation resembles one of support and contiguity. The resemblance itself motivates the use of *on*.

To discuss the core meaning of *in*, Herskovits (1982: 72-82) provides the following examples (not all examples are repeated here):

1a. The milk in the bowl
1b. The bird in the tree
1c. The nail in the box
1d. The horse in the field
1e. The gap in the border

In 1a, the *Lo* the milk is "contained" or within the "inclusion" of the *Ro* the bowl. The same "inclusion" also applies in 1b. However, the "inclusion" of the bird in the tree in 1b is not based on the same geometric description as in 1a. Rather, it is a reflex of geometric conceptualization mapped onto the geometric relation of the real objects, i.e., the bird is conceptualized within the containment outlined by the volume of the tree.

Example 1c shows how the practice of *in* is ambiguous. In such a context, two interpretations are plausible: the nail could be within the containment of the box, i.e., within the volume of the box, or it could be that the nail is embedded or nailed partially into the box's wall.

The two phrases in 1d and 1e indicate how the "inclusion" is generalized across dimensions, i.e., one-, and two-dimensions. There is, however, a distinction between the practices of *in* with the one-, or two-, dimensional objects. When *in* is used with the two-dimensional *Ro* (*the horse in the field*), the *Lo* the horse is on top of the *Ro* the field, while when it is employed with a one-dimensional *Ro* (*the gap in the border*) the *Lo* the gap is part of the *Ro* the border. In short, the examples show how the meanings of phrases 1b, 1c, 1d, and 1e are derived from the core meaning of *in*, that is the *inclusion* of a geometric construct in a one-, two-, or three-dimensional geometric construct.

For the preposition *at*, Herskovits provides *coincident* as its core meaning as in *The train is at Victoria Station*. In the example, the train and the station are viewed as points that are "coincident". Like *on* and *in*, other uses of *at* also derive from its core meaning. The derivation from the core meaning of *at* can be seen in *The target is at ten feet*. According to Herskovits, the meaning of *at* in the context is "embedded", i.e., the target is viewed as a point "coincident" or located ten feet from the reference object.

However, before leaving this section, another question should be posed: how is the core meaning determined? This is the other problem of Herskovits's study, especially of her proposal since she does not provide a rigorous procedure to arrive at the core meaning. Instead, her definition is based on the range of use types from which she selects the central or ideal meaning for a particular preposition.

To assess the accuracy of her definitions of core meaning, it is necessary to compare them, for example, to how a lexicographer defines *at*, *in*, and *on* in a dictionary. For that purpose, I referred to the Oxford English Dictionary (OED). Unlike Herskovits, the lexicographers in the OED provide more than one core sense (core meaning in Herskovits's term) for each of the prepositions. There are six core senses for *at*, e.g., i. expressing location or arrival in a particular place or position, ii. expressing the time when the event takes place, iii. denoting a particular point or segment on a scale, iv. expressing a particular state or condition, v. expressing the object of a look, gesture, thought, action, or plan, vi. expressing the means by which something is done, eight core senses for *in*, e.g., i. expressing the situation of something that is or appears to be enclosed or surrounded by something else, ii. expressing a period of time during which an event takes place or situation remains the case, iii. expressing the length of time before a future event is expected to take place, iv. expressing state or condition, v. expressing inclusion or involvement, vi. indicating the language or medium used, vii. as an integral part of an activity, viii. expressing a value as a proportion of a whole, and twelve core senses for *on,* e.g., i. physically in contact with and supported by a surface, ii. forming a distinctive or marked part of the surface of something, iii. having the thing mentioned as a topic, iv. as a member of a committee, jury, or other body, v. having the place or thing

mentioned as a target, vi. as a medium for transmitting or storing information, vii. in the course of a journey, viii. indicating the day or part of a day during which an event takes place, ix. engaged in, x. regularly taking a drug or medicine, xi. paid for by, xii. added to. In addition, each core sense could have several sub-senses or derived meanings in Herskovits's term.

The lexicographer defines the core meanings not based on the oldest meaning because word meanings change over time, or on the most frequent meaning because sometimes the figurative meanings are more frequently used. Rather, they are determined based on the acceptance by native speakers as the one that is most established as literal and central. The core senses represent the central or typical meanings established by research on and analysis of the British National Corpus and other written corpora and citation databases.

Herskovits's analysis of the core meaning, on the other hand, is mainly based on the simple geometric relations between objects. For example, the core meaning of the preposition *in* is contributed by the fact that *in* is used when a *Lo* is within the inclusion of a *Ro*, e.g., *The fruits are in the bowl*. Thus, according to Herskovits, inclusion or containment is the core meaning of the preposition *in*. Recall that the lexicographers of the OED provide eight core meanings for *in*. And if we look specifically at the core topological meanings of *in* provided in the OED, two core meanings are available, i.e., expressing the situation of something that is or appears to be enclosed or surrounded by something else, expressing inclusion or involvement. It seems that the different core topological meanings are due to the distinct procedures used by Herskovits and the lexicographers of the OED.

I am not trying to claim that Herskovits's definitions are false. In fact, it would be great advantage to formulate primitive concepts of spatial relations, if they are indeed there, to be tested across languages. I realize the approaches adopted by Herskovits and the lexicographers are different. What matters is a rigorous and reliable procedure to arrive at the core meanings of each preposition.

2.2.1.3 Use types

In addition to the core meaning, each lexical, i.e., each preposition, also has use types. The use type is the extension of the core meaning and is indicated with quotation marks. For example, the unusual roles of subjects and objects in *the lady in red* introduce a use type "person in clothing". Its interpretation shifts from the core meaning of *in*, i.e., inclusion of geometric construct in a one-, two-, or three-dimensional geometric construct to extention of this core meaning, containment by an artifact.

Another example of a locative construction that introduces a use type is *Maggie is at her desk*. This locative construction, according to Herskovits, results in a use type called "person at artifact". The situation types that are refered to by the locative construction could be a situation where a person is engaged with the artifact in a typical manner or where a person is located. Thus, the interpretation could be generated from our knowledge about Maggie and the artifact, i.e. the desk, either she is working at her desk or she is located at her desk. If we compare it to *She is at work*, for example, the interpretation of this locative construction is that she is functionally related with her work, i.e., she is working.

2.2.1.4 Encoding and decoding

As explained in the two previous sections each preposition includes both core and derived meanings. Herskovits's proposal creates two problems. First, given a situation containing a spatial relation between the objects, how can we encode such a situation using the appropriate preposition? Second, given a clause containing a locative construction, how can we decode or interpret the spatial relation of the objects? To handle these questions, Herskovits proposes pragmatic principles.

2.2.1.5 Pragmatic principles

Grice (1967) proposed a general principle of cooperation for communicative utterances and exchanges called the Cooperative Principle. The cooperative principle consists of four categories: Quantity, i.e., the quantity of information to be provided, with two further maxims, i.e., make your contribution as informative as is required and do not make your contribution more informative than is required, Quality, i.e., try to make your contribution one that is true, with two more specific maxims, i.e., do not say what you believe to be false and do not say that for which you lack adequate evidence, Relation with a single maxim, i.e., be relevant, and Manner, i.e. how what is said is to be said with various maxims, i.e., avoid obscurity, avoid ambiguity, be brief, be orderly (Grice, 1989: 26-27). Herskovits adopted one of Grice's maxims, i.e. relevance, for interpreting locative constructions. The "relevance" principle (Herskovits, 1982: 145) says that "of several expressions true of a given situation, the appropriate one is the maximally relevant one". Other principles that Herskovits employs are "salience", "tolerance and vagueness", and "typicality". Herskovits provides examples of how the principles can be

used to help select an appropriate spatial term in a complex spatial relation between objects.

For example, given a situation that includes a socket and a bulb, we have to decide between *in* and *under* to specify the spatial relation appropriately in the context. Since there is a "functional" interaction between the socket and the bulb, i.e., there will be light when it is put in the socket, "function" is the relevant aspect for the two objects. Thus, *in* is more appropriate than *under* to describe the functional relation between the bulb and the socket.

The functional relation is ubiquitous in English (and in other languages as well). There are many examples to support this. For example, when fertilizer contained in a bag lies in a field, one can say *the fertilizer in the field*, not* *the fertilizer on the field*. But, when the fertilizer is spread over the field there is a contact between the fertilizer and the field. For that strong association of contact, according to Herskovits, one can then say *the fertilizer on the field*. Herskovits's argument, I think, is only partly true. I believe what is more relevant in that context is the functional relation between the objects. I refer to such relations as the "expected" relation, i.e., the fertilizer is spread on the field for the purpose to fertilize the field, that motivates the use of *on*.

A functional relation can also be observed in *There is a truck in the road*. Herskovits (1986: 154) claims that the fact that the truck is seen as an obstacle cannot be inferred from its location and our world knowledge of trucks and road. I again disagree with her. Instead, I argue that the truck being an obstacle can indeed be related to its location and our knowledge of the truck and the road. Functionally, *the truck on the road* is common, i.e., the trucks commonly function on the road. The reason why *There is a*

truck in the road is also possible is because in that situation the truck does not perform its normal function, hence is understood as an obstacle. A similar argument is also voiced by Cienki (1989: 75) saying "it is normally sufficient to identify a vehicle's location with *on the road*, and this usage is associated with the context of travel in English".

If these examples are not sufficient to convince us about the ubiquity of functional relations, other examples can still be presented. In *the knob on the front of the TV,* normally and functionally the knob is placed on the front of TV, i.e., in relation to the intrinsic purpose of the TV – its front. Thus, the purpose of the knob with respect to the TV in such a position motivates the use of *front* in locating the knob. A similar functional relation is also applicable to the use of *on* in *the legs on the table*, etc. (Pye, in conversation).

The facts above drive us to question what distinguishes the functional relation from the locative/spatial relation. Some clarification is necessary to point out the extent that functional relations are encoded using spatial terminology. It seems, based on the previous examples, the function of objects can be used to differentiate the functional and spatial relations. When the *Lo* serves a purpose, e.g., *the fertilizer on the field, the truck on the road, zipper on a jacket, button on a computer, the legs on the table*, *pattern on a shirt,* etc., the relation is called "functional" or "expected". However, when that purpose is absent, e.g., *the fertilizer in the field, the truck in the road*, *zipper in a jacket*, etc. the relation is "locative/spatial" or "unexpected". Herskovits is aware of the functional relation as I emphasized in sub-section 2.2.1.1, i.e., *where the function is relevant, they behave according to their normal function*. However, she did not discuss it specifically. I

will define the *expected* relation, i.e., to refer to functional relation, more precisely in Chapter 4. Let us now continue to the other pragmatic principles.

The (perceptual) salience principle, e.g., size, color, visibility, etc. can be used to explain the metonymic shift of spatial objects. In the example *The house is on the top of the mountain*, the top of the mountain is the most visible part of the mountain, not the base of the mountain. In other words, the top of the mountain is more salient than the base. Hence, the location of the house is specified in relation to the top of the mountain. But, function is also relevant here, i.e., it is that houses are located on the top of the mountain. Even, Herskovits (1986: 153) explains that in such an example "functional" salience plays a role which could be confused with perceptual salience.

There is a context of geometric description where a particular spatial relation is given tolerance. In *The morning star is to the right of the church*, to the right of the church does not imply that the star is beside the church. Thus, the distance and the exact position of the morning star to the church are ignored. (We can show that functional importance is implied here. In the utterance, the exact position and the distance of the morning star to the church are functionally irrelevant since the statement provides only an approximate location of the star. Tolerance, as Herskovits (1982: 29) explains, "is usually associated with vagueness that is with objects whose descriptions are somewhat indeterminate, and with relations whose truth is in doubt".

Typicality is also important in selecting an appropriate preposition in a given context. We say *the cap is on the cognac bottle* not **the cognac bottle is the one in the cap* since typically the cap is smaller and more mobile than the cognac bottle. Again, Herskovits's argument is partly true here. In my opinion, what is more relevant here is the

functional relation between the objects, i.e., the cup is used for the purpose of closing the bottle. Herskovits does not restrict typicality only to a size difference between objects. Rather, she also implies "normality" within typicality. For instance, one can say *The house on the lake*. Unlike the previous example, i.e., *the cap is on the cognac bottle*, the house is on the edge of the lake and is fixed. But, "fixed", as Herskovits (1982; 159) explains, must be qualified by "typically" – since if someone's house is a mobile one, he can still say *my house on the lake*. Thus, the interpretation is based on typicality of such particular contexts. Moreover, the typicality discussed by Herskovits also implies "conventionality". For example, if an object is put below a table, the preposition *under* is used to describe the spatial relation between the two objects. But, if the object is now located below another table with the space under it more solidly enclosed, the same preposition, i.e., *under*, is also used for this atypical case. Herskovits (1982: 160) explains "'the table is used as a metonymic substitute for the table top; this involves typicality too, since the table top is the 'typically' salient part of the table".

But, why do English speakers not say *bottle is in the cap* as in *the bulb is in the socket?* The argument is related to the function itself. When they say the former utterance, the cap does not serve its normal purpose on the bottle, i.e., the possible interpretation is the bottle is contained within the interior of the cap. In other words, the relation between the objects in *the cap is in the bottle* is "spatial", not "functional". In the case of *the bulb is in the socket*, however, it is ambiguous. Herskovits's argument for this case is that the function between the bulb and the socket is prominent, i.e., there will be light when the bulb is placed in the socket. In fact, the relation is described with *in*, not *on* to indicate the functional relation. One possible explanation could be the relative

importance of the functional relation in English. The functional relation in English is not as prominent as that in Rongga as will be explained in this study.

Thus, based on her proposal, Herskovits will predict that whether a cup is put on a saucer or a doll is put on a saucer for example, the preposition *on* is used in English because the concept *support* is relevant. In Rongga, Balinese, and Indonesian, however, this is not the case. In the former context, since the spatial relation between the cup and the saucer is expected the *expected* prepositions are used to describe such a relation. In the later context, nevertheless, a set of *unexpected* prepositions is used in the languages since the spatial relation between the doll and the saucer is unexpected.

2.2.2 Cienki's study on topological prepositions

Cienki (1989) compares the spatial behavior of a selected group of locative and adlative prepositions in English, Polish, and Russian. His basic approach to the topic is the same as Herskovits. However, what makes his study different from Herskovits is that his objectives are to examine the translation equivalents of the prepositions under study across the three languages and to test the applicability of Conceptual Semantics in order to point out why the translation equivalents of prepositions differ cross-linguistically.

Furthermore, Cienki disagrees with Herskovits to some extent in explicating the core meaning of basic topological prepositions. For instance, the meanings of the preposition *at* in English are devided into three (Cuyckens, 1984 cited in Cienki, 1989: 102):

a. Proximity, e.g., *The man at the wall, the man at the table*.

b. Proximity or coincidence, e.g., *Meet me at the post office, Meet me at the*

Market Place.

c. Coincidence, e.g., *They put up camps at strategic points*.

Cuykens (1984 cited in Cienki, 1989: 104) points out that *at Ro* is considered a dimensionless entity, i.e., the perceived interior or supporting surface of *Ro* is absent. He further adds that *at* has a very general meaning from which the more specific meanings, i.e., proximity, coincidence, proximity or coincidence, can be derived. In other words, the specific senses of *at* above are not parts of its core meaning. Rather, its meaning depends upon the context.

For instance, following Cienki's example, when someone comes into an office to look for Barbara, she may be told "She's at her desk". In a close-up view, the *Ro* the desk indicates a prominent feature of supporting surface and allows us to lexicalize the spatial relation with *on*. However, the desk can still be considered as a point in a region of space. When *at* is used with *Ro* schematized as a container or boundary, it is with that region or the place of *Ro* the *Lo* coincides with. Thus, *at* indicates only proximity in that sentence.

In *Chicago is at the point where the East and West meet* the derivation of coincidence can be observed. In this example, the region or the place of *Ro* is covered by the *Ro* itself. Therefore, there is no space besides the *Ro*. In such a context, there is a coincidence reading, not proximity.

For the proximity or coincidence readings, it can be pointed out in *Meet me at the post office*. In a close-up point of view, the *Lo* is in the place or the space outside the *Ro*, i.e., the *Lo* coincides with the place of *Ro*. Hence, the proximity reading is possible. But when a remote point of view is involved the *Ro* is seen as a point, the coincident reading is allowed.

Given theses facts, Cienki argues that the core meanings of *at* include either coincidence or proximity. It is in contrast with Herskovits's definition (1986): *at* is for a point to coincide with another.

2.2.2.1 Meanings of topological prepositions in English, Polish, and Russian

To compare the meanings of *on* and *in* in the three languages, I use topological situations showing spatial relations between a door handle and a door, and fruits and the bowl (Bowerman, 1996). In English and Russian, the spatial relation between the door handle and the door is described with *on* (support and contiguity) and *na* "on" (support) respectively. In Polish, however, more specific semantic conditions are required for the spatial relation shown in the situation just mentioned. When *Lo* is supported with horizontal surface *na* "on" is appropriate. But, in a situation where *Lo* is in normal contact with a vertical side and the attachment is salient, *przy* "on" is more representative.

For the spatial relation of containment, i.e., *fruits in the bowl*, it seems that English, Polish, and Russian express the relation in the same way. The prototypical instances of this use type include *Ro* with complete enclosure, e.g. *jar, bag*, or partial enclosure, e.g., *glass, bowl*. *Lo* contained in such *Ro* is described with *in*, *w* + L (Locative case), *v* + L (Locative case) in English, Polish, and Russian.

There is, however, disagreement between the three languages especially in describing the interior of a flat area (two dimensional *Ro*). According to Sysak-Boronska (1980: 54-63 cited in Cienki, 1989: 71-73), there are three types of surfaces in Polish. The first is a flat, frame-like surface. It can be composed of a non-material surface surrounded by a material boundary, e.g., a doorway, or is a border itself for a flat area,

e.g., a frame. In such *Ro*, *w* "in" is used. The second type of surface is the opposite of the first one. It is vast flat areas with imperceptible boundaries. To describe the spatial relation in that surface, *na* "on" is appropriate. The final type of flat area is the one between the previous two extremes above. The area may be surrounded by boundaries but not be very salient. In this context, the spatial relation could be specified either with *w* "in" or *na* "on".

In Russian, there are some differences in the use of *v* "in" and *na* "on" from Polish *w* "in" and *na* "on". However, the differences are not widespread and systematic as the uses of *in* in English and *w* "in" in Polish.

Regarding *at*, it seems that there is no true counterpart of *at* in Polish and Russian. The two languages require that the spatial relations between the objects must be specific from the beginning. Thus, the counterpart of *at* could be *na* "on", *w* "in", or *przy* "on" in Polish, and *na* "on", *v* "in" in Russian depending upon the relevant locative situations. For example, when *at* has the coincident reading, it usually corresponds to *na* "on" or *w* "in" in Polish, and *na* "on" or *v* "in" in Russian. *na* "on" is more common with the *Ro* schematized as two-dimensional, e.g., *skating rink* in Polish and Russian, while *w* in Polish and *v* in Russian is common with three-dimensional objects, e.g. a school.
The distinct translation equivalents in the languages stems from the different conceptualization of the locative relations at stake.

2.2.3 Levinson et al.'s cross-linguistic study on locative constructions

The main goal of Levinson et al.'s study (2003; 485-516) in *'Natural Concepts' in the Spatial Topological Domain-adpositional meanings in cross-linguistic perspective* is

to reevaluate the strong version of Universal Conceptual Categories or UCC for topological prepositions. The UCC is based on a set of standard assumptions listed below (in Levinson, 2003: 485-486):

a. The simplest spatial notions are topological – concepts of proximity, contiguity, containment (Piaget & Inhelder, 1956).

b. Such notions can be taken to be either primitive, so that we have conceptual primes like IN, ON, UNDER (Jackendoff, 1983), or near primitive, so that, for example, IN is decomposed in terms of at least partial inclusion (Miller & Johnson-Laird, 1976).

c. These concepts are more or less directly coded in spatial language, above all in the closed-class spatial relators like prepositions and postpositions, which have (comparatively) simple semantics (Talmy, 1983), largely universal in nature since they correspond to elements of our neurocognition (Landau & Jackendoff, 1993). Consequently, "we can develop a fairly comprehensive ideas of the spatial relations expressed in language by focusing on spatial prepositions" (Landau & Jackendoff, 1993; 223).

d. Hence, the topological adpositions are among the earliest concepts learned by children (Johnston & Slobin, 1979), and in learning them children map prelinguistic universal spatial concepts directly onto words (H. Clark, 1973, E. Clark, 1974), suggesting that we have rich innate concepts in this field (Li & Gleitman, 2002).

The claim is supported with the acquisition of English prepositions. Johnston and Slobin (1979), for example, investigated the development of children's locative acquisitions cross-linguistically, i.e., in English, Italian, Serbo-Croatian, and Turkish. In their study, Johnston and Slobin included 48 children (2;0 – 4;8) in each of the four

linguistic communities. Each child was tested by an experimenter. The experimenter placed a reference object, e.g., *a plate,* in front of the child. A located object, e.g., *a stone*, was then put next to the plate. The child was asked "*Where is the stone standing?*" The children were credited more when they could use a particular spatial word in an appropriate context than in the inappropriate contexts. For example, an English speaking child who correctly used both *under* configurations, i.e., under, underneath, would be given credit though he or she used it incorrectly to specify one of the *behind* configurations, i.e. behind, in back (of). He or she, however, was not given credit if he or she used *under* incorrectly two or more times.

Johnston and Slobin pointed out, despite the various patterns of developmental acquisition within the individual languages, e.g., the 3;4-4;0 Turkish subjects were unable to use the *back, front* for non-featured reference objects, while the Italian subjects at this age were advanced at the use of *back* and *front* for non-featured contexts. Moreover, the large percentage of English and Serbo-Croatian subjects failed to express any of the second group of locatives, e.g. $back_f$, $front_f$ for featured objects even at older age than the Turkish and Italian subjects, general cross-linguistic order emerged:

in/on/under/beside < $back_{feature}$/$front_{feature}$/between < back/front

The idea that children have pre-linguistic concepts of spatial relations gains further support from other scholars. Trying to challenge Piaget's claim that emphasizes the role of children's actions upon objects, other scholars pointed out that children are sensitive to many properties of spatial relations. For example, Antell and Caron (1985 cited in Bowerman, 1996: 388) found that within a few days or months of life children can differentiate the spatial scenes such as above-below. Additionally, Quinn and Eimas,

Behl-Chadha and Eimas (cited in Bowerman, 1996: 388) also indicate that children with an age of a few days or months can distinguish left-right spatial scenes. However, most of these studies are based on English and rely upon Herskovits's prototypical locative examples, e.g., spatial relations between human-made artifacts such as *a book on the table, fruits in the bowl*, rather than the extensions, e.g., spatial relations between human-made artifacts such as *the ring on the finger,* or spatial relations between non-human objects such as *the leaves on the tree, the nose on face*. To validate the strong claim of the UCC, it is necessary to look at how the topological spatial relation is expressed cross-linguistically.

Bowerman (1996: 293-398), for example, discusses how the following spatial situations containing simple spatial relations are described differently in English, Finnish, Dutch, and Spanish.

The cup on the table	The fruit in the bowl	The handle attached on the cupboard
on	*in*	*on*

a. English

The cup on the table	The fruit in the bowl	The handle attached on the cupboard
-lla	*-ssa*	*-ssa*

b. Finnish

The cup on the table	The fruit in the bowl	The handle attached on the cupboard
op	*in*	*aan*

c. Dutch

The cup on the table	The fruit in the bowl	The handle attached on the cupboard
en	*en*	*en*

d. Spanish

As can be seen from the use of prepositions for the spatial situations above that even for languages that are genetically related there is a different way of marking the locative construction. In English, the spatial relation of the cup and the table, and the handle and the cupboard are encoded with *on*, e.g., *the cup on the table, the handle on the cupboard*, but the preposition *in* is required to encode the spatial relation of containment, e.g., *the fruit is in the bowl*. It is in contrast to Finish where the spatial relation of the fruit and the bowl, and of the handle and the cupboard is marked with the same case ending *–ssa* "in". The relation between the cup and the table, however, is marked with a different case ending *–lla* "on".

Further distinctions can be pointed out in Dutch and Spanish. Different adpositions are employed to describe the spatial relations of the cup and the table (*op* "on_1"), of the fruit and the bowl (*in* "in"), and of the handle and the cupboard (*aan* "on_2") in Dutch, while in Spanish the same preposition *en* is used to describe all three spatial relations.

The question now is that if languages belonging to the same family, i.e., the Indo-European language family, encode the same spatial relations distinctly, how do languages from different language families mark the relation? Bowerman and Choi in their study of acquisition of topological relations in English, Korean and Dutch (2001: 490-491) pointed out that English children consistently distinguished *containment* from *support*, e.g., *put in*, *put on*, while Korean children were more attentive to the distinction between

the *interlocking* relations (*kkita*) and various "looser" kinds of joinings including putting clothing onto different body parts.

Levinson et al. (2003) investigate how nine unrelated languages, i.e., Basque, Dutch, Ewe, Lao, Lavukaleve, Tiriyó, Trumai, Yélî Dnye, Yukatek, mark spatial relations. Their findings show that the use of adpositions in the nine languages clusters around the notions of *attachment*, *superadjacency*, *full containment*, *subadjacency*, and *proximity*. Note that these notions are different from the standard English concepts of support, containment, and proximity. Unfortunately, these differences are not emphasized in the study of spatial relations. The differences, as Levinson et al. (2003: 513) says, support the Universal Tendency or UT rather than the strong version of UCC.

Regarding the spatial relation differences, where do they stem from? Levinson et al. (2003: 514) argue that "they should be seen in a functional perspective, given universal tendencies in human organization of the environment". For example, the *in* relation (in-container) is shared by nearly all contemporary cultures for different purposes. The Hunter-gatherers like the Australian Aboriginals, however, have little traditional use of containers. Instead, for the most part they use flattish trays. As a result, Australian languages conflate the IN/UNDER notions in a single spatial nominal. Similarly, for the *on* category, cultures that habituate to elevated working surfaces and storage above the ground distinguish such relations from, for example, *over*. Levinson et al. (2003: 514) further add "in addition to these cultural pressures for the distinction between special spatial relations, the shared nature of our human stance and preoccupations in a terrestrial environment with its uniform gravitational field offer additional functional sources for universal tendencies".

Given the fact that the concept *attachment* is crucial in the languages Levinson et al. (2003) studied, they will predict that when an earring is in a typical relation with an ear or when an earring is in atypical relation with an ear, i.e., it is attached on top of an ear, the concept *attachment* should be relevant in the two contexts. This prediction, however, is not true in Rongga, Balinese, and Indonesian since what seems to be more important in these languages is the expectedness of spatial relations between objects. Thus, in the former context, the *expected* prepositions are used in the languages, while a set of *unexpected* prepositions is used to describe the unexpected spatial relation in the later context.

2.2.4 Aryawibawa's study in Rongga

Quite interestingly, as I pointed out in my previous study of Rongga (Aryawibawa, 2008), neither of the two proposals just discussed is confirmed in Rongga. In my previous study using the topological relation picture series by Bowerman (1996) on semantics of spatial relations in Rongga (Aryawibawa, 2008) I found that Rongga prioritizes the concept of which I called a "natural" function, i.e., a function that is constrained by normal purpose of objects. With such a concept, the spatial relations in Rongga subsume two relations, i.e. *functional* and *locative* relations.

The functional relation requires the expected relation between objects being spatially described. For example, to use an appropriate preposition to describe the relation between *Lo*, e.g., a table cloth, a picture and *Ro*, e.g., a table, a wall, one should have knowledge of the expected relation between the *Lo* and *Ro*. More specifically, one should

know that the tablecloth typically covers the upward facing surface of the table and the picture is normally put on the wall as examples 2 and 3 show.

2. kain meja **one** meja
   cloth table on table
   "The tablecloth is on the table"

3. manga foto ja'o **one** kembi mbo
   there picture I on wall house
   "There is a picture on the house's wall"

In these situations, the expected preposition *one* is true and appropriate to describe the expected relations. However, if the picture is put on the table, e.g., a kitchen table or the tablecloth is put on the wall, the relations become unexpected since the relations between the objects are atypical in the language. To specify such relations, the unexpected prepositions *zheta wewo* or *zheta tolo* is used as illustrated in examples 4 and 5.

4. manga foto ja'o **zheta wewo/zheta tolo** meja
   there picture I on table
   "My picture is on the table".

5. kain meja **zheta wewo/zheta tolo** kembi mbo
   cloth table on wall house
   "The tablecloth is on the house's wall".

The expected relation for Rongga, i.e., *one*, is also used to specify the spatial relations between the *Lo* and body parts. For instance, if we want to describe the location of an earring on someone's ear, a necklace on someone's neck, a headband tied around

someone's head, a bandage on someone's ankle, a watch on someone's wrist, *one* should be used. In such contexts, the *Lo* are typically located on *Ro*, i.e., body parts.

In the contexts of unexpected relations, as previously exemplified, the expected relation is absent. For instance, as can be seen from the previous example, *one* is appropriate to locate the tablecloth in relation to the table since it is expected that the tablecloth is to cover the upward surface of the table. But now, if the tablecloth is folded and put back on the upward surface of the table, *one* is inappropriate because the tablecloth no longer performs its expected relation to the table, i.e., to cover the upper surface of the table. Rather, the unexpected preposition *zheta wewo* "up up" is appropriate since the unexpected relation is now more prominent, not the expected one.

Another example showing that having knowledge of the expected relation is essential in Rongga can be illustrated in the example *Air one gelas* "The water is in the glass". *One* is employed to describe the location of water in the glass because the water is normally contained in *a glass* or other containers such as a cup, a tea pot, etc. However, if the water is now removed from *the glass* and *a pen* is put in it instead, *one* is not applicable. In this context, the unexpected preposition *zhale one* "down expect" is more common since once again the expected relation is salient.

Thus, the locative concept of expected relation provides further evidence that both UCC and UT should be reevaluated. In the case of locative relations between an earring and an ear, and between clothing and a clothing line, for examples, it will be further examined if the concept *support* of UCC or *attachment* of UT is relevant in Rongga, Balinese, and Indonesian.

2.3 Summary

Herskovits (1982) indicates that the basic topological relations in English are, like the UCC's claim, related to the notions of *containment*, *support* and *contiguity*, and *coincidence*. Even though in most cases the similar spatial notions in English are also shared in Polish and Russian, results of the study by Cienki (1989) show that there are still distinctions in the spatial relation markings as further pointed out by Bowerman in English, Finnish, Dutch, and Spanish, and in English, Korean and Dutch. The more significant differences are indicated in the nine unrelated languages investigated by Levinson et al. Their study reveals such different spatial notions as *attachment*, *superadjacency*, *full containment*, *subadjacency*, and *proximity*. However, neither of these proposals is confirmed in Rongga, which prioritizes *expected* relations over *unexpected* relations.

For example, given a locative situation in Rongga as shown by spatial relation between apples and tree (Bowerman, 1996), Herskovits and Levinson will have different predictions about the appropriate adposition to describe the spatial relation between *Lo* (the apples) and *Ro* (the tree).

Herskovits will predict that the notion (vertical) *support* is relevant in that context, hence *on* is appropriate to describe the topological relation, e.g., *apples on the tree*. Meanwhile, Levinson et al's prediction is that the notion *attachment* is more relevant in the languages they studied, e.g., Yélî Dnye, Tiriyó. In Yélî Dnye, for example, the postposition *p:uu* "attached to" is used. Imagine that a piece of cloth is attached now on the tree, the concept *support* and *attachment* are also relevant in English and Yélî Dnye respectively.

Quite interestingly, unlike Herskovits's and Levinson's predictions, the idea of expected relation between the objects determines the selections of the appropriate preposition in Rongga. In the situation *apples on tree*, *one* "at" or "expect" is representative, not *zheta wewo* "on" or "unexpected" that is used to describe the situation *a piece of cloth on the tree*.

In the next chapter, I address the basic grammatical properties in Rongga, Balinese, and Indonesian and the grammar of topological relations in the languages. I will also overview how the topological relations are coded in the languages.

Chapter 3

The Grammar of Topological Relations in Rongga, Balinese, and Indonesian

3.1 Introduction

This chapter describes basic grammatical properties and grammar of topological relations in Rongga, Balinese, and Indonesian. The description of basic grammatical properties for Rongga, Balinese, and Indonesian is presented in section 3.2. Sections 3.3 and 3.4 discuss the grammar of topological relations and overview the topological relations respectively in the three languages followed with a brief summary.

3.2 Basic grammatical properties of Rongga, Balinese, and Indonesian

The following are some basic properties of Rongga, Balinese, and Indonesian grammar. All examples coded in the right margin indicate languages, R= Rongga, B= Balinese, I= Indonesian.

a. The basic word order is SVO.

1. ja'o ala li'e one mako R
   I take fruit in bowl
   "I took the fruit in the bowl ".

   rage-e n-mak buah ane di mangkok-e B
   I-the act.[3]-take fruit that at bowl-the
   "I took the fruit in the bowl".

   saya n-ambil buah yang di mangkok I
   I act.-take fruit that at bowl
   "I took the fruit in the bowl". (Elicitation)

[3] act.= active verb marker

This basic word order is determined based on two tests – frequency and markedness. Of 35 Rongga sentences that occur in the text *Pake* "Frog", 94% of them have SVO word order. In cases where the order VO is found in Rongga, the subject is dropped as the following example shows.

2. wuku-wuku niu pake ndau dano pota mbiwa zhenge
   shout shout call frog that also lost not hear

   ko talu
   part answer
   "Called out the frog but there was no answer from it". (*Pake* "Frog" text)

Like Rongga, the subject can also be dropped in Balinese and Indonesian. When this happens, the discourse informs who the subject is as can be observed in the following dialogues. The Balinese examples are from Arka (2005b: 7).

A: Nyoman k-ija? B
   Nyoman to-where
   "Nyoman, where (are you going) to?"

B: n-kaja-an/*kaja
   act.-north-loc.
   "(I am going) toward the north"

A: kemana Pak? I
   where Sir
   "Where are you going Sir?"

B: mau ke kantor
   want to office
   "(I want) to go to office".

Following the dialogue in the two languages, it can be predicted correctly that the subjects in B utterances is B, i.e., "I". The subject is not necessarily stated because the

discourse context has informed sufficiently who the interlocutors, i.e., addresser and addressee, in the discourse are. Such constructions are common in the languages.

In contrast to the subject, there is no example of a sentence with a missing object in the text in Rongga. It seems that, based on the data available, the object is obligatory in Rongga. This is also true in Balinese and Indonesian.

The markedness test also confirms that SVO is the basic word order in the three languages. Let's look at examples in 3 to explain it.

3. ndoi,	Sis	ti'i	na'a	ja'o	R
money	Sis	give	to	me	
"Money, Sis gave me"					
pis,	baange	rage-e	teken	Wayan	B
money	give	me	by	Wayan	
"Money was given to me by Wayan"					
uang,	Budi	kasi	(ke)	aku	I
money	Budi	give	(to)	me	
"Money, Sis gave me"					

Based on the examples in 3, Rongga and Indonesian are the same, i.e., the two languages use topicalization. In Balinese, nevertheless, the passive construction is used in that context (in the sense of Chung's explanation of non-canonical passive construction in Indonesian). If we look at Balinese example in 3, *pis* "money" is the subject since it occurs before the passive verb *baange* "give". Wayan is the oblique for it is preceded by the preposition *teken* "by". Compare it, for example, to the verb *ngemaang/n-baang* "give" in the active sentence in Balinese in 4 below. However, even though the examples are possible, those structures are relatively uncommon in Rongga, Balinese, and Indonesian, i.e., they are only spoken to emphasize that money is given to me, not

something else. Put another way, the constructions in 3 are more "marked" than those in 1.

Moreover, Rongga, Balinese, and Indonesian do not distinguish the morphological forms of subject and object. In other words, the three languages lack a case system as illustrated in the examples in 4 and 5.

4. **ja'o** ti'i kau li'e R
   I give you fruits
   "I gave you fruits"

   rage-e n-baang awak-e buah-e B
   I-the act.-give you-the fruits-the
   "I gave you fruits".

   saya kasi kamu buah I
   I give you fruits
   "I gave you fruits"

5. kau ti'i **ja'o** li'e R
   you give me fruit
   "You gave me fruits"

   awak-e n-baang **rage-e** buah-e B
   you give me fruits-the
   "You gave me fruits"

   kamu kasi **saya** buah I
   you give me fruit
   "You gave me fruits"

The examples show that the forms of the pronoun *ja'o, rage, saya* "I" as the subjects are the same as their forms as the objects *ja'o, ragee, saya* "me" respectively in Rongga, Balinese, and Indonesian. Note that the forms *kau, awake, kamu*" you" as the subjects are also the same as *kau, awake, kamu* "you" as the objects.

b. The noun modifiers, e.g., demonstrative, adjective, possessive forms, are postnominal in the languages as can be seen in the following examples.

6. manga one sa mbo mazhi ko ana **ito ndau** R
exist in one house live part child little that
"There is a little child living in one house". (*Pake* 'frog' text)

anak **cenik ento** di rumah-**ne** B
childlittle that at house-the
"The little child was at home".

anak **kecil itu** ada di rumah-**nya** I
child little that exist at house-his
"The little child was at his house".

However, the numeral marker in Rongga and Indonesian is prenominal, while it is postnominal in Balinese as examples in 7 illustrate.

7. **sa** mbo R
one house
"a house"

umah **a(h)** bungkul B
house one class.[4]
"a house."

sebuah rumah I
one house
"a house".

c. The direct object usually appears after the indirect object.

8. Sis ti'i **kazhi ndoi** R
Sis give her money
"Sis gave her money". (Elicitation)

[4] class. = classifier

Wayan	n-baang	**rage-e pis**	B
Wayan	act.-give	me-the money	
"Wayan gave me money".			

Budi	kasi	**aku uang**	I
Budi	give	me money	
"Budi gave me money".			

But, when the direct objects precede the indirect objects there is a preposition that precedes the indirect objects in Rongga and Indonesian. In Balinese, on the other hand, the direct object can precede the indirect object, but without a preposition between the two objects.

9. Sis	ti'i	ndoi	**na'a** kazhi	R
Sis	give	money	to/for her	
"Sis gave money to her". (Elicitation)				

Wayan	n-baang	pis	rage-e	B
Wayan	act.-give	money	me-the	
"Wayan	gave me money".			

Budi	kasi	uang	**ke** aku	I
Budi	give	money	to/for me	
"Budi gave me money".				

Benefactive constructions in Rongga and Indonesian are also described with prepositions. In contrast, this construction is described by lexical words, i.e., a verb, in Balinese.

10. Carles	kengo	wae	**pi'i**	Sis	R
Carles	make	tea	to/for	Sis	
"Carles made tea for Sis". (Elicitation)					

Wayan	n-gae	teh	**baang**	meme	B
Wayan	act-make	tea	give	mother	
"Wayan	made tea for mother".				

Budi	bikin	teh	untuk	ibu	I
Budi	make	tea	for	mother	

"Budi made tea for mother".

Instrument constructions using verbs, e.g., *cut*, also use prepositions in Rongga and Indonesian, but lexical words, i.e., a verb, in Balinese.

11. ja'o	to'i	kajuperi	**ne'e**	gergaji		R
I	cut	bamboo	with	saw		

"I cut the bamboo with a saw". (Elicitation)

rage-e	n-getep	tiing	**n-anggon**	gergaji	B
I	act.-cut	bamboo	act.-use	saw	

"I cut the bamboo with a saw".

saya	me-potong	bambu	**dengan**	gergaji	I
I	act-cut	bamboo	with	saw	

"I cut the bamboo with a saw".

But, comitative constructions using verbs, e.g., *see*, a preposition is used in the three languages.

12. om	Domi moni	film	**ne'e**	Ivan		R
uncle	Domi see	film	with	Ivan		

"Uncle Domi saw film with Ivan". (Elicitation)

Made	m-balih	film	**ajak**	Putu	B
Made	act-see	film	with	Putu	

"Made saw film with Putu".

Iwan	n-tonton	film	**dengan**	Wati	I
Iwan	act.-see	film	with	Wati	

"Iwan saw film with Wati".

d. An adverb, in general, occurs after the word it modifies. For example, the adverbs of intensifier *tu'u* and *bholo* in Rongga, *sajaan* in Balinese, and *sekali* in Indonesian (all are glossed "very" in English) modify the adjectives that occur before them.

13. mezhe **tu'u/bholo** R
big very
"very big" (Rongga grammar book by Arka et al. 2007)

gede **sajaan** B
big very
"very big"

besar **sekali** I
big very
"very big"

The intensifier *very* also occurs after the verb in Rongga, Balinese, and Indonesian.

14. ja'o le he kau **bholo** ko R
I part remember you very part
"I remember you very well". (Rongga grammar book by Arka et al. 2007)

rage-e inget **sajan** ajak awak-e B
I-the remember very with you-t
"I remember you very well".

aku ingat **sekali** dengan kamu I
I remember very with you
"I remember yor very well".

The adverb of manner which is commonly formed by combining a preposition and an adjective, especially when it occurs with an intransitive verb, follows a verb in Rongga and Indonesian. In Balinese, however, no preposition is needed before an adjective. In

this case, the Balinese adjective can function as an adverb as can be seen in examples in 15.

15. kazhi soro **ne** **molo** bhate ngge wolo ndia Rongga
she speak with nice all each mountain here Rongga
"She speaks nicely to every mountain here'. (Rongga grammar book by Arka et al. 2007) R

iye n-omong **halus** B
he/she act.-speak polite
"He/she speaks politely".

dia ber-bicara **dengan** **sopan** I
he/she act.-speak with polite
"He/she speaks politely".

However, when the adverb of manner appears with a transitive verb, it is usually mobile, i.e., it can occur at the beginning, at the end of the verb, or after an object.

e. The relative clause in Rongga, Balinese, and Indonesian is postnominal. Typologically, this property is expected in a verb-medial language that behaves like a verb initial language.

16. tana **ata** ngia wake mbo ndi'i ja'o. R
land that place build house live I
"I live in the place that I built the house". (Autobiography Bapak Antonius Gelang)

rage-e ketemu anak muani **ane** nakal B
I-the meet person male who naughty
"I met the man who is naughty".

ibu m-lihat ular **yang** masuk ke kamar-nya I
mother act-.see snake that crawl to room-her
"Mother saw the snake that crawled into her room".

f. Tense in Rongga, Balinese, and Indonesian is marked by distinct lexical forms, which are mobile. In other words, the verb is not marked to indicate the tense.

17. ana ndau mata ga **nembumai** R
child that die already yesterday
"The child died yesterday". (Rongga grammar book by Arka et al. 2007)

anak cenik ento suba sing nuu **dibi** B
child little that already not alive yesterday
"The little child died yesterday".

anak kecil itu sudah meninggal **kemarin** I
child little that already die yesterday
"The little child died yesterday".

3.3 The grammar of topological relations

Languages differ in the way they mark topological relations. The next sub-section addresses the grammar of topological relations across languages followed by a discussion of the grammar of topological relations in Rongga, Balinese, and Indonesian.

3.3.1 Cross-linguistic grammar of topological relations

A topological construction describes how *Lo* is spatially related to *Ro*. The locative relations between the *Lo* and *Ro* itself may be expressed using locative adpositions, e.g., prepositions, postpositions, as examples 18-20 in English below illustrate.

18. The bird is **in** the tree.
19. The book is **on** the table.
20. The train is **at** Victoria Station.

In these examples, there are topological relations between *Lo*, i.e., *the bird, the book, the train* and *Ro*, i.e., *the tree, the table, Victoria Station*. And to describe the topological relations in the examples the prepositions, e.g., *on, in, at,* are used in English. In other words, the spatial information is coded lexically.

However, the adpositions are not the only relators employed to describe topological relations. There are also languages where the spatial information is coded with lexical words, but a different category than the adpositions. In an isolating language like Thai, the spatial nominal is used to specify the topological relations between objects as example 21 shows (taken from Levinson, 2003: 102).

21. khăw yùu bâan
he stay house
"He is at home"

In Thai, the spatial nominal *bâan* "house" can function without any further marker to specify the spatial information.

In addition to the adpositions and spatial nominal, a locative case can also be used to express the spatial information. Examples 22 and 23 that I elicited from a native speaker of Marathi illustrate this.

22. pustUk tebla-**wUr**[5] aH[6]e
book table-**on** COP[7].SG[8]
"The book is on the table".

5 Orthography /U/ is for [ə]
[6] Orthography /H/ is for [h]
[7] COP= copula
[8] SG= singular

23. pustUk pis'wi-**t** aHe
book bag-**in** COP.SG
"The book is in the bag"

Unlike English, Marathi does not use adpositions to specify its locative constructions. Instead, Marathi uses a locative case. To make it more concrete, let's look at examples 22-23. The examples inform us that the suffix *–wUr* corresponds to *on*, while the suffix *–t* corresponds to *in* in English.

However, there is also a case where the spatial information is distributed through a clause. To make it more specific, example 24 in Arrernte, an Australian language (taken from Levinson (2003: 100), is presented.

24. panikane-∅ tipwele akertne-le aneme
cup-NOM table superadjacent-LOC sit
"The cup is on the table"

In this language, the locative case, i.e., *–le* is used to specify the topological relation. But, *-le* is not used alone for that purpose. *–le* is also combined with the spatial nominal *akertne* glossed as supperadjacent, i.e., it covers both *on* and *over*. The use of *akertne* is to further specify the nature of the reference object *tipwele* "table". The adjunction of *akertne* to the non-case-marked *tipwele* "table" signals a part-whole relation, specializing *akertne* to "top surface". Furthermore, the verb *aneme* "sit" also contributes to the topological construction. Specifically, the verb signals the shape and orientation of the *Lo panikane* "cup" in relation to the reference object *tipwele* "table" (Levinson, 2003).

3.3.2 The grammar of topological relations in Rongga, Balinese, and Indonesian

Rongga, Balinese, and Indonesian use adpositions, i.e., prepositions, to express their topological relations. The topological constructions that use prepositional phrases are placed after the subjects or objects. Typologically, this property of adpositions, i.e., preposition, is consistent with Rongga, Balinese, and Indonesian as verb-medial languages.

25. ja'o ala li'e **one** mako R
I take fruit expect bowl
"I took the fruit in the bowl". (Elicitation)

rage-e n-mak buah ane **di** mangkok-e B
I-the act.[9]-take fruit expect bowl-the
"I took the fruit in the bowl".

saya n-ambil buah yang **di** mangkok I
I act.-take fruit that expect bowl
"I took the fruit in the bowl". (Elicitation)

26. handfon **zhale** **one** gelas R
handphone down expect glass
"The handphone is in the glass".

handfon-e **di** **tengah** gelas-e B
handphone-the expect inside glass-the
"The handphone is in the glass".

handfon itu **di** **dalam** gelas I
handphone that expect inside glass
"The handphone is in the glass".

27. lambu **zheta** **wewo** meja R
shirt up up table
"The shirt is on the table". (Elicitation)

baju-e **di** **duur** meja-e B
cup-the expect up table-the
"The cup is on the table".

[9] act.= active verb marker

baju	itu	**di**	**atas**	meja	I
cup	that	expect	up	table	

"The cup is on the table".

Examples 26 and 27 show that Rongga, Balinese, and Indonesian lack of copula verbs.

To explain the syntactic forms of the *expected* prepositions, i.e. *one, di, di*, I use a phrase structure rule (Chomsky, 1965).

S ⟶ NP VP

NP ⟶ Det. N

N ⟶ (AP) N (PP)

PP ⟶ P N (*expected* preposition, e.g., *one/di/di* "expect")

PP ⟶ P [P N] N (*unexpected*/complex preposition, e.g. B: *di tengah* "expect inside"; I: *di atas* "expect up")

According to the phrase structure rule, a sentence (S) is composed of a noun phrase (NP) and a verbal phrase (VP), a NP is composed of a determiner (Det.) and a noun (N). Likewise, a prepositional phrase (PP) is also composed of a preposition followed by a noun. Since *one, di,* and *di* "expect" in Rongga, Balinese, and Indonesian respectively are always followed with nouns in prepositional phrases, e.g., R: *one gelas* "in the glass"; B: *di tase* "in the bag"; I: *di dompet* "in the wallet", they are called prepositions in the languages.

The syntactic composition of the *unexpected* prepositions *di tengah* and *di dalam* in Balinese and Indonesian respectively are formed by combining the preposition *di* "expect" and the noun, i.e., place, *tengah* and the noun, i.e., a place, *dalam* both mean "inside" in Balinese and Indonesian. The evidence that *tengah* is a noun, i.e., a place, in Balinese can be tested by using other prepositions with *tengah*, e.g., ***ke*** *tengah* "to

inside", ***uli*** *tengah* "from inside". The same test can also be applied in Indonesian, e.g., ***ke*** *dalam* "to inside", ***dari*** *dalam* "from inside". When *di* is followed with *tengah* in Balinese and with *dalam* in Indonesian, as the phrase structure rule shows, *di tengah* and *di dalam* syntactically function as complex prepositions. The evidence can be seen from the fact that the complex prepositions *di tengah* and *di dalam* are followed with nouns in prepositional phrases, e.g., B: ***di tengah*** *gelase* "in the glass"; I: ***di dalam*** *gelas* "in the glass. Recall that in the phrase structure rule the preposition *di* in the two languages is also followed with nouns in prepositional phrases, e.g., B: ***di*** *gelase* "in the glass"; I: ***di*** *gelas* "in the glass. Note that *tengah* and *dalam* as prepositions can be used without *di* especially in casual speech. In the standard, i.e. formal Balinese and Indonesian, however, the two prepositions must be used.

At this point there is no study reporting why Balinese and Indonesian share the same preposition *di*. Balinese may have borrowed the preposition *di* from Indonesian. In Balinese, there is the native form of a preposition equivalent in meaning with *di* "expect" in Indonesian, namely the preposition *ring* "expect". Nevertheless, this preposition is used in very limited contexts, e.g., when someone speaks to people from the higher cast, e.g. *Brahmana* cast, or in formal written texts. For example, when I speak to a Brahmana person to describe the spatial relation *water in the glass* I will use *ring tengah* "in", e.g., *toyae* ***ring tengah*** *gelase, Ratu* instead of *di tengah* "expect inside", e.g., *yehe* ***di tengah*** *gelase*.

Note also that syntactically *di tengah* and *di dalam* can function as adjectives as well. The evidence is *di tengah* and *di dalam* can be modified by intensifiers *sajaan* "very" and *sekali* "very" in Balinese and Indonesian respectively, e.g., B: *di tengah*

sajaan "very deep inside"; I: *di dalam* ***sekali*** "very deep inside". In other words, both *sajan* and *sekali* modify *di tengah* and *di dalam*.

In Balinese and Indonesian, like the *unexpected* prepositions *di tengah* and *di dalam* "in", the *unexpected* prepositions *di duur* and *di atas* "expect up" are also syntactically derived by combining the preposition *di* and the noun, i.e., a place *duur*, which means "up/above" in Balinese, and the noun, i.e., a place *atas*, which also means "up/above". The evidence that *duur* and *atas* are nouns, i.e., places, can be seen from the fact that these nouns can also occur with other prepositions, e.g., B: ***uli*** *duur* "from above"; I: ***dari*** *atas* "from above". The other syntactic evidence that *duur* and *atas* are nouns can be tested with a possessor. Specifically, *duur* can occur with the possessor *cange* "my" in Balinese, e.g., *duur* ***cange*** "my top of head" and *atas* can occur with the possessor *nya* "its", e.g., *atas* ***nya*** "its top". In Balinese especially in casual talk *duur* can be used without *di*, e.g., *batae* ***duur*** *mejae* "the brick is on the table". In formal Balinese, however, *di* and *duur* must be used together, e.g., *iye negak* ***di duur*** *mejae* "he/she sat on the table". It is in contrast to *di atas* in Indonesian where *di* and *atas* must be used both in formal and casual talks.

Regarding the syntactic forms of the *unexpected* prepositions in Rongga, i.e., *zhale one, zheta wewo/tolo*, at this point it is unclear why *one* occurs second in the form *zhale one* and why *one* is not extended to *zheta wewo/tolo*, i.e., *one zheta wewo/tolo*. When I asked my language consultants if it is possible to say *one zhale* or *one zhetawewo/tolo*, they said "no". Further investigation is necessary to uncover the syntactic motivation of the *unexpected* prepositions in Rongga. Since *zheta wewo/zheta tolo* "up up", *zhale one* "down expect" in Rongga are also followed with nouns in

prepositional phrases they are categorized as prepositions as well, i.e., the *unexpected* prepositions.

Semantically, the meanings of *di tengah* "expect inside", *di duur* "expect up" in Balinese are derived from the combination of literal meanings of *di* "expect", *tengah* "inside", and *duur* "up". Likewise, the meanings of *di dalam* "expect inside", *di atas* "expect up" in Indonesian are also composed of the literal meanings of *di* "expect", *dalam* "inside", and *atas* "up". Moreover, the semantic composition of *di tengah* and *di duur* in Balinese, and *di dalam* and *di atas* in Indonesian may also be attributed to the intrinsic features of reference objects. Put another way, *di tengah* and *di dalam* "expect inside" are used in Balinese and Indonesian when a *Lo* is within the inherent concave surface of a *Ro*, and *di duur* and *di atas* "expect up" in Balinese and Indonesian are used when a *Lo* is on the inherent top part of a reference object.

Regarding the semantic composition of the *unexpected* prepositions in Rongga, the meaning of *zhale one* is composed of the literal meanings of *zahle* "down" and *one* "expect". The intrinsic feature of a reference object may also contribute to the meaning of *zhale one*. Specifically, when *zahle one* is used the location of a *Lo* is within an inherent concave surface of a *Ro*. The use of *zhale* "under" in the form could be motivated by the inherent concave surface of a *Ro*. Thus, the combination of the two prepositions produces the meaning "inside". Note that to express the proper meaning of *zhale one* "down expect", the two prepositions, i.e., *zhale* and *one* must be used.

In relation to the meaning of *zheta wewo* "up up", the actual meaning of *zheta* in Rongga is "up". Topologically, it is associated with *wewo* (*zheta wewo*) and *tolo* (*zheta tolo)* that also mean "up". It is typical of Rongga to juxtapose two words with the same

meaning (Arka, 2004b: 5). The other example can be seen in the preposition *zhale wena* "under". This preposition is derived from the forms *zhale* "down" and *wena* "under/below". Note that the meaning for *wena* is also rather unclear at this point because *wena*, according to my language consultants, can also mean "side", e.g., *olo wena* "front side". But, why *zhale one* is not a result of juxtaposition of two words with the same meanings is also unclear at this point.

In addition to the constructions in examples 26 and 27, the topological relations especially the constructions using positional verbs, e.g., *sit,* can also be expressed by using applicative-like constructions, i.e., "locative" applicative constructions, especially in Balinese and Indonesian as illustrated in examples below.

28. iye n-tegak **di** kursi-e B
he/she act[10]-sit expect chair-the
"He/she is sitting on the chair".

iye n-tegak-**in** kursi-e
he/she act-sit-appl.[11] chair-the
"He/she is sitting on the chair".

29. dia duduk **di** kursi itu I
he/she sit expect chair the
"He/she is sitting on the chair".

dia m-duduk-**i** kursi itu
he/she act-sit-appl. chair that
"He/she is sitting on the chair".

I call these constructions applicative-like constructions because they are not exactly like the common applicative constructions, which have double objects, e.g., *I*

[10] act.= active verb marker
11 appl.= applicative

*gave **a book to John,** I gave **John a book***. According to Baker (1988:229), these constructions are called preposition "incorporation", i.e., the syntactic movement of a X^o category to adjoin to its X^o governor. The examples above in fact only have one object, i.e., the objects of prepositions. However, the second examples in 27 and 28 behave like the applicative constructions.

In the first examples of 28 and 29, the relation between the *Lo* and *Ro* is *expected* because *Ro* the chair serves a normal *purpose* and the *Lo* the person is in normal *relation* with the *Ro*. Therefore, the *expected* preposition *di* is used to describe such a spatial situation in Balinese and Indonesian. Syntactically, *kursie* and *kursi* "chair" in the first examples of 28 and 29 are the objects of the prepositions *di*, *di*. In the second examples of 28 and 29, the grammatical function of *kursie* and *kursi* changes to become the direct object of the verbs *negakin* and *menduduki* in Balinese and Indonesian respectively. Thus, they behave like applicative constructions.

However, the *unexpected* relations between objects can also be specified using the "locative" applicative constructions as illustrated in the following examples.

30. murid-é n-tegak **di** **duur** meja-é B
student-the act-sit expect up table-the
"The student is sitting on the table".

murid-é n-tegak-**in** meja-é
student act-sit-appl table-the
"The student is sitting on the table".

31. murid itu duduk **di** **atas** méja I
student that sit expect up table
"The student is sitting on the table".

murid	itu	m-duduk-**i**	méja
student	that	act.-sit-appl.	table

"The student is sitting on the table".

In the first examples of 30 and 31, the relation between objects is *unexpected* since the table does not serve the normal *purpose*. Hence, the spatial prepositions *di duur*, *di atas* are appropriate now in the two languages. Like in examples 28 and 29, *Ro* in the first examples in 30 and 31 are the direct object of prepositions *di duur*, *di atas* "expect up". But, *Ro* in the second examples of 30 and 31 becomes the direct object of the verbs. Again the process of preposition "incorporation" can be seen here. Given these evidence, it suggests that the *expected* and *unexpected* relations in Balinese and Indonesian are not constrained syntactically since both relations can appear as "locative" applicative constructions. In other words, the topological relations in the two languages seem to be purely semantically motivated in nature.

Unlike Balinese and Indonesian, Rongga does not have "locative" applicative constructions. Therefore, the only way to express the *expected* and *unexpected* relations described in the sentences in Balinese and Indonesian above are *Ja'o po'o **one** kadhera* "I am sitting on the chair" and *Ja'o po'o **zheta wewo** meja* "I am sitting on the table".

3.4 Overview of coding topological relations in Rongga, Balinese, and Indonesian.

A topological construction describes how a *Lo* is spatially related to a reference *Ro*. The topological relation between the *Lo* and *Ro* itself is expressed using locative prepositions. As can be seen in the previous examples, the *Ro* appears after the *Lo* and locative prepositions. Other examples are presented below.

32. lambu kau **one** lemari R
shirt you expect cupboard
"Your shirt is in the cupboard". (Elicitation)

baju-e **di** lemari-e B
shirt-the expect cupboard-the
"The shirt is in the cupboard"

baju ada **di** lemari I
shirt exist expect cupboard
"The shirt is in the cupboard"

3.4.1 Encoding and decoding topological relations in Rongga, Balinese, and Indonesian

As explained by Herskovits (1982, 1986), the two main problems in interpreting a topological construction are the process of encoding, i.e., generation of locative constructions, and decoding, i.e., interpretation of locative constructions. For example, given a locative situation as in Picture 1 below, what is the appropriate preposition to describe the locative relation between the *Lo*, i.e. *the earring*, and the *Ro*, i.e., *the ear*, in the three languages?

Picture 1: An earring on her ear

Or, given locative constructions such as R: *Lambu kau **one** lemari* "Your shirt is in the cupboard"; B: *Bajue **di** lemarie* "The shirt is in the cupboard"; I: *Baju ada **di*** lemari "The shirt is in the cupboard", what real world situations correspond to its interpretation in the

three languages? I describe some relevant aspects of Rongga, Balinese, and Indonesian topological constructions in the following sub-sections.

3.4.2 Normality

The locative construction *the man at the desk* can have multiple interpretations, e.g., the location of the man, the man is working at his desk. Herskovits says that the interpretation is based on "normal" situation types. However, the discussion of normality provided by Herskovits, i.e., conformity to the laws of physics, the place where the objects belong, and the "normality" of objects, is to encode and decode physical norms, i.e., the designed purpose of human-made objects rather than cultural norms, i.e., what is considered to be normal not only in relation with human –made artifacts, but also with part-whole relation and juxtaposition in certain linguistic communities.

The generation and interpretation of Rongga, Balinese, and Indonesian locative constructions are related to cultural norms of locative relations between the *Lo* and *Ro*, i.e. whether the spatial relation between objects is *expected* or *unexpected*, which is affected by three spatial domains: spatial relations between human-made artifacts, part-whole relations, and juxtapositional relations between objects as discussed further in chapter 4.. In addition to the physical norms discussed by Herskovits, Rongga, Balinese, and Indonesian locative relations are based on the "expectedness" of relations between objects for speakers of the three languages. For example, given a locative situation between an earring and an ear, the preposition *one*, *di*, and *di* "on" in Rongga, Balinese, and Indonesian respectively is appropriate to describe the *expected* spatial relation between the earring and the ear. The *expected* relation applies since the earring is

normally located on the ear. Imagine now if the earring is put on top the ear. In this context, the spatial relation between the objects is *unexpected*, and prepositions *zheta wewo, di duur, di atas* are appropriate in Rongga, Balinese, and Indonesian respectively. These examples suggest that the prepositions *one*, *di*, *di* "expect" describe the cultural norms for spatial relations, while the prepositions *zheta wewo* "up up"*, di duur* "expect up"*, di atas* "expect up" are used to specify the *unexpected* spatial relations between the *Lo* and *Ro*. The prominence that Rongga, Balinese, and Indonesian give to *expected* over *unexpected* relations has not been documented in other languages and will be, among other things, the main focus of this study.

The Rongga, Balinese, and Indonesian prepositions contrast semantically with the locative prepositions to describe an earring on the woman's ear shown in Picture 1 above. In English, as predicted by Herskovits for example, the notion *support* is relevant, hence *on* is appropriate. Imagine now that the earring is placed on top of the ear, the preposition *on* can be used as well. In Rongga, Balinese, and Indonesian, nevertheless, the former context is considered *expected*, i.e., the *expected* prepositions are used to describe the topological relation, while in the latter context it is *unexpected*, i.e., the *unexpected* prepositions are used in the languages to describe the relation.

Levinson et al. (2003), however, will predict that the postposition *p:uu* is used in Yélî Dnye for example to describe the topological relation in Picture 1 since the notion "*attached to*" is more salient in that language. The same preposition should also be true to describe an earring attached on top of an ear in Yélî Dnye since the concept "attached to" is relevant. In Rongga, Balinese, and Indonesian on the other hand there is simply no such a concept expressed by adpositions in the languages. What is important is the

expectedness of spatial relation between objects. Thus, in the former context, i.e., Picture 1, the *expected* prepositions are used, while in the latter situation, i.e., the earring attached on top of the ear, the *unexpected* prepositions may be practiced.

In the locative situations, e.g., *the headband on head, the clothing on the clothsline, the picture on the wall* (Bowerman, 1996), the *expected* relation also hold to describe the topological relations between the *Lo* and the *Ro*. The *expected* relation and other features relevant to the topological constructions in Rongga, Balinese, and Indonesian, and a more precise definition of *expected* relation will be presented in Chapter 4.

The salience of *expected* relation is a decisive feature in the description of locative relations in Rongga, Balinese, and Indonesian. In many cases, there is considerable overlap between the expression of *unexpected* and *expected* relations, however the two concepts are distinct and should not be confused. I will attempt to clarify the *expected* relation that *one, di, di* express in Chapter 4 and demonstrate the distinction between *expected* and *unexpected* relations. Rongga, Balinese, and Indonesian appear to be unique in the priority they give to *expected* relations. No other discussions of locative relations in the world's languages have discussed an *expected* basis as the primary determinant of locative relations, e.g., Cienki, 1989, Herskovits, 1982, 1986, Jackendoff, 1983, Levinson, 2003. In this study, I will illustrate the *expected* basis of locative relations in the three languages and attempt to define the *expected* relations that Rongga, Balinese, and Indonesian speakers consider "normal".

3.4.3 Pragmatics

The other factor that is essential to the interpretation of locative constructions is pragmatics. Herskovits (1982, 1986) discusses how the pragmatic principles, i.e., relevance, salience, tolerance and vagueness, and typicality, are used to interpret complex spatial relations in English. The pragmatic principles, however, are different from the *expected* relation. For example, the preposition *on* is used in English for both *the glass on the table* and *the glass on the TV* because the concept *support* is relevant in the two contexts. In Rongga, Balinese, and Indonesian, nevertheless, the former spatial context is marked with a different topological preposition from the latter context, i.e., the former context is *expected*, while the latter one is *unexpected*.

Pragmatics, as Jackendoff (1983: 208) explains, is "a theory of invited reference, relation to discourse, and relation to the world". The speaker and the hearer are supposed to share the same pragmatic knowledge when they encode or decode the locative constructions involved in communication. The pragmatic knowledge includes, among other things, knowledge of the world.

3.4.3.1 World knowledge

In the examples Rongga: *Mok **one** meja*, Balinese: *Cangkire **di** mejae*, Indonesian *Cangkirnya **di** meja* "The glass is on the table" we generally assume that the table is supported by the ground, i.e., the floor, and the glass stands on the horizontal surface of the table in a position to hold liquids. Such knowledge of the world is a part of the pragmatic knowledge that we employ to interpret locative expressions. In other words, our interpretation of locative constructions is based upon our naïve view, i.e., in contrast

with the more scientific theories. In accordance with this view, Herskovits (1986: 64-65) states:

> "Space is three-dimensional, isotropic, and Euclidian. The earth is immobile, and its surface—the ground—extends to infinity in all directions. The ground has bumps and hollows, but keeps overall within not "excessive" distances from an horizontal plane. Above the ground is empty space, and underneath, earth and rocks to unknown depth. In places, solid ground gives way to seas, lakes, and rivers, with more or less horizontal top surfaces except where rivers fall.
>
> The ground supports solid objects, which are connected, isolatable wholes. At a given instant, they have a well-defined surface, which separates the inner substances of the object from the outside world. Each has a shape and a location in space. The surface of an object may appear totally plane and smooth, but it may also have a very apparent "texture", i.e. some more or less periodic three-dimensional patterns.
>
> Liquids may be still, or agitated, or flowing. When still, they are contained, and have an horizontal top surface. Liquid in movement may maintain the overall shape, and thus constitute an "object", although none of its parts are the same from one moment to the next. Some "objects" have less definite shapes: air, clouds, fog, etc. There is light and darkness, and shadows with more or less definite shapes, all without substance.
>
> Gravity pervades space. Every object, unless it is in movement, or lighter than air, must be supported, either by the ground, or by another object which is itself supported. Water will support some objects and not others.

Herskovits (1982: 66) calls this view the *canonical description* of the world. In the everyday use of locative constructions, however, our description of the spatial relations between objects is not based upon the canonical description. Rather, it reflects the ways in which we conceptualize these relationships. For example, when we say *in the valley*, it does not necessarily reflect the exact boundary of the valley. In fact, the boundary is a result of our mental processing of the real view, i.e., the boundary of the valley. Thus, *in the valley* reveals our conceptualization of the real world. In Jackendoff's words (1990), *in the valley* is "the projection of the real world in our mind".

3.4.3.2 Figure/Ground relationship

The other pragmatic knowledge relevant to the encoding and decoding process is our understanding of the Figure and Ground (*Lo* and *Ro* in this study) relationship. Talmy (2000: 315-316) provides the characteristics of Figure and Ground as follows:

Figure	**Ground**
• more movable	more permanently located
• smaller	larger
• geometrically simpler (often pointlike) in its treatment	geometrically more complex in its treatment
• more recently on the scene/in awareness	more familiar/expected
• of greater concern/ relevance	of lesser concern/relevance
• less immediately perceivable	more immediately perceivable
• more salient, once perceived	more backgrounded once Figure is perceived
• more dependent	more independent

In "unmarked" cases, the Figures are usually the subject of the given locative expressions. For example, in *The shirts are in the cupboard*, the shirts are the Figure and the subjects of the locative expression, while the cupboard is the Ground. Such a Figure/Ground relationship is canonical in Rongga, Balinese, and Indonesian and is

useful in generating or interpreting their locative constructions. Inverse relations, i.e., the Ground as the subject of the locative expressions like the English examples *the man in the blue cap* or *The Empire State building is near me,* are not found in the three languages. This fact is related to Rongga, Balinese, and Indonesian's *expected* topological relation system. In the three languages what is normal, hence *expected*, is that the location of the blue cap is on the man's head, and this relation of the cap with regard to the man's head (not vice versa) is prominent, therefore described topologically using *one*, *di*, *di* "on" to indicate the *expected* relation. In the case of the second example, what is normal in Rongga, Balinese, and Indonesian is the fact that someone is usually at a building and his relation to the building is important. In this context, *one*, *di*, *di* are used to describe the *expected* relation as well between the person and the building in the three languages. Thus, to describe *the man in the blue cap*, the speakers of Balinese and Indonesian, for example, say:

anak	muani	ane	n-ango	topi	biru	B
person	male	that	act.-wear	cap	blue	

"The man that wears the blue cap".

laki-laki	yang	pakai	topi	biru	I
man	that	wear	cap	blue	

"The man that wears the blue cap".

And to express *The Empire State building is near me*, Balinese and Indonesian speakers say:

rage	ade	di	paek	gedung	Empire	State	B
I	exist	expect	near	building	Empire	State	

"I am near the Empire State building"

aku	ada	di	dekat	gedung	Empire	State	I
I	exist	expect	near	building	Empire	State	

"I am near the Empire State building"

Note that the last two examples are not an answer to a question "*Where is the Empire State building?*" Rather, the examples are to describe someone's location relative to the building. To answer the question, Balinese and Indonesian speakers usually describe the location of the Empire State building relative to other reference objects, i.e., other buildings, e.g. *The Empre State building is near X building*. In short, what is expected in Balinese and Indonesian is that someone is near a building, not a building is near someone.

Note also that the use of the existential verbs and the locative preposition *di* "expect" are optional in the contexts of the last two examples. When the existential verbs are used, *di* can be dropped but the verbs must be used with the adverbs *paek* and *dekat* "near" in Balinese and Indonesian respectively. Likewise, when *di* is used, the existential verbs can be dropped, but *di* must be followed with the the two adverbs, i.e., *paek*, *dekat* "near". The use of the existential verb and the locative preposition *di* altogether, however, are more common in the standard, i.e., formal, Balinese and Indonesian.

3.5 Summary

Rongga, Balinese, and Indonesian employ prepositions in their locative constructions. They can appear as prepositional phrases either after the direct object or after the subject of the locative expression. In the encoding and decoding process, Rongga, Balinese, and Indonesian speakers use the *expected* relation between the objects

as a decisive feature to generate or interpret a locative construction. In addition to this *expected* feature, Rongga, Balinese, and Indonesian speakers and hearers are also assumed to share the same pragmatic knowledge, e.g., the world knowledge, the Figure/Ground Relationship, in the process of interpreting or generating locative constructions.

The next chapter will present my study on the toplogical relations in Rongga, Balinese, and Indonesian. Specifically, I will explore how the topological relations are encoded in the three languages and specify their different cultural expectations.

Chapter 4

Topological Relations in Rongga, Balinese, and Indonesian

4.1 Introduction

In Chapter 3, I have pointed out in general how Rongga, Balinese, and Indonesian speakers encode or decode their topological relations. This chapter discusses the semantics of topological relations in the languages in more detail. The chapter is organized as follows. Section 4.2 deals with the limitations of previous approaches to the studies of topological relations. The methodology used in this study is addressed in sub-section 4.3.1. Sub-sections 4.3.2 and 4.3.3 discuss *expected* and *unexpected* relations respectively in the three languages. The chapter is then concluded with a brief summary.

4.2 Limitations of previous approaches to the topological relations

Many theories of spatial relations, e.g., Clark, 1973; Fillmore, 1975; Miller & Johnson-Laird, 1976; Herskovits, 1982; Talmy, 1983; Jackendoff, 1992, maintain that the spatial relations are topological or geometric in nature. In English, for example, the use of the preposition *in* is related to a "containing interior" (Herskovits, 1986) or a set of contours (Miller & Johnson-Laird, 1976), and the use of *above* is related to an alignment of a located object to the center of mass of a reference object (Gapp, 1995; Regier, 1996). However, the topological or geometric features do not fully account for the use of spatial terms. In fact, in addition to the topological or geometric features, the functions of objects play a crucial role in describing locative relations, e.g., Vandeloise, 1991; Carlson-Radvansky, 1999; Aryawibawa, 2008.

In her study, Herskovits (1986) mentioned that the functions of objects affect the selection of English prepositions to describing spatial relations. For example, to describe the spatial relation between a bulb and a socket in English one has to decide whether to use *under* or *in*. However, with the salience of the function between the two objects *in* is appropriate because for the bulb to function normally, i.e., to light up, the functional end of the bulb must be within the containment of the socket. Unfortunately, Herskovits does not discuss functional relations in more detail.

Vandeloise (1991), like Piaget and Inhelder (1956) and Carlson-Radvansky (1999), provides a further definition of function. By function he means the intended functions which the reference objects are designed to fulfill. For examples, *a bowl, a bag*, and *a glass* are designed to contain, and *a table* or *a tray* are designed to support located objects. I will call this definition of function a "designed" function because human-made artifacts are designed to fulfill some purpose. The sense of "design" here is based on its definition given in Oxford English Dictionary (OED). The OED provides various definitions. Three senses relevant to the concept of "designed" function are presented here: 1) a plan or scheme conceived in the mind and intended for subsequent execution; the preliminary conception of an idea that is to be carried into effect by actions, 2) in a weaker sense: purpose, aim, attention, and 3) the thing aimed at; the end in view; the final purpose.

While these studies focused on English final purpose, Aryawibawa (2008) studied the semantics of locative relations in Rongga. I found that Rongga prioritizes what I called a "natural function" of objects for the use of spatial terms. In Rongga, the *functional* preposition *one* "expect" is used to describe the typical locative relations

between objects. For example, in a spatial situation where a located object *a tablecloth* is put on a reference object *a table* in the usual manner, *one* is used since the situation exhibits the "natural function" or expected relation between the two objects. If now the tablecloth is folded and placed on the horizontal surface of the table in an atypical fashion, the *spatial* preposition *zheta wewo* "up up" is more appropriate. In the later context, the relation between objects is *locative* or *spatial*.

Based on the importance of functional perspective in Rongga, my definition of function goes beyond the definition of "designed" function provided by Vandelosie. My definition of function includes the "expected" relations. To make the definition more concrete, I will use spatial situations from Bowerman (1996), e.g., *the tablecloth on the table, the jacket on the hanger, the rabit in the cage, fruits in the bowl, the bandage on foot, the cigarette in his mouth*.

Referring to the "design" definition of function by Vandeloise, the spatial relations between the objects, e.g., between the jacket and the hanger, the tablecloth and the table, and between the rabit and the cage, the fruits and the bowl, are described with *sur* "on" and *danz* "in" respectively in French, and *on* and *in* respectively in English. The explanation is that the reference objects are respectively designed to support and contain the located objects.

In the situations between the bandage and the foot, and between the cigarette and mouth, *on* and *in* are used to express the spatial relation in English, *sur* and *danz* respectively in French because the support and containment functions are still relevant. However, these situations, in my opinion, create difficulty in applying the Vandeloise's definition since feet and mouths are not manufactured objects. In fact, the functions of the

Lo rather than the *Ro* are purposely designed. Hence, the intended purpose of the *Lo* is more relevant here, i.e., bandages are designed to put on wounds, a cigarette is designed to put in mouths. To summarize, the "designed" function defined by Vandeloise is insufficient. Function should include the manufactured function of the *Lo* as well as the *Ro*.

The concept I used to call "natural function" on the other hand means that the located object is intended to be in functional relation to the reference objects, or vice versa. Thus, a tablecloth is usually located on the horizontal surface of tables, a jacket is usually hung on a hanger, fruits are normally put in a bowl, the normal location of a domestic rabbit is in its cage (since in Rongga, Balinese, and Indonesian contexts the domestic rabbits are usually kept in a cage), a bandage is typically located on a wounded body part, and when someone is smoking the cigarette is normally in his mouth. All these senses reflect the "expected" relations between objects, i.e., in the sense of "designed" function by Vandeloise. One question is how the "designed" function can be extended to non-human made artifacts, e.g., *a coconut on tree, a nose on face*, etc.? The *Lo*, i.e., *coconut* and *nose*, and *Ro*, i.e. *tree* and *face*, are not designed by humans for any purpose. But, in facts the relations between those *Lo* and *Ro* are also expressed with prepositions describing the expected location in Rongga, Balinese, and Indonesian.

In this study, I will use the term "expected" relation to refer to the "natural" function that I used in my master thesis. Note again that Levinson (2006: 164-165) uses the term "expected" earlier, i.e., the characteristic or normal spatial relation between objects as in part-whole relations, clothing-body relations, etc. The question now is: what

are the spatial domains that are included in the *expected* relation between objects? I will attempt to define the *expected* relation more precisely in sub-section 4.3.2 below.

4.3 Topological relations

I overviewed how topological relations in Rongga, Balinese, and Indonesian are marked using topological prepositions in section 3.5 of Chapter 3. The basic topological prepositions in the three languages seem to fall into two categories: a preposition that encodes *expected* relations, i.e., *one, di, di* "expect" respectively in Rongga, Balinese, and Indonesian, and a set of prepositions that encode *unexpected* relations, i.e., *zheta wewo/zheta tolo* derived from *zheta* "up" and *wewo/tolo* "up" glossed as "up up", *zhale one* derived from *zhale* "under/below' and *one* "expect" glossed as "down expect" in Rongga; *di duur* "expect up" derived from *di* "expect" and *duur* "up/above", *di tengah* derived from *di* "expect" and *tengah* "inside" glossed as "expect inside" in Balinese; *di atas* derived from *di* "expect" and *atas* "up/above" glossed as "expect up", *di dalam* derived from *di* "expect" and *dalam* "inside" glossed as "expect inside" in Indonesian. The syntactic forms of of the *unexpected* prepositions will be addressed again later in the discussion of the *unexpected* relations. Before I discuss further the *expected* and *unexpected* relations in the three languages, I would like to explain about the methodology I used in collecting the data.

4.3.1 Methodology

4.3.1.1 Participants

To obtain conceptual knowledge of topological relations in Balinese and Indonesian, I recruited six respondents for this study. Three of them are Balinese monolinguals, who are first and secondary school graduates. The other three are Indonesian monolinguals, who are undergraduate students at Universitas Udayana in Bali. The reason why I involved the monolingual Balinese and Indonesian speakers is that the spatial knowledge they provide in each language is not influenced by another language. Note, for example, that Wassmann and Dasen (1998) in their study found that Balinese speakers also employed a relative frame of reference, though not predominantly. I suspect it might be that the Balinese speakers who participated in their study were perhaps bilinguals, i.e., they speak Balinese and Indonesian, so that their use of the relative frame of reference in Balinese is influenced by the relative frame of reference in Indonesian. Therefore, in this study I involved monolingual Balinese and Indonesian.

For Rongga's topological relations, I mostly rely on the findings of my previous study, i.e., based on the knowledge provided by four Rongga speakers in Tanarata, where Rongga is mainly spoken and two Rongga speakers in Bali. Some further remarks should be given about the Rongga speakers.

Based on the studies reported by Baird (2000 in Arka 2003: 6), more and more young speakers of Keo, a neighboring language of Rongga, tend to switch to major neighboring languages. A similar tendency also occurs in Rongga. Young Rongga speakers have a higher level of fluency in Indonesian than in Rongga. This may be due to the Indonesianization policy established by the former regime of Soeharto. Therefore, the

participants involved in my previous study were Rongga elders, whose knowledge of Rongga language and culture is still intact. For the current study I consulted a Rongga couple living in Bali who was also involved in my previous study to confirm their knowledge of topological relations based on my current elicitation tool. In their everyday contact at home and their contact with other Rongga people in Bali, Rongga is the main language. They switch to Indonesian at office and at social gatherings involving people other than Rongga.

4.3.1.2 Definition of data

Since this study deals with topological relations that involve adpositions, i.e., prepositions, it is necessary to provide an operational definition of the locative construction. The working definition applied here is the one that combines semantic and syntactic criteria adopted from Levinson (2003: 486): "a spatial adposition is any expression that heads an adverbial phrase of location in the BASIC LOCATIVE CONSTRUCTION (answers to *where*-questions)" as in *The water is in the glass, The clothing is pinned on the line,* etc.

4.3.1.3 Data collection

Data included in the current study are clauses or phrases that express locative relations, i.e., constructions that contain a preposition as an answer to *where*-questions.

4.3.1.3.1 Topological relation data

Since in this study I also aim at reevaluating the claims of strong universal conceptual categories (UCC) and universal tendencies (UT), the current elicitation tool contains 18 color pictures representing the concepts *containment*, *support***,** and *attachment*. In addition to these pictures, several pictures showing only the three basic concepts of spatial relations in Bowerman's topological relation pictures series or TRPS (Bowerman, 1996) were also used in this study, e.g., *fruits in the bowl, a cup on the table, clothing on the clothsline*. Three examples of pictures included in the modified elicitation tool are presented below. The others are provided in Appendix A.

Picture 2: Money in the wallet
containment

Picture 3: A doll on a saucer
support

Picture 4: A ring on a finger
attachment

(Aryawibawa, 2008)

I collected the data in Bali. I showed the elicitation tool to my language consultants individually and asked them to provide topological information in a written form, i.e., by writing a sentence describing the topological relation between objects shown in the pictures, of what prepositions or spatial terms they used to describe the spatial relations between the *Lo* and *Ro* in the pictures, e.g., where is the [figure]?.

Some remarks should also be given about the topological knowledge provided by the speakers in the three languages. Since, as I pointed out in my previous study of Rongga, the use of *functional* and *spatial* prepositions overlaps in certain contexts, e.g., for the glass put on the table, both the functional preposition *one* "expect" and the spatial

prepositions *zheta wewo/zheta tolo* "up up" were used by my language consultants in Rongga, and since this could also be true in Balinese and Indonesian, the natural response was expected from my language consultants in both *functional* and *spatial* relations shown in the pictures. Given the most natural response, I expected to obtain the most appropriate use of the *expected* and *unexpected* prepositions in Rongga, Balinese, and Indonesian.

In addition to data elicited by using TRPS, especially the use of topological prepositions in Rongga, some data in this study were taken from Rongga texts such as the autobiography of Bapak Antonius Gelang and *Pake* "Frog" texts, and from the Rongga grammar book by Arka et al. (2007). For Balinese and Indonesian topological relations, my intuition as a native speaker of Balinese and Indonesian will also be relied upon especially in the analysis of Balinese and Indonesian data.

One advantage of employing the TRPS elicitation tool is that the reference is carefully controlled. In this manner it produces more reliable results than methods that are based on, for example, senses as applied in the Natural Semantic Metalanguage tradition by Wierzbicka (1980). The main question in the tradition of this study in its pursuit of lexical and semantic universals, in my opinion, is how the sense across languages can be measured objectively. In addition, the meta-language, i.e., a small number of neutral language used to get the universal lexical, is mainly based on European languages. Another question is why the number of meta-language terms should be small? In some situations, more words are required to get an appropriate sense in a language as applied in the field of Lexicography, for example.

In addition to the advantage of TRPS just mentioned, such responses from the native language consultants are important in semantic analysis as voiced by Hymes (in Berlin, 1968: 31) "An unfortunate distrust of the native speaker as anything but a source of sounds has sometimes led to the ignoring of information of an [ethno-linguistic] sort as 'unscientific'. As it happens, reliable data of this sort could be of immense importance to students of psycholinguistics as well as Ethno-linguistics".

4.3.2 Defining *expected* relations

As I said before, Herskovits (1982, 1986) mentions that the functions of objects affect the selection of prepositions to describe spatial relations. In the case of the spatial relation between a bulb and a socket in English one has to use *in*, not *under* because of the salience of the function between the two objects, i.e., for the bulb to function normally, i.e. to light up, the bulb must be within the containment of the socket. However, Herskovits does not discuss the functional relations in more detail. Vandeloise (1991) also provides a further definition of function that I call a "designed" function. I call it a "designed" function because it is restricted to human-made artifacts, which are purposely designed in the senses given in the OED above.

Function also plays an important role in describing topological relations between objects in Rongga, Balinese, and Indonesian. However, my definition of function, which I call *expected* functions, i.e. *expected* relations, now goes beyond the "designed" function provided by Vandeloise. My definition refers to the typical or normal relations between objects, hence *expected*. To make the definition more concrete, I will again refer to the

previous examples, e.g., *the tablecloth on the table, the jacket on the hanger, the rabit in the cage, the fruits in the bowl, the bandage on foot, the cigarette in his mouth*.

Recall that according to the definition given by Vandeloise the spatial relations between the tablecloth and the table, the jacket and the hanger, and between the rabbit and the cage, and the fruits and the bowl are described with *sur* "on" and *danz* "in" respectively in French, and *on* and *in* respectively in English. The explanation is that the reference objects in these situations are respectively designed to support and contain the located objects. In the spatial situations between the bandage and the feet, and between the cigarette and mouth, *on* and *in* are used to express the spatial relation in English, *sur* and *danz* respectively in French because the support and containment functions are still relevant. However, the later situations, as I said previously, create difficulty in applying the "designed" function since the feet and mouth are not designed to support and contain the located objects. In fact, the functions of *Lo*, i.e., *bandage*, and *cigarette*, are purposely designed in the sense given by definitions of design in the OED. Hence, the functions of *Lo* are more relevant here, i.e., bandages are designed to put on wounds, a cigarette is designed to put in mouths.

What seems to be more salient in those situations is the "expectedness" of spatial relations between objects. The *expected* relation means that the located object is normally related to the reference object. Thus, a tablecloth is normally located on the horizontal surface of tables, a jacket is usually hung on a hanger, fruits are normally put in a bowl, the normal location of a rabbit is in its cage (at least in the contexts of the three languages), a bandage is typically located on a wounded body part, and when someone is

smoking the cigarette is normally in his mouth. In all these contexts, the relations between objects are *expected*.

Given the fact that the spatial relation between objects above involves "expectedness", one question should be posed: what are the spatial domains included in the *expected* relations? It seems that the *expected* relation includes three spatial domains: relations between human-made artifacts, e.g., *a saucer* and *a cup, a tablecloth* and *a table, a jacket* and *a hanger*, etc., relations between non-human artifacts, e.g., body parts of human, animals, or trees, etc., and natural objects in juxtapositional relations, e.g. *leaf* and *ground*, *garbage* and *ground*, *rocks* and *ground*, etc. There are two more specific factors that contribute to the *expected* relations in each spatial domain: designed *purpose* and normal *relation*. Let's look at each domain in more detail now.

For the *expected* relation involving human-made artifacts, the *expected* relation between objects should reflect the normal *purpose* of the objects. Purposes of both *Lo* and *Ro* appear to be central to define the *expected* relation. Indeed, all of the topological relations discussed previously include man-made artifacts, which are designed for certain purposes, i.e., *a bowl, a hanger, cigarettes, a cage*, etc. are all designed for particular purposes.

For the sake of clarity of definition of *purpose*, I would like to refer to how Petroski in *The Toothpick* (2007: 6-7) describes that an object is designed for a purpose.

> Nothing can be more annoying than having a piece of food stuck between our teeth. As tiny as it might really be, in time it can seem to grow out of all proportion to its place in mouth. As the pea under the princess's mattress prevented her from enjoying a night's sleep, so a tiny seed between molars can deny the dinner much-anticipated postprandial peace and satisfaction. Like a grain of sand between two milestones, the foreign matter grates on us until it is worked free.
>
> We have all devised our own preferred methods for dealing with the problem, but when we are not alone some of us may be constrained by social strictures to work within

a close mouth. Our tongue is often the instrument of choice, but the tongue's soft, blunt tip is usually ineffective. We have to flex and strain the muscles that harden and point it, and the process can be excruciatingly trying, tiring, not really so private or inconspicuous as we might wish.

When wooden matches were commonly found near the kitchen stove, they were convenient to be split or whittled into toothpicks. One uninhibited character in a 1920s novel entered a shop "still helping the breadcrust out of his teeth…with his tongue," supplemented by a split matchstick, which was a sure giveaway of his plight. However, even without opening our mouth to use a pointed tool, whenever we proceed to drag the tongue across and thrust it between our teeth at a repast's tenacious residue, we reveal our mission by the bulge moving around our lips and cheeks like a mole beneath the lawn.

Sucking at the stuck debris can sometimes be effective, but not always easily for stubborn little things. It takes more than eight pages in James Joyce's *A Portrait of the Artist as a Young Man*, involving "sucking at a crevice in his teeth," among other efforts, for the character Cranly to dislodge fig seeds. We can also try squirting saliva between the teeth to flush out some unfriendly food debris. However, like vacuuming a rug or washing windows with a water hose, such actions can be noisy. The overzealous tooth sucker whose lips slip apart can sound like a wet kisser bussing the air, the too-eager spit squisher like someone squeezing a wet sponge.

The finger can be an effective lever to move what will not otherwise budge, but in many circles its use points to the defeat of other means. Besides, like the tongue, the finger is usually too blunt an instrument for the task at hand, and some people have been known to "grow a long finger nail especially for picking teeth." Sometimes, even an ordinary fingernail can be enlisted successfully, but implementing it as a solution can seldom be done with grace.

The most common alternative to natural and self-contained means is, of course, the familiar wooden toothpick. Where the social strictures do not censure its use, the toothpick can be a most effective tool to succeed where tongue and nails fails.

What this description shows is that an object, i.e., an artifact, is purposely designed. And, the designed *purpose* itself contributes to the *expected* relation of an object when it is normally related with another object in topological relations.

The next aspect relevant to the definition of *expected* relation involving human-made artifacts is related to the following question: for a topological relation to be expected, must one of the objects, i.e., either *Lo* or *Ro*, or both of them have a designed purpose? It appears that the *expected* relation can be affected by both conditions. For example, in a topological relation between a bandage and a wounded foot, the designed purpose is only exhibited by *Lo*, i.e. *a bandage*. In a topological relation between the *Lo*

fruits and *Ro* bowl, the purpose belongs to the *Ro*. In these two spatial situations, the relation between the objects is *expected* since the bandage is manufactured to cover the wounded body parts and the bowl is purposely designed to contain fruits. Moreover, both *Lo* and *Ro* can also share complementary purposes to show the *expected* relations as can be seen in the relation between the *Lo* cup and *Ro* saucer. What I mean by the complementary purposes here is that for a particular *Lo* to be spatially *expected*, it should be normally related to *Ro* with a purpose that complements the purpose *Lo* has. Thus, the purpose of the cup complements that of the saucer. Hence, their spatial relation is *expected* as well.

However, the purpose itself cannot stand alone to determine the *expected* relation. In addition to it, *relation* between objects itself also plays a role (based on the findings in this study). In the last example, e.g., the relation between the cup and the saucer, the cup should sit as it normally happens, i.e., the cup sits with its mouth face up. Only in this situation, can the relation be called *expected*. If, for example, the cup sits with its mouth face down on the saucer, the relation between the two objects could possibly be *unexpected* (at least in the cultural contexts of the three languages). Furthermore, if the saucer is on top of the cup (Kemper, personal communication), even though this spatial relation is expected in the Chinese culture to keep tea inside the cup warm, it is not considered an *expected* relation in Rongga, Balinese, and Indonesian since such a spatial relation is not normal, hence *unexpected* in these cultures. Imagine also that a cup is placed upside down on a saucer, which is normal at least in a banquet tradition, i.e. to ask for more tea or coffee (Kemper, personal communication). This spatial relation is however not expected in Rongga, Balinese, and Indonesian cultures as well.

Another example of the *expected* relation that requires the normal *relation* between objects can be illustrated with the spatial relation of *a bandaid on a cup*. In this case, the bandaid is not normally related with the cup, but with wounds instead. Thus, the example violates the normal *relation* of the two objects.

Also when a normal size tablecloth is put on a table in a typical manner the spatial relation between the two objects is again *expected*. But, if huge garment, e.g. *bed sheets*, is placed on the table, the spatial relation now is *unexpected*. Moreover, imagine now that the normal size tablecloth is put up on the wall, such a relation is *unexpected* as well because the objects do not perform the normal *purpose* and *relation*.

All the examples I present here show the *expected* relations between human-made objects. As I said previously, the *expected* relation between objects also involves non-human objects and natural objects in juxtapositional relations as explained in the following paragraphs.

The *expected* prepositions, i.e., *one*, *di*, *di* "expect" in Rongga, Balinese, and Indonesian respectively, can also be extended to describe the *expected* relations that do not show purpose in Petrosky's sense. For example, the relations between the *Lo* coconut or coconut leaves and the *Ro* coconut tree, the *Lo* peanut and the *Ro* its bush, the *Lo* body parts of animate and inanimate things and the *Ro* their bodies, etc. are all described with the prepositions describing the *expected* relations, i.e., R: *one*; B: *di*; I: *di* "expect", although neither *Ro* or *Lo* is designed by humans. In fact, the factor that is more salient in this case is a *part-whole* relation. Can the part-whole relation be considered an *expected* relation as well? In these contexts, the *expected* relations between non-human objects are relevant as I attempt to demonstrate now.

The analysis of part-whole relations as *expected* is motivated by the fact that body parts can be expected to have "purposes", but not in the sense of purposes involving human artifacts. Specifically, our ears, eyes, lung, head, brain should be located on our body as they are normally located to be able to perform their functions. The eyes of crabs are on stalks, not on the head, i.e., in this context their location can be considered *expected*. Therefore, I analyze the part-whole relations between the non-human objects as *expected* as well.

Petroski describes a tool's purpose as an extension of our bodies (Petroski, 2007: 7). This does not mean, however, that our body parts have purposes in the sense of either "designed" function or purposes involving human artifacts.

> …as all tools are extensions of our bodies and their extremities, so the toothpick is an extension of the finger. It allows us to reach into the back of our mouth more easily and effectively…

This description suggests that tools are extensions of the purposes of our body parts that, to some extent, cannot function as we expect as in the case of the creation of the toothpick. For extensions to be *expected*, they should provide *purpose* as normally used by humans.

What if a hand has six fingers in a row instead of five (Pye in conversation)? Is the relation between the fingers and the hand expected? I think, based on the use of prepositions used to describe such a situation, the relation between the six fingers and the hand is still considered *expected* because the fingers are located on the hand , i.e., the location of the finger is *expected*. Imagine if the one extra finger is on the back of the palm, or imagine that a broken leg of a table is put on the hosizontal surface of the table. In these contexts, the relation between the finger and the hand or between the leg and the

table is *unexpected*. So, we have expectations about part-whole relations based on our conception of what the non-human objects, animals or plants require to function correctly.

Another example, the spatial relation between coconut leaves (the branch of the tree with its leaves) and coconut tree in a normal relation is *expected*. If the branch gets old, it will partly break or fall down to the ground. The relation between the branch and the ground is also *expected*. In this case, the situation is like that in the United States where people expect the leaves of trees to fall down in the fall. But, imagine again now that the branch is on top of somebody's house or it is on another tree, e.g., a bamboo tree. Such a relation is *unexpected*. These examples show that physical forces, i.e. gravity, become salient in the absence of purpose or design. Coconut leaves do not serve a purpose lying on the ground, but we expect them to be on the ground rather than floating in the water.

Thus, all these facts motivate a description of the part-whole relations in Rongga, Balinese, and Indonesian as *expected* relations, though not in the same sense as the examples of a cup and a saucer, a jacket and a hanger, etc.

A linguistic test that can be used to verify the *expected* relations could be a question "*What does it do?*" For example, to ask the purpose of *Ro,* we can ask the question "*What does a cup do?*" It is, for example, to contain coffee, tea, etc. To ask the function of *Lo*, the question can be "*What does the ring do?*" It decorates a finger. These questions elicit the spatial information about the relations of human-made artifacts. Note that such a question entails designed *purpose* and normal *relation* between objects. Note also that such a question can also be extended to part-whole relations, e.g., body parts.

For example, "*What does an arm do?"* It supports the hand. "*What does a leg do?"* It supports a table. "*What does a branch do?"* It supports leaves.

The third spatial domain included in the *expected* relations is spatial relations involving the natural objects in juxtapositional relations. Specifically, the leaves are expected on the ground. But, if the leaves are placed on the surface of a table, the relation is unexpected in Rongga, Balinese, and Indonesian. Garbage and rocks are also expected to be on the ground, but unexpected when they are put on a bed or in a bag for example. In other words, leaves, rocks, or garbage are in the normal *relation* with the ground. A *purpose*, however, is absent since the relation is purely accidental. To describe the spatial relation between the objects in juxtapositional relations, i.e., *leaves* and *ground*, *rocks* and *ground*, etc., the *expected* preposition *one, di, di* "expect" is used in Rongga, Balinese, and Indonesian respectively since such contexts are expected in the cultures of the languages. But, when the juxtapositional relation is not present, e.g., the rocks placed in a bag, the spatial context is expressed using a set of *unexpected* prepositions in the languages, e.g., R: *zale one* "down expect"; B: *di tengah*; I: *di dalam* "expect inside". In short, the spatial relation between objects in this domain, i.e., objects in juxtapositional relations, is expected as well in the languages.

Note, in addition to the use of the *expected* prepositions in the three spatial domains, the prepositions can be used to refer to times, e.g., days, months, and abstract entities, e.g., feeling, mind, in Rongga, Balinese, and Indonesian as well, e.g., R; *one Minggu* "on Sunday", *one January* "in January", *one ate* "in the heart"; B: *di Minggue* "on Sunday", *di bulan Januarie* "in the month of January", *di kenehe* "in the heart"; I: *di hari Minggu* "on Sunday", *di bulan January* "in the month of January", di hati "in the

heart". The use of the *expected* prepositions for the times and abstract entities are perhaps motivated by the facts that an event normally takes place in a period of times and human feeling is normally felt in the heart, hence expected.

If that is the case, we should be able to test the *expected* relations, i.e., the *purpose* and *relation* between objects. How should we test it? We can do it by testing relations between *Lo* and *Ro* involving abnormal *purpose* and *relation*. For example, when a cup is put on a saucer as it is normally located, i.e., with its mouth face up, the relation between the two objects is *expected*, i.e., the two objects meet the criteria *purpose* and *relation*. To describe such an *expected* relation, the prepositions specifying *expected* relations are used in the three languages, i.e., R: *one*; B: *di*; I: *di* "expect". But, if the cup is now turned over and placed upside down on of the saucer, the relation becomes *unexpected*, i.e., the normal *purpose* and *relation* are absent. And to specify such a spatial relation, a set of spatial prepositions expressing *unexpected* relations is used in the three languages, e.g., R: *zhale one* "down expect", *zheta wewo* "up up"; B: *di tengah* "expect inside", *di duur* "expect up"; I: *di dalam*, "expect inside", *di atas* "expect up". These are examples of *unexpected* relations involving abnormal *purposes* and *relation* between human-made objects.

Like the human-made artifacts, the *part-whole* relation, i.e., non-human objects, can also be tested. For example, when a mutilation case happened in Bali, the mutilated body parts of the victim were put in a sack by the perpetrators. When the local media reported it on line, the media used the *unexpected* preposition *di dalam* "expect inside" in Indonesian to describe the location of the body parts and the sack. Furthermore, in another mutilation cases in Yogyakarta and Bandung, the mutilated body parts were

placed in plastic bags and left in a bus by the perpetrators. When one of national media reported the cases online (July 13, 2009 and July 14, 2009), they also used the *unexpected* preposition *di dalam* "expect inside" in Indonesian to describe the spatial relations between the *Ro* and *Lo* for both cases, e.g., ***Di dalam*** *bus itulah warga menemukan potongan tubuh korban* "Local people found the mutilated body parts in the bus", *Dalam waktu tiga hari polisi berhasil mengungkap kasus pembunuhan dengan korbanya ditemukan* ***di dalam*** *bus di terminal Banjar Patoman, Jabar* "In three days the police succeeded in uncovering the mutilation case where the victim was found in a bus at Banjar Patoman Terminal, Jabar".

Perspective taking could also be a factor that determines the *expected* relation. It is normal to put things in plastic bags, though it depends on what is put in the bags. If, for example, groceries are placed in the bags, the relation is *expected*. But, it will not be normal to put body parts in the plastic bags. Moreover, to describe organ transplants, for example, the location of the organs may be described more appropriately with *unexpected* prepositions. In short, the spatial relation in the context above is contributed by the fact that the body parts are put in the bags.

The *expected* relation between human-made artifacts and non-human artifacts can also be tested. For instance, when a ring is put on top of a finger, the spatial relation is not expected since the *relation* between the ring and the finger is not normal. But, if the ring is now put on the finger as the ring is normally related with the finger, the relation becomes *expected,* i.e. the ring performs normal *purpose* and has an expected *relation* with the finger.

Thus, the *expected* relation in Rongga, Balinese, and Indonesian involves human-made objects, part-whole relations, and juxtapositional relations. The *expected* prepositions, i.e., *one*, *di*, *di* "expect" in Rongga, Balinese, and Indonesian respectively, are appropriate to describe the *expected* spatial relations, while a set of *unexpected* prepositions, i.e., R: *zhale one* "down expect", *zheta wewo* "up up"; B: *di tengah* "expect inside", *di duur* "expect up"; I: *di dalam*, "expect inside", *di atas* "expect up" is used for *unexpected* spatial relations in the three languages.

However, one caveat should be emphasized here. There is sometimes an overlap between the *expected* relation and the *unexpected* relation. In this study, I would like to distinguish the two relations carefully.

4.3.3 The *expected* relations in Rongga, Balinese, and Indonesian

Herskovits (1982: 18-19) defines what is "normal' in English. Let me repeat her definition here. First, a normal situation conforms to the laws of physics -- the common sense physics of ordinary solid objects, liquids and gaseous substances. Second, objects are where they belong -- most of them near the earth, within the field of gravity. Finally, objects are "normal", and *where the function is relevant, they behave according to their normal function* (my emphasis since it is relevant to how Rongga, Balinese, and Indonesian speakers encode locative situations). The "normal" situation combined with pragmatic principles is used to generate or interpret locative expressions in English.

Unlike English, the expectedness of relations between objects seems to define what is "normal" in Rongga, Balinese, and Indonesian. Put another way, as I said repeatedly, the concept expectedness of relation between objects is important in describing

topological relations in Rongga, Balinese, and Indonesian. The evidence is provided by the following situations: *the tablecloth on the table, the picture on the wall, the clothing on the clothing line, the handle on the door, the cigarette on his mouth, the headband on his head, the bandage on the foot, the fruits in the bowl*, *the cup on the saucer*, *the ring on his finger*, etc. (Bowerman, 1996).

To use the appropriate preposition in the contexts of these situations, one should have knowledge of the *expected* relation between the *Lo* and *Ro*. More specifically, one should know that a tablecloth normally covers the upward facing surface of a table, a picture is usually put on a wall, it is normal that clothing is pinned on a line, it is commonly understood that the door's handle is expected to locate on either vertical surfaces of a door that it can be used to open or close it, for smokers it is expected to put a cigarette in their mouth, etc. Thus, the *expected* prepositions *one*, *di*, *di* "expect" are true and appropriate in Rongga, Balinese, and Indonesian respectively to describe the *expected* relations between objects in the pictures as illustrated in examples in 1.

1. kain meja **one** meja R
   clothtable expect table
   "The tablecloth is on the table".

   manga foto ja'o **one** kembi mbo
   exist picture I expect wall house
   "There is my picture on the wall".

   ngani wari **one** azhe
   clothing dry expect line
   "The clothing is pinned on the line"

   wusu beso **one** wiwi komo
   cigarette inhale expect lips
   "The cigarette is in his mouth".

taplak	méja-é	**di**	méja	B
cloth	table-the	expect	table	

"The tablecloth is on the table".

poto	rage-e	**di**	témbok-é
picture	I-the	expect	wall-the

"My picture is on the wall".

jemuan-é	**di**	tali	jemuan-é
clothing	expect	line	clothing-the

"The clothing is on the clothing line".

roko-é	**di**	bibih	iya-é
cigarette	expect	lips	he-the

"The cigarette is on his mouth".

taplak	méja	ada	**di**	méja	I
cloth	table	exist	expect	table	

"The tablecloth is on the table".

foto	itu	**di**	dinding
picture	that	expect	wall

"The picture is on the wall".

pakaian	**di**	tali	jemuran
clothing	expect	line	dry

"The clothing is on the clothing line".

rokok	ada	**di**	mulut-nya
cigarette	exist	expect	mouth-his/her

"The cigarette is on his mouth".

Recall that the relation between objects to be *expected*, the *relation* and the *purpose* of the objects involved in spatial relation as shown in the examples above should be normal. And the examples indeed show that the *Lo* or *Ro* has designed *purposes* and are in normal *relation*.

Furthermore, the *expected* relations also describe the employment of *one, di, di* in the contexts of relations between human objects and non-human objects. For instance, if

we want to describe the location of earrings on someone's ear, a necklace on someone's neck, a headband tied around someone's head, a bandage on someone's ankle, a watch on someone's wrist, *one, di, di* should be used. In such contexts, those located objects should be normally located on those reference objects, i.e., body parts. The summary of use of prepositions by all subjects in Rongga, Balinese, and Indonesian based on Bowerman and my stimuli can be seen in Figures 4.1 and 4.2 below. The figure in brackets shows the number of subjects using particular prepositions. Six Rongga consultans gave their response to Bowerman's topological pictures in my first study on this language. For my current study, I retested Bowerman's topological pictures to three Balinese monolinguals and three Indonesian monolinguals (Figure 4.1). Additionally, I tested my stimuli to two previous Rongga consultants, three Balinese monolinguals, and three Indonesian monolinguals (Figure 4.2).

Topological relation pictures (Bowerman, 1996)	**Description of topological situations in the pictures**	**Prepositions used**
Picture 1	The cup on the table	R: one "expect" (2), zheta wewo "expect up" (2), zheta tolo "expect up" (2) B: di "expect" (3) I: di "expect" (1), di "expect" & di atas "expect up" (2)
Picture 2	The cigarette in his mouth	R: one "expect" (6) B: di "expect" (3) I: di "expect" (3)
Picture 3	The cat on the mat	R: one "expect" (6) B: di "expect" (3) I: di "expect" (3)
Picture 4	The rabbit on the cage	R: one "expect" (6) B: di "expect" (3) I: di "expect" (3)
Picture 5	The rope on the stump	R: zheta wewo "up up" (6) B: di duur "expect up" (3) I: di atas "expect up" (3)
Picture 6	The handle on the door	R: one "expect" (6) B: di "expect" (3) I: di "expect" (3)

Picture 7	The tablecloth on the table	R: one “expect” (6) B: di “expect” (3) I: di “expect” (3)
Picture 8	The fruit on the tree	R: one “expect” (6) B: di “expect” (3) I: di “expect” (3)
Picture 9	The bandage on the foot	R: one “expect” (6) B: di “expect” (3) I: di “expect” (3)
Picture 10	The flag on the pole	R: one “expect” (6) B: di “expect” (3) I: di “expect” (3)
Picture 11	The picture on the wall	R: one “expect” (6) B: di “expect” (3) I: di “expect” (3)
Picture 12	The ribbon on the candle	R: one “expect” (6) B: di “expect” (3) I: di “expect” (3)
Picture 13	The headband on his head	R: one “expect” (6) B: di “expect” (3) I: di “expect” (3)
Picture 14	The cap on the bottle	R: one “expect” (6) B: di “expect” (3) I: di “expect” (3)
Picture 15	The jacket on the hanger	R: one “expect” (6) B: di “expect” (3) I: di “expect” (3)
Picture 16	The stick on the apple	R: one “expect” (2), zale one “down expect” (4) B: di tengah “expect inside”(3) I: di dalam “expect inside”(3)
Picture 17	The clothing on the clothsline	R: one “expect” (6) B: di “expect” (3) I: di “expect” (3)
Picture 18	The fruit in the bowl	R: one “expect” (6) B: di “expect” (3) I: di “expect” (3)
Picture 19	The writing on the t-shirt	R: one “expect” (6) B: di “expect” (3) I: di “expect” (3)

Figure 4.1: Summary of subjects’ response to Bowerman’s topological relation picture series in R= Rongga, B= Balinese, I= Indonesian.

Topological relation pictures (Aryawibawa, 2008)	**Description of topological situations in the pictures**	**Prepositions used**
 Picture 1	An earring on her ear	R: one “expect” (2) B: di “expect” (3) I: di “expect” (3)
 Picture 2	Money in the wallet	R: one “expect” (2) B: di “expect” (3) I: di “expect” (3)
 Picture 3	A doll on a saucer	R: zheta wewo “up up” (2) B: di duur “expect up” (3) I: di atas “expect up” (3)
 Picture 4	A ring on a finger	R: one “expect” (2) B: di “expect” (3) I: di “expect” (3)
 Picture 5	A comb in the book	R: zhale one “down expect” (2) B: di tengah “expect inside” (3) I: di dalam “expect inside” (3)
 Picture 6	A cup on a saucer	R: one “expect” (2) B: di “expect” (3) I: di “expect” (3)
 Picture 7	A glass on the table	R: one “expect” (2) B: di “expect” (2), di “expect” & di duur “expect up”((1) I: di “expect” (3)

 Picture 8	An earring on her ear	R: zheta wewo “up up” (2) B: di duur “expect up” (3) I: di atas “expect up” (3)
 Picture 9	A pencil in the wallet	R: zhale one “down expect” (2) B: di tengah “expect inside” (3) I: di dalam “expect inside” (3)
 Picture 10	A cell phone in the glass	R: zhale one “down expect” (2) B: di tengah “expect inside” (3) I: di dalam “expect inside” (3)
 Picture 11	Water in the glass	R: one “expect” (2) B: di “expect” (3) I: di “expect” (1), di “expect” & di dalam “expect inside” (2)
 Picture 12	Paper in the book	R: one “expect” (2) B: di “expect” (3) I: di “expect” (3)
 Picture 13	A watch on his hand	R: one “expect” (2) B: di “expect” (3) I: di “expect” (3)
 Picture 14	A watch on his hand	R: zheta wewo “up up” (2) B: di duur “expect up” (3) I: di atas “expect up” (3)

 Picture 15	A toy bicycle on the table	R: zheta wewo “up up” (2) B: di duur “expect up” (3) I: di atas “expect up” (3)
 Picture 16	A ring on his finger	R: zheta wewo “up up” (2) B: di duur “expect up” (3) I: di atas ‘expect up” (3)
 Picture 17	Feet on shoes	R: one “expect” (2) B: di “expect” (3) I: di “expect” (3)
 Picture 18	Feet on shoes	R: zheta wewo “up up” (2) B: di duur “expect up” (3) I: di atas “expect up” (3)

Figure 4.2: Summary of subjects’ response to Aryawibawa’s topological pictures in R= Rongga, B= Balinese, I= Indonesian.

The *expected* relations are also applicable to express the spatial relations between non-human objects, e.g., body parts of animate and inanimate things. Thus, to describe the spatial relations between a nose and the face, an ear and the head, a hand and the body, leaves and the tree, etc. the expected prepositions, i.e., *one, di, di* “expect” in Rongga, Balinese, and Indonesian respectively, are used.

The concept *expected* relation is in contrast to, for example English, in which the concepts *containment*, *support* and *contiguity* are basic (Herskovits, 1982, 1986) or Yélî Dnye, in which the concept *attachment* is important (Levinson et al., 2003). Specifically, even though the locations of the *Lo* with respect to the *Ro* in the situations above indicate the notion of *support*, e.g., *the tablecloth on the table, the headband on his head*,

attachment (when *Lo* is placed on body parts), e.g., *the earring on her ear*, and *containment*, e.g. *the money in the wallet*, the locative relations between the *Lo* and *Ro* in those contexts are specified with *one, di, di* signifying the *expected* relations in Rongga, Balinese, and Indonesian. In those contexts, what is more relevant and salient in the three languages is the "expectedness" of relation between the objects, not such notions as the *support*, *attachment*, and *containment* themselves.

In the previous examples, the *expected* relations can be pointed out in a straightforward manner based on our knowledge of the "expectedness" of relation between the objects. On the other hand, in Picture 5 below the *expected* relation between comb and book is clearly absent. Therefore, the spatial prepositions in the three languages, e.g., R: *zhale one* "down expect"; B; *di tengah* "expect inside"; *di dalam* "expect inside", are more appropriate to describe the *spatial* relation between the objects. In that context, in addition to the absence of the *expected* relation, the *Lo* the comb being within the containment of the *Ro* the book is also relevant.

Picture 5: A comb in the book

Nonetheless, as I said before, the distinction between the *expected* and *unexpected* relations is not always clear-cut. In other words, there are certain spatial contexts that are indeterminate, i.e., both the *expected* and *unexpected* prepositions can be used to describe the *expected* relation. Let us look at the spatial situation taken from Bowerman (1996),

i.e. *The cup on the table*. Given this locative situation, my Rongga language consultants offered various responses:

one	*zheta wewo*	*zheta tolo*
2	*2*	*2*

The use of *one* (*Mok one meja* "The cup is on the table") is predicted from the fact that it is normal that a cup is put on the horizontal surface of the table. The use of *zheta wewo* and *zheta tolo* "up up" (*Mok zheta wewo/zheta tolo meja* "The cup is on the table"), however, is also possible. But, why *zheta wewo/zheta tolo*, which can be used when *Lo* is supported by *Ro* in unexpected contexts, can be used in this expected situation? When I asked this question to my language consultants, who used *zheta wewo/zheta tolo*, they told me "the uses of *one* and *zheta wewo/zheta tolo* depend on the kind of tables where you put the cup. If you put it on a kitchen table *one* is good. But, if you put on a less typical table, e.g., a log used as the table, *zheta wewo/zheta* tolo is more appropriate". Thus, in this context, four consultants viewed the table as less typical, i.e., it is viewed as atypical because they saw the size of the table is too small. Therefore, they provided me with *zheta wewo/zheta tolo* "up up".

Note that even though *zheta wewo* and *zheta tolo* can be used in the context, their uses encode distinct perspectives on this situation. The distinctions are related to the speakers' pragmatic emphasis. The use of *zheta wewo* and *zheta tolo* is to inform that the cup is directly supported by the table. This pragmatic information was emphasized by four speakers. Since if the cup is not directly supported by the table, i.e., there is another objects between the cup and the table such as a magazine, *zheta wewo*/*zheta tolo* are still used, but in relation to the magazine, not the table (*Mok zheta wewo/zheta tolo majalah*

'The cup is on the magazine"). In the latter context, the pragmatic information is different from the former one. More specifically, the support in the latter context is provided by the magazine, while in the former context it is provided by the table. However, as predicted by the expected relation test, *one* can not be used in the latter context since it is not normal that a cup is placed on a magazine. Put another way, the relation in the latter context is *unexpected*, not *expected*.

Furthermore, a different pragmatic emphasis can be revealed in the use of *zheta wewo* and *zheta tolo* which is related to the viewing distance. When *zheta tolo* is used the speakers said that both *Lo* and *Ro* are relatively distant (within "there" context). But, when the *Lo* and *Ro* are close (within "here" context) the speakers use *zheta wewo*.

As in Rongga, one Indonesian language consultant provided me with information that *di* is appropriate in the context, while two language consultants gave a response that both *di* "expect" and *di atas* "expect up" are good in that context. Please note that unlike their response to this situation, my Indonesian consultants systematically described other pictures showing the *expected* relations, e.g. Picture 6 below, with the expected preposition *di*. Because I tested the prominence of the *expected* relation and since I expected the natural response from my language consultants, I asked them individually "Which one of the two prepositions is more natural or more expected in that context? They said that *di* is more natural and more expected. To confirm this knowledge, I further tested it by providing them with other locative situations not included in the stimuli. I put a plate on a dining table and a plate on a TV. The two respondents said that *di* "expect" is appropriate in the first spatial context, while *di atas* "expect up" must be used in the latter context.

Picture 6: A cup on a saucer

The prepositions *di* "expect" and *di dalam* "expect inside" were also used by two Indonesian consultants to describe the expected context, i.e., *water in the glass*, but not the other expected contexts, i.e., *money in the wallet, paper in the book* as can be seen in Figure 4.2 above. Again, I tested the prominence of the *expected* relation by creating spatial relations not included in the stimuli. I provided them with extra spatial situations such as *a pen in my pocket* and *a stone in my pocket*. They told me that *di* "expect" must be used in the former context, but *di dalam* "expect inside" is appropriate in the latter context. Even though I cannot point out the precise motivation of using the *expected* and *unexpected* prepositions in the expected contexts mentioned above, based on the overall responses of Indonesian subjects to the stimuli, it seems that the "expectedness" of relation between objects is crucial in describing the topological relations in Indonesian.

Recall that Mintz proposed that the use of *di dalam* "expect inside" and *di atas* "expect up" are used to "emphasize" *Lo* in relation with *Ro* in Indonesian. However, he does not provide further explanation why a speaker has to emphasize such a location? As I said before that I agree with him that sometimes *di dalam* or *di atas* is used to emphasize that a located object is within the containment of a reference object, or a located object is supported by a reference object. For example, if a friend of mine asks me where the book he wants to borrow is, I will say *buku itu di tas* "the book is in the bag". Now, imagine that that person looks at the bag and does not find the book there and

asks me again where the book is. Then I say with emphasis (by giving high intonation to *di dalam*) *buku itu di dalam tas* "the book is inside the bag". But, this in fact rarely happens. When I say *buku di tas* "the book is in the bag" it must refer to the fact that the book is inside the bag since the book is normally in the bag. Moreover, emphasis can also be given to *di* when *di* is used in such a context, i.e., to emphasize that the book is inside the bag also by giving high intonation to *di*. Mintz, nevertheless, does not discuss that the use of *di* in the later context can also be emphasized. Thus, "to emphasize", I think, is not the most salient aspect that separate the use of *di* from *di dalam* or *di atas* in Indonesian. What Mintz may mean is that *di dalam* and *di atas* are used "to emphasize" the spatial situations in the context of *unexpected* relations between objects as I propose in this study, i.e., since the spatial situation is not normal, it needs to be emphasized by using the *unexpected* prepositions.

A more reliable method to confirm that the use of *di dalam* "expect inside" and *di atas* "expect up" in Indonesian is in the context of *unexpected* relations is by investigating how children acquire the topological prepositions in Indonesian. This issue will be addressed specifically in Chapter 5.

In Balinese, one of my Balinese language consultants provided sentences using *di* "expect" and *di duur* "expect up" to describe the expected situation as shown in Picture 7 below.

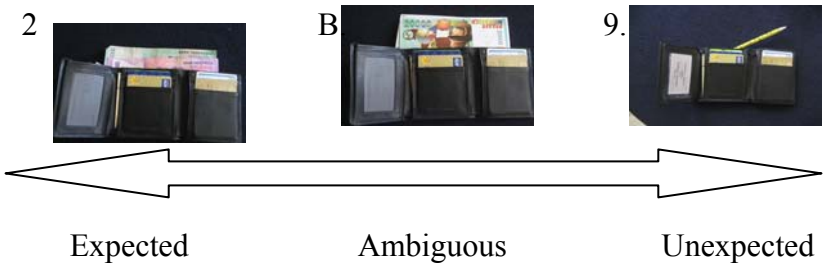
Picture 7: A glass on the table

Again, to test the expected relations, I gave him the same extra stimuli, i.e., *a plate on a dining table, a plate on a TV*. He provided me sentences using *di* "expect" to express the location of the plate relative to the dining table and *di duur* "expect up" for the spatial situation between the plate and the TV. In the contexts of *the water in the glass* and other *expected* relations, all my Balinese consultants used *di* "expect" as Figure 4.2 shows. To answer my question if *di duur* "expect up" or *di tengah* "expect inside" can be used in the spatial contexts between the plate and the dining table, and between the water and the glass respectively, they in similar tone told me "The plate is normally put on a dining table and the water is normally put in the glass, so *di* must be used in these contexts". The fact that the spatial situation in Picture 7 was described using *di* "expect" and *di duur* "expect up", as in Rongga, might be related to the typicality of the table. The table I used in the stimuli was atypical, i.e., a concaved log with glass on top of it and covered with a piece of cloth. But, my Balinese consultant did not say explicitly that the fact is the reason.

Please note that although there are individual variations in the use of *expected* and *unexpected* prepositions, i.e., both the *unexpected* and *expected* prepositions are used in the expected contexts it does not suggest that the concept "expectedness" is subjective. Rather, it is language-specific. The fact that the *unexpected* prepositions are used in the expected contexts as well occured only in limited contexts, i.e., *a glass on a table*, *water in the glass*. Additionally, as I said before, the fact may be influenced by the typicality of reference objects as explicitely mentioned by my Rongga subjects.

For the reasons that the ambiguity is one of important features of natural languages and that the indeterminate spatial relation is there in the three languages, it is

necessary that I identify as clearly as possible the boundaries that produce the ambiguous spatial relations lying between the *expected* and *unexpected* relations. The pictures below show how the indeterminacy of spatial relations may appear.



In 2, the *expected* relation is clear since the money is normally put in the wallet. Therefore, the *expected* prepositions *one*, *di*, *di* "expect" in Rongga, Balinese, and Indonesian respectively are applied in this context. In 9, however, the *expected* relation is not there any more for the reason that the pencil and the wallet are atypically related. Hence, the *unexpected* prepositions *zhale one*, *di tengah*, *di dalam* in Rongga, Balinese, and Indonesian respectively are more appropriate now. Picture B could be ambiguous. The ambiguity stems from the status of the toy money put in the wallet. The toy money is not money but it looks similarly (in its physical form) like the real money. This indeterminate condition could possibly trigger the ambiguity. Note that for a *Lo* to be contained by a *Ro* in these languages, the *Lo* does not have to be fully contained. Thus, although the *Lo* is partially contained, it is still considered within containment. However, I should be cautious here that this diagram is just an approximation since, as we saw earlier, there were *expected* spatial relations that were described using both *expected* and *unexpected* prepositions. What I would like to highlight in this study is that the *expected* relation is separated from the *unexpected* relation in Rongga, Balinese, and Indonesian.

In short, what determines "normality" in Rongga, Balinese, and Indonesian, in addition to the precise definition given by Herskovits (1982) above, is the expectedness of relation between objects. When the relation between objects is normal the relation is considered *expected* and the prepositions *one, di, di* "expect" are used to express *the expected* relations. This *expected* relation can be tested with atypical relations between objects, e.g., when a folded tablecloth is placed on a table. In this context, the *unexpected* prepositions are used to describe the *unexpected* relations as further discussed in the following sub-section.

4.3.3.1 Testing the *expected* relations

Understanding the expectedness of the *Lo* in relation to the *Ro* is crucial in Rongga, Balinese, and Indonesian since when the *expected* relation is not there the preposition used to describe the relation between the objects will change. We can use some tests to clarify the distinction between *expected* and *unexpected* relations. For instance, in the situation *The tablecloth is on the table* it shows that *one, di, di* should be appropriate in the languages to locate the tablecloth in relation to the table. It is because, commonly, the typical function, i.e., the purpose, of the tablecloth is to cover the upward surface of the table. But now, if the tablecloth is folded and put back on the upward surface of the table, *one, di, di* are inappropriate because the tablecloth no longer performs its normal function in relation to the table, i.e., to cover the upper surface of the table. Rather, the *unexpected* prepositions, e.g., R: *zheta wewo* "up up"; B; *di duur* "expect up"; *di atas* "expect up", are more appropriate since the *unexpected* relation is now more prominent than the *expected* relation.

These cultural constraints are different, for example, from English. In English, whether the tablecloth is placed normally on the table or it is folded on the table, the two spatial contexts are regarded normal. What is more important in English is the fact that the tablecloth in the two contexts is supported by the table, not the expectedness of spatial relations between objects. Therefore, the preposition *on* is used to describe the spatial relations for the two contexts in English.

Another example showing that having knowledge of the *expected* relation is essential in the languages can be illustrated in the example *The water is in the glass*. Based on the overall responses given by my language consultants in the three languages, *one, di, di* are employed to describe the location of water in the glass because normally water is contained in *a glass* or other containers such as a cup, a tea pot, etc. However, if the water is now removed from *the glass* and *a cellphone* is put in it instead, *one, di, di* is inapplicable. In this context, the spatial prepositions, e.g., R: *zhale one* "down expect"; B: *di tengah* "expect inside"; I: *di dalam* "expect inside", are more required since once again the *unexpected* relation is more prominent than the *expected* relation.

Again, these cultural expectations in Rongga, Balinese, and Indonesian are different from English. In English, as far as a located object is within the containment of a reference object, e.g., *the water is in the glass, the cellphone is in the glass,* etc., such spatial relations are specified with the preposition *in*. Put another way, in these contexts the concept containment is more important than the expectedness of spatial relations between objects.

Moreover, recall that in sub-section 2.2.1.5 I argued that in *There is a truck in the road* the *expected* relation between the truck and the road is absent. Thus, the absence of

the *expected* relation may trigger the use of *in* to describe the *unexpected* relation between the truck and the road, i.e., the truck being an obstacle. A similar case can also be pointed out in the three languages. For example, when a passenger is in a car and the car is moving on the road the relation between the passenger and the car is described with *one, di, di,* e.g., R: *Sis one oto* "Sis is on the bus"; B: *Made di bise* "Made is on the bus"; I: *Budi ada di bis* "Budi is on the bus". On the other hand, if somebody is in a car and the car does not perform its expected function, i.e., it does not move on the road as usually happens, the *unexpected* prepositions are again more appropriate, e.g., R: *zhale one* "down expect"; B: *di tengah* "expect inside"; I: *di dalam* "expect inside". Thus, as the tests point out when the *expected* relation is prominent *one, di, di* tend to be used in Rongga, Balinese, and Indonesian. Otherwise, one of the *unexpected* prepositions is used to express the specific *unexpected* spatial relation between *Lo* and *Ro*.

4.3.3.2 The core meaning of *one, di, di* "expect"

Herskovits (1982) provides the core meanings for the basic topological prepositions as explained in section 2.2.1.2. The formulation of the core meaning is important because we can point out how the extended meanings can be derived from the core meaning. Even though the extended meanings can not be pointed out for prepositions in Rongga, Balinese, and Indonesian due to the decisive feature of the *expected* relation, it is still appropriate in the current study to propose a core meaning. Unlike Herskovits's procedure in determining the core meaning based on the range of use types from which she selects the central or ideal meaning for a particular preposition, the core meaning in Rongga, Balinese, and Indonesian can be more precisely derived from

the *expected* relation between the *Lo* and *Ro*. When the *expected* relation is present in the locative situations, then *one, di, di* are expected to use. Referring to the previous discussion, I propose the formalization of the core meaning of *expected* prepositions, i.e., *one, di, di*, following Herskovits, as:

For *Lo* to locate at one-, two-, three-dimensional *Ro*

EXPECTED (Lo, Ro)

4.3.4 The *unexpected* relations in Rongga, Balinese, and Indonesian

In this section, the semantics of *unexpected* prepositions is discussed. The discussion of their syntactic forms has been presented in Chapter 3.

4.3.4.1 R: *zhale one* "down expect", B: *di tengah*, I: *di dalam* "expect inside"

As the previous *expected* relation test shows when an *expected* function is irrelevant in a particular situation, the relation is defined as *unexpected* rather than *expected*. The first *unexpected* prepositions I discuss are *zhale one* "down expect", *di tengah*, *di dalam* "expect inside" in Rongga, Balinese, and Indonesian respectively.

To apply *zhale one, di tengah, di dalam* correctly, we have to be able to determine whether the objects involved in the given locative relation is expected or not. For example, it is normal that stones, sand, etc. are contained in a burlap. In that context, as predicted, *one, di, di* are more appropriate. However, even though *zhale one, di tengah, di dalam* may also be possible in that context with a distinct pragmatic emphasis, i.e. to emphasize that the *Lo* is "expect inside" the *Ro*, they are less commonly used. There are two explanations for this. First, as explicated in the previous section the *expected* relation

is crucial in the use of *one, di, di*. Thus, it is sufficient to describe the topological relation using *one, di, di*. Second, when *one* is used in that situation it already implies that *Lo* is "inside" *Ro* given the expected function of sacks. In other words, the use of *zhale one, di tengah, di dalam* is redundant. Because of this redundancy and of the salience of the *expected* relation *one, di, di* are more commonly applied.

Imagine now that other objects which are atypically related to the burlap, e.g., shirts, are put in it. The *zhale one, di tegah, di dalam* must be employed to describe the *locative* relation between the shirts and the sack. This example confirms that the expected function is important in defining Rongga, Balinese, and Indonesian's topological relations.

To see a more explicit context of the use of *zhale one*, *di tengah*, *di dalam* let us look at again Picture 2 below.

Picture 2: Money in the wallet

As can be predicted from the context, i.e., it is usual that money is put in a wallet, *one, di, di* are appropriate to describe the *expected* relation between the objects in the picture. But, when the money is removed from the wallet and a pencil is placed in the wallet as indicated in Picture 9 below now *zhale one, di tengah, di dalam* are used by all my language consultants in the three languages to describe the *unexpected* relation between the two objects.

Picture 9: A pencil in the wallet

In the later context, the location of the pencil breaks the conditions required by the *expected* relation I defined previously. More specifically, since the purpose of wallet is to keep money, not pencil, this is what triggers the relation becomes *unexpected*, and the *unexpected* prepositions are used to describe such a context in the languages.

In addition to the absence of an unexpected function, there is another specific feature relevant to the use of *zhale one, di tengah, di dalam,* namely *containment***,** i.e., *Lo* lies within the interior of *Ro*. The *Ro* that serve as containers include cup-like objects, e.g. *glasses*, objects with holes, e.g. *shoes, a bottle*, and objects with complete enclosure, e.g., *sack*. Additionally, institutional objects, e.g., *a school, a university*, etc., are also conceived to perform containing functions. In relation to *Lo*, it can be both animate and inanimate objects, e.g., *human being, animal*, etc., and physical objects, e.g., *water, book,* etc.

Further evidence that *zhale one, di tengah, di dalam* indicates containment in the absence of the *expected* relation can be found in describing the unexpected relation between a cellphone and a glass as Picture 10 shows.

Picture 10: A cellphone in the glass

When a cellphone is placed in the glass, the use of *zhale one, di tengah, di dalam* is more motivated as illustrated in the examples below.

2. handfon	ndau	**zhale**	**one**	gelas	R
cellphone	that	down	at	glass	
"The cellphone is in the glass"					
handfon	**di**	**tengah**		gelas-e	B
cellphone-the	expect	inside		glass-the	
"Th cellphone is in the glass".					
handfon	itu	**di**	**dalam**	gelas	I
cellphone	that	expect	inside	glass	
"The cellphone is in the glass".					

However, *one, di, di* are used when water is put in the glass. In this situation, the *purpose* and *relation* of the two objects are normal, thus the *expected* relation is prominent.

4.3.4.1.1 The core meaning of *zhale one* "down expect", *di tengah, di dalam* "expect inside"

I stated in the previous sections that the presence or absence of the *expected* relation allows us to formulate the core meaning of Rongga, Balinese, and Indonesian topological prepositions. Here, I propose the core meaning of the *unexpected* relation of *zhale one*, *di tengah, di dalam* and its formal spatial relation based upon the preceding discussion as follows:

Lo lies within the interior of a three-dimensional *Ro*.

UNEXPECTED CONTAIN (Lo, Ro)

4.3.4.2 R: *zheta wewo/zheta tolo* "up up", B: *di duur*, I: *di atas* "expect up"

In addition to the absence of the *expected* relation, *zheta wewo*, *di duur*, *di atas* are used to show the *unexpected* relation between *Lo* and *Ro*, where the latter objects provide support for the former one.

But, what objects can be considered to provide support to the located objects? The objects that have an upward facing surface such as *a table*, *a stump* as prototypical examples or objects that are conceptualized as having such features as human's shoulder, head, a tree branch, etc. In relation to the *Lo*, it includes both animate and inanimate objects, e.g., *persons, animals*, and physical objects, e.g., *a cup, a pen,* etc. Thus, *zheta wewo, di duur, di atas* are applicable to describe spatial situations such as *the rope is on the stump* (Bowerman, 1996) as can be seen in the examples in 3

3.	azhe	ndau	**zheta**	**wewo**	jala	kaju	R
	rope	that	up	up	cut	stump	
	"The rope is on the stump". (Elicitation)						
	tali-e	**di**	**duur**	kayu-e			B
	rope-the	expect	up	stump-the			
	"The rope is on the stump".						
	tali itu	**di**	**atas**	kayu			I
	rope that	expect	up	stump			
	"The rope is on the stump".						

The direct support provided by the *Ro* also entails a direct contact between the *Lo* and *Ro*. Thus, as explained before, if there is another object between the rope and the stump, let's say a magazine, *zheta wewo/zheta tolo, di duur, di atas* are appropriate to describe the *unexpected* relation between the rope and the magazine. To describe such a

topological construction, Rongga, Balinese, and Indonesian speakers will say sentences in 4.

4. azhe	**zheta**	**wewo**	majalah		R
rope up		up	magazine		
"The rope is on the magazine".					
tali-e	**di**	**duur**	majalah-e		B
rope-the	expect	up	magazine-the		
"The rope is on the magazine".					
tali itu	**di**	**atas**	majalah		I
rope that	expect	up	magazine		
"The rope is on the magazine".					

It appears that the use of *zheta wewo, di duur, di atas* is in the context of "immediate geometric relations", i.e., the immediate geometric relation of *The rope is on the stump* is between the rope and the stump. However, when there is another object between the rope and the wood, e.g., *a magazine*, the immediate geometric relation can be between the rope and the magazine or between the magazine and the stump. Which immediate geometric relation is activated depends upon which geometric relations the speaker intends to specify. In other words, in such a context, the immediate geometric relation cannot only be between the rope and the stump in Rongga, Balinese, and Indonesian. In English, however, the magazine could be ignored. Therefore, to describe such a spatial context an English speaker says *the rope is on the stump*.

Recall that *one*, *di*, *di* "expect" are applied to specify the *expected* relation of *Lo* with respect to *Ro* in *The cup is on the table*. As also pointed out previously, *zheta wewo*/*zheta tolo* "up up", *di duur, di atas* "expect up"" are also applicable in that situation in Rongga, Balinese, and Indonesian. It is not clear why the *expected* and

unexpected prepositions can be used to describe the *expected* spatial relation in this context. It might be that the use of the two prepositions is motivated by the typicality of the table as informed explicitly by my Rongga consultants, i.e., the use of the *expected* prepositions *one, di, di* "expect" and the *unexpected* prepositions *zheta wewo* "up up"*, di duur, di atas* "expect up"depends on what table you put the *Lo*. The *expected* prepositions are used when a glass is put on a dining table. But, when the glass is put on a block of wood intended as a table, the *unexpected* prepositions are preferred.

In Balinese, based on my judgment as the native speaker, *di* is used in the spatial situation between the cup and the table. The table is common in Bali especially in villages. It is usually put in a living room. When a guest is visiting a cup of tea or coffee is usually served on the table. Thus, the spatial relation between the cup and the table is expected. Moreover, based on the summary of responses given by my Balinese consultants above, the spatial relation is indeed considered *expected*.

Regarding the support, it is not only provided by upper flat surface such as *a table*, *a stump*, etc., but also by other objects that are imagined to have such a surface as head, shoulder, stone, tree, etc. Being imagined to have such a surface, the objects are conceived to provide supports. So, when an object is put on one's head, one's shoulder, or a stone (in particular in the absence of the expected functions) *zheta wewo, di duur, di atas* are more appropriate. However, as pointed out before, when the expected function is prominent as in the case between the hat and the head *one, di, di* are applicable in Rongga, Balinese, and Indonesian.

The other informative feature that is also associated with the use of *zheta wewo* or *zheta tolo* in Rongga is distance. *Zheta wewo* is used for the spatial relation between the

Lo and *Ro* at a close distance to the speaker. More specifically, *zheta wewo* is applied to *The cup on the table* above when, for example, we are sitting in the living room and are describing the spatial relations of the objects. But, if the located and reference objects are distant from the speaker (but within the speaker's and hearer's sight) the spatial relations are specified by *zheta tolo* "up up" as in example 5 below.

5. manu	lalu	**zheta**	**tolo**	kaju	R
cock	male	up	up	tree	
"The cock is in the tree". (Elicitation)					

In this context, the *Ro*, i.e., *kaju* "tree", is relatively distant from the speaker. The use of *zheta tolo* here is motivated by the absence of the expected relation. In this situation, someone is in a search of a cock that has been lost for days and finds that the cock is in a tree. In this situation, the normal *purpose* between objects required by the definition of *expected* relation is violated, i.e., the cock is not in its cage where it is usually kept by the owner. Hence, *zheta tolo* is more appropriate to describe the *unexpected* relation in Rongga because the objects are distant from the speaker and because of the absence of the *expected* relation. This example again shows how the *expected* relation is prominent in Rongga.

In Balinese and Indonesian, the *unexpected* prepositions *di duur*, *di atas* are also appropriate in such a context. Unlike Rongga, however, Balinese and Indonesian do not distinguish the use of *di duur* and *di atas* based on the distance. In other words, when *Lo* and *Ro* are distant or near from the speakers, especially in the absence of *expected* relations, the two prepositions are used in Balinese and Indonesian.

4.3.4.2.1 The core meanings of *zheta wewo/zheta tolo* "up ", *di duur, di atas* "expect up"

Following the discussion, the salience of support and direct contact, i.e., in the absence of the *expected* relation, are relevant to the application of *zheta wewo/zheta tolo*, *di duur*, *di atas* in Rongga, Balinese, and Indonesian. It allows me to formulate the core meanings of the *unexpected* prepositions as follows:

Lo is in a direct contact and supported by *Ro*

UNEXPECTED SUPPORT & DIRECT CONTACT (Lo, Ro)

4.4 Summary

There are two specific factors contributing to the *expected* relation. It requires the designed *purpose* and normal *relation* between objects in the three spatial domains, i.e., the spatial relations between human-made objects, part-whole relations, and juxtapositional relations.

Referring to the previous discussion, Rongga, Balinese, and Indonesian speakers employ the same pragmatic principle to describe their topological relations. This principle, unlike Herskovits pragmatic principles, is based on the expectedness of relation between objects. When the relation between objects is expected the spatial relation between objects is *expected*. To describe the *expected* relation, the *expected* prepositions, i.e., *one, di, di* "expect", are used in Rongga, Balinese, and Indonesian respectively. But, when the relation between objects is not expected, i.e., atypical, the spatial relation is *unexpected*. And a set of *unexpected* prepositions are used to describe such a spatial relation, i.e., R: *zheta wewo/zheta tolo* "up up", *zhale one* "down expect"; B; *di duur*

"expect up" *di tengah* "expect inside"; I: *di atas* "expect up", *di dalam* "expect inside". This principle appears to be crucial in the three languages allowing us to separate the *expected* relation from the *unexpected* relations.

The use of the same concept of topological relations in the three languages is evidently related to the fact that the three languages belong to the same language family, i.e., the Austronesian language family. However, what it is not clear at this point is how precisely the concept is shared in the languages, i.e., whether it is through language contacts among the languages or whether it is related to genetic relations among the languages. To my knowledge, there are no publications on this issue to date. Further study is necessary to answer this question.

The results do not support the proposal of strong universal conceptual categories claiming that the concepts *containment* and *support* are universal and that of universal tendencies saying that the concept *attachment* is primary are not confirmed in Rongga, Balinese, and Indonesian. More specifically, whether an earring is put on an ear in a typical relation or it is attached on top of the ear the universal conceptual categories will predict that the concept *support* is relevant in those two cases, while the universal tendencies will predict that the concept *attachment* is important. In Rongga, Balinese, and Indonesian, however, the two concepts are not basic. What is more important is the expectedness of spatial relation between objects. Therefore, in the first context, i.e., the earring is on the ear in the normal fashion, the relation is *expected*, while in the latter context, i.e., the earring is attached on top of the ear, the relation is *unexpected*.

One valid question deserves to be asked now. Is there some evidence from spatial language acquisition showing that the expectedness of relation between objects affects

the acquisition of the *expected* and *unexpected* prepositions in the languages? The answer of this question is the main issue in the next chapter.

Chapter 5

Some Evidence from Spatial Language Acquisition

5.1 Introduction

This chapter is mainly dedicated to point out if there is some evidence showing that the expectedness of spatial relations between objects affects the acquisition of topological prepositions. The chapter is organized as follows. Section 5.2 reviews previous studies on the acquisition of topological relations. My study on the acquisition of topological prepositions in Indonesian using three tasks, i.e., scaling, production, and comprehension tasks, is presented in section 5.3. Section 5.7 deals with a general discussion of all the findings followed with a brief summary.

5.2 The acquisition studies of topological relations

Many scholars have investigated the pattern of acquisition of topological relations. Piaget and Inhelder explain that "spatial notions do not derive directly from perception" but must be constructed operationally on the plane of reflective, non-presentational thought (Inhelder, 1969: 35 in Johnston, 1985: 969). This development of representational space begins with the objectivization of the physical world and the child's knowledge of inherent object properties (Piaget and Inhelder, 1969 in Johnston, 1985: 969). At the earliest stage, the spatial notions acquired by children are those related to the functions of an object, e.g., *containment*, *support*. Recall that toddlers love pots, pan, towers, and hiding games. Note that what Piaget and Inhelder define as *functional* here is not in the sense of my definition of the concept of the *expected* relation above.

Rather, their definition of *functional* is more like the *designed* function by Vandeloise as previously explained, i.e., the function of a table is to support the tablecloth, and of a bowl is to contain water, for example, etc. Moreover, Piaget and Inhelder do not distinguish the *expected* preposition from the *unexpected* preposition.

In the next stage, the spatial notions constructed by children are proximity, separation, surrounding, and order in which these concepts do not entail children's perspectives. For example, when children were asked to locate lampposts along an imaginary street, they created a meandering row with all the elements of objects touching each other.

Finally, children coordinate topological relations with their schemes for quantifying sets and imagining alternative points of view, arriving at spatial notions of a projective and Euclidean character (Piaget and Inhelder, 1967 in Johnston, 1985: 969).

Piaget and Inhelder (1967) further predicted that if cognitive development is the sole factor that affects language development, regardless of linguistic community, the following order of acquisition of spatial terms will occur (cited in Ingram, 1991: 427).

1. 'in', 'on', 'under': the first spatial concepts are of containment, support, and occlusion.
2. 'beside': a purely spatial proximity relation, not dependent on the speaker's point of view.
3. '$front_f$', '$back_f$' (i.e. of objects which have inherent fronts and backs, e.g. houses): proximity to inherent feature.
4. 'between': coordination of two proximity relations.

5. ‘front’, ‘back’ (in relation to objects without inherent fronts and backs, e.g. balls): coordination of the relative proximities of the speaker, reference object, and located object.

Thus, as Johnston (1985: 969) said “the Piagetian account of spatial conceptualization during the preschool years proposes a developmental progression from functional to topological to projective-Euclidean representation of space”. This account is in agreement with Johnston’s hypothesis that the non-verbal cognition influences the path of children language acquisition.

Johnston and Slobin (1979) also conducted research on the same domain. Unlike Piaget and Inhelder’s study, Johnston and Slobin investigated the development of children’s locative acquisitions cross-linguistically, i.e., in English, Italian, Serbo-Croatian, and Turkish. In their study, Johnston and Slobin included 48 children (2;0 – 4;8) in each of the four linguistic communities. Each child was tested by an experimenter. The experimenter placed a reference object, e.g., *a plate*, in front of the child. A located object, e.g., *a stone*, was then put next to the plate. The child was asked “*Where is the stone standing?*” (Note that this is an instance of *unexpected* relation because it is not normal that a stone is put on a table or a stone is spatially related to the plate. This factor, as we have seen previously, affects the use of topological prepositions in Rongga, Balinese, and Indonesian). The children were credited more when they could use a particular spatial word in an appropriate context than in the inappropriate contexts. For example, an English speaking child who correctly used both *under* configurations, i.e., under, underneath, would be given credit though he or she used it incorrectly to specify

one of *behind* configurations, i.e., behind, in back (of). He or she, however, was not given credit if he or she used *under* incorrectly two or more times in other configurations.

Johnston and Slobin pointed out, despite the various patterns of developmental acquisition within the individual languages, e.g., the 3;4-4;0 Turkish subjects were unable to use *back, front* for non-featured reference objects, while the Italian subjects at this age were advanced at the use of *back* and *front* for non-featured contexts. Moreover, the large percentage of English and Serbo-Croatian subjects failed to express any of the second group of locatives, e.g. $back_f$, $front_f$ even at older age than Turkish and Italian subjects, general cross-linguistic order emerged:

in/on/under/beside < $back_{feature}$/$front_{feature}$/between < back/front

The results show that the pattern of acquisition is similar to Piaget and Inhelder's findings, i.e., the topological relation is acquired earlier than the unfeatured relation or the non-topological relations. It is not clear, however, what objects they used in their experiments to elicit the topological relations. They do not address this issue in the article.

Regarding the order of the development, Johnston & Slobin (1979: 542) thought that it is affected by the interaction between conceptual or cognitive factors, i.e., the spatial understanding underlying locative terms and their relative salience, and linguistic factors, e.g., homonymity, lexical diversity, and lexical complexity. For example, the 11-month age difference between Turkish and Serbo-Croatian children who were more advanced in using the locative term *back* showed that, for the Turkish children, their interpretation of the use of *back* (*arkasinda*) is only for featured-objects, e.g., *a chair*. They did not understand that *back* was also applicable for nonfeatured-objects, e.g. *a tree*.

On the other hand, the Serbo-Croatian children who have acquired *back* for nonfeatured-objects may still be acquiring $back_{feature.}$ For them $back_{feature}$ is more difficult than *back* for nonfeatured-objects which might be due to the morphological complexity and lexical diversity of *back* (*iza, izada*). This example shows that a linguistic factor, i.e., homonymity, might affect the acquisition of locative prepositions because conceptually children prefer one-to-one mapping between semantic concepts and surface morphemes (Slobin, 1977 in Johnston and Slobin, 1978 532).

Carlson-Radvansky et al. (1999) conducted two different experiments to investigate how the function of objects influences the use of spatial terms, e.g., *above* and *below*. They involved 32 undergraduate students at Notre Dame. In their first experiment, Carlson-Radvansky et al. manipulated alignment, i.e., the aligned and misaligned conditions, and object relatedness, i.e., whether objects involved in the locative situations are functionally related or not.

In this experiment, the participants were first shown all the reference objects, e.g., *a toothbrush*, and then the located objects, e.g., *a tube of toothpaste, a tube of oil paint* for the purpose of identification. Then the experimenter taped a picture of a reference object, e.g., *a toothbrush*, within a rectangular field on the wall. The participants were handed a located object, e.g., *a tube of toothpaste, a tube of oil paint* with a tape and asked the participant to tape the located object below or above the reference object, e.g., "*Place the toothpaste tube above the toothbrush!*" The placements were coded in terms of horizontal deviations (in millimeters) from a vertical line running through the center of mass of the reference object. For coding placements in the misaligned condition, which is crucial in this experiment, deviation towards the functional part of the reference objects

were coded as positive, while deviations away from the functional part were coded as negative.

The results show that there was a significant interaction between functional relatedness and alignment. A critical difference of 6 mm was required for significance. Unsurprisingly, for the thirty-two aligned conditions, there was no difference between placements for functionally related (*M*= 0.2 mm) and unrelated (*M*= 0.8 mm) located objects. Nevertheless, the placements for functionally related (*M*= 19 mm) and unrelated (*M*= 12 mm) were significantly more deviant for the thirty-two misaligned conditions than the aligned condition. In short, the results show how the function affects the placements of located objects in relation to the functional part of the reference objects.

In their second experiment, Carlson-Radvansky et al. manipulated the location of a slot in a reference object used in experiment 1, i.e., *a piggy bank*. The piggy bank has three slots, one toward the tail of the pig, one in the middle, and one toward the head of the pig. Three pictures were created, one with each slot. On each trial, the coin was placed in 1 of the 58 locations. A sentence, e.g., *the coin is above the piggy bank*, appeared at the bottom of the display, accompanied by the rating scale (1= not all acceptable; 4= moderately acceptable; 7= perfectly acceptable). They hypothesized that if the function of objects indeed affected the use of spatial terms then there was a shift of spatial term uses according to the locations of the slot.

The results show that the highest scores shift according to the locations of the slots into which the coin is put, i.e., 7.0 when the slot is in the back, 6.9 in the middle, 6.8 in front. This evidence, once again, validates their claim that the objects' function plays some role in using the spatial terms.

Bearing in mind Piaget and Inhelder's order of development (functional < proximity/topological < projective) and Johnston and Slobin's argument on the factors affecting the pattern of the acquisition, i.e., the conceptual and linguistic factors, I hypothesize that the prepositions indicating the *expected* relation, i.e., *di* "expect" should be acquired earlier by Indonesian children because it is morphologically and syntactically less complex and its semantics is more abstract than the prepositions indicating the *unexpected* relations (*di dalam* "expect inside", *di atas* "expect up"). Thus, in this study I am attempting to point out if the *expected* functions also affect the acquisition of the *expected* and *unexpected* prepositions in Indonesian, and if the conceptual and linguistic factors play a role in the acquisition.

5.3 Evidence from the acquisition of topological relations in Indonesian

To examine the role of the expectedness of spatial relations between objects in the acquisition of topological prepositions in Indonesian, I used three different tasks, i.e., a scaling task, a production task, and a comprehension task, that will be discussed in the following sections.

5.3.1 Scaling tasks

5.3.1.1 Participants

Before the stimuli were tested with the young subjects, control stimuli were tested with four adult speakers of Indonesian. They were undergraduate students at Faculty of Letters, Universitas Udayana in Bali (*M*= 19; 2 years old). They voluntarily participated in this experiment.

5.3.1.2 Stimuli

The control stimuli were 18 color photographs (10.2 x 5.3 cm) showing the two kinds of spatial relations, i.e., the *expected* and *unexpected* relations, the same as those used in the stimuli for the young subjects. The concepts containment, support, and attachment were also represented by the pictures. The photographs were randomly arranged.

The main objective of testing the control stimuli was to examine the adults' responses to the expectedness of spatial relations shown in the photographs.

5.3.1.3 Procedure

The adult participants were presented all the photographs with two Indonesian sentences below each photograph. The sentences described the spatial relations in the pictures using prepositions indicating the *expected* relation, i.e., *di* "expect", and the *unexpected* relation, i.e., *di dalam,* "expect inside", *di atas* "expect up". They were asked to scale the sentences. The scale ranged from 1 to 4 (1= the least appropriate, 2= less appropriate, 3= appropriate, 4= the most appropriate). The subjects were encouraged to use all the scale. The subjects were naïve about the hypotheses. One example of stimuli is presented in Picture 6 below.

Before the actual experiment, I did practice trials (two extra stimuli for each subject). The question (in Indonesian) I asked to each participant before scaling the pictures is as follows: *Apakah pemakaian preposisi dalam kalimat-kalimat di samping gambar ini tepat penggunaanya untuk menggambarkan letak benda dalam gambar tersebut*? "Are the use of prepositions in the sentences appropriate to describe the

topological relation in the picture?" Then, the participant had to scale the use of prepositions in the sentences describing the spatial relations in the pictures.

Cangkir *di* alas cangkir= Cangkir *di atas* alas cangkir=
Picture 6: A cup on a saucer

5.3.1.4 Results

The results of the scaling task by the adult participants can be seen in Figure 5.1.

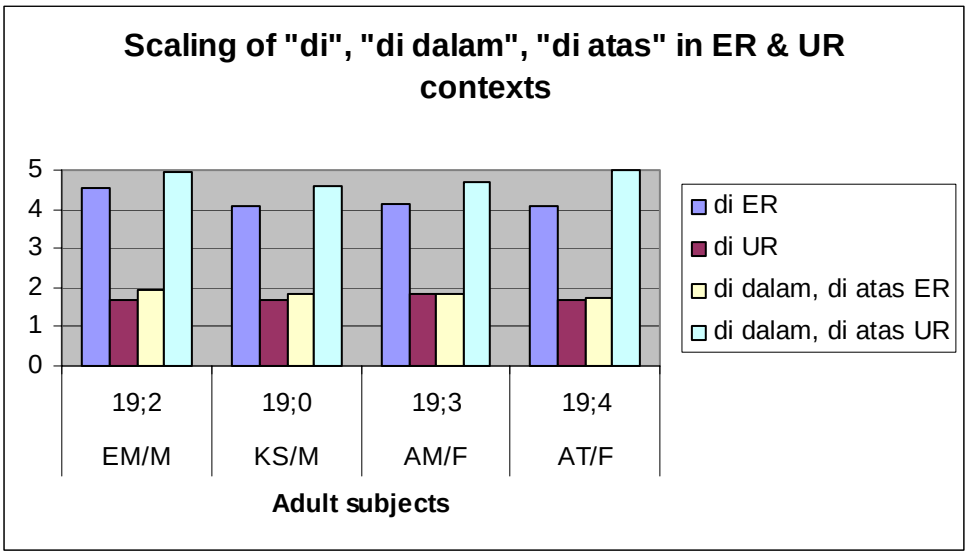


Figure 5.1: Scaling of *di* "expect", *di atas* "expect up", *di dalam* "expect inside" by the adult participants in ER and UR contexts.

Figure 5.1 shows that the *expected* preposition *di* "expect" is scaled higher in the *expected* relation (ER) contexts than in the *unexpected* relation (UR) contexts. The difference is significant (t (6)= 21.30, P > .05). The scaling of the *unexpected* prepositions *di atas/di dalam* "expect up/inside", on the other hand, is higher in the UR contexts than that in the ER contexts. The difference is also significant (t (6)= 27.51, P

>.05). Therefore, the results confirm my prediction that the *expected* preposition *di* "expect" is used in ER contexts, while the *unexpected* prepositions *di atas/di dalam* "expect up/inside" are used in UR contexts.

5.3.2 Production tasks

5.3.2.1 Participants

18 children participated in this experiment (3; 0 – 11; 0 years old). Eight of them (3; 0 – 5; 0) are recruited from Rama Childcare in Denpasar Bali, while the rest (5; 1 – 11; 0) are from families who used to leave their children in that childcare and families who voluntarily participated.

Regarding the subjects' socio-economic background, they are from middle to upper-middle class families based on parental education and occupational prestige. The childcare is one of the primary children's centers in Denpasar where the parents usually work in the management of private or foreign companies in Bali. This information was obtained from the application forms the parents filled in when they enrolled their children.

In addition, they are normally developing children. The information is from caregivers about their language skills, from the parents that they do not have problems of language skills in their family, and from my direct observation, e.g., personal talk with each child. For example, in my talk with them I showed them an Indonesian cartoon figure that they are familiar with. I then had them answer questions about the figure such as his name, his school, his favorite food, etc. In this fashion, I was able to test their ability to produce simple sentences, i.e., sentences that at least have a SVO word order.

To recruit the participants, written consent forms, i.e., the study proposal, containing the general idea and the detailed procedure of the study were sent to the childcare's directress and the parents. I was assisted by one caregiver to distribute the proposal to the parents. The meeting between the experimenter, the parents, the caregivers, and the childcare's directress was conducted to provide chances for them to ask further questions about the study. For parents who could not attend the meeting, they were contacted via telephone to allow them to ask questions regarding this study. After the permission from the childcare was obtained and when the parents agreed that their children participate in this study, the parents signed the form.

5.3.2.2 Stimuli

The stimuli consist of located and reference objects that the participants are familiar with, e.g., *a cellphone, a glass, water,* etc. The complete list of stimuli can be seen in Figure 5.2 below.

Containment	**Expected Relations**	**Unexpected Relations**	**Spatial Domains**
glass	water in the glass	a cellphone in the glass	artifacts
book	a paper in the book	a comb in the book	artifacts
wallet	money in the wallet	a pencil in the wallet	artifacts
Support			
saucer	a cup on the saucer	a doll on the saucer	artifacts
wrist	a watch on his hand	a watch on top of his hand	artifacts
table	a glass on the table	a child bicycle on the table	artifacts
Attachment			
finger	a ring on his finger	a ring on top of his finger	artifacts
foot	foot on his shoes	foot on top of his shoes	artifacts

ear	an earring on her ear	an earring on top of her ear	artifacts

Figure 5.2: Stimuli for the production tasks

The objects were arranged in such a way so that they showed particular kinds of spatial relations, i.e. *expected* and *unexpected* relations, that the subjects had to describe, e.g., *water in the glass, an earring on an ear* for the *expected* relations; *a ring on top of a finger, a comb in a book* for the *unexpected* relations, etc. The criteria I used to decide the *expected* and *unexpected* relations are based upon the presence of the *expected* relations I defined in Chapter 4. Thus, there is an *expected* relation between a watch and a hand when the two objects are in normal relation, while the *expected* relation is absent when the watch is put on top of a hand.

Three basic concepts of spatial relations, e.g., *containment*, *support*, and *attachment*, were represented in the stimuli. There were nine topological situations for each kind of spatial relations, i.e., three of them show the relations of containment, three show the support relations, and the other three show the attachment relations. Thus, a total of 18 color photographs expressing the *expected* and *unexpected* relations were used in this study.

5.3.2.3 Procedure

The experimenter and child participants sat at a same table. The experimenter took a located object, e.g., *a cup*, and asked the participant to name it. Then, the experimenter pointed to a reference object, e.g., *a table*, and asked the participant to name it as well. The named located object was put on the horizontal surface of the reference object. The experimenter then asked: *Dimana cangkirnya?* "Where is the cup?" The subjects provided a spatial relation between the objects, e.g., *Cangkir itu **di** meja* "The

cup is on the table". To elicit natural knowledge of spatial relations from the participants, the experiment was conducted in play contexts. The order of the objects' relations presented to participants used a Latin square design, e.g., *expected* relations followed with *unexpected* relations; *unexpected* relations followed with *expected* relations. Additionally, before the actual experiment was administered, warm up sessions (three trials which are not included in the stimuli) were given to each subject to assure that the tasks worked. The entire experiment lasted for about thirty minutes for each subject.

When the stimuli were tested with the young subjects, two general patterns were observed as shown in Figures 5.3, 5.4, and 5.5. Please note that in this test two of the young participants at 3; 10 and 3; 11 were excluded from data analysis since they made more than one error, i.e., three errors of three trial items during the warm up sessions. Instead of using *di, di dalam, or di atas* they used the word *sini* "here", not demonstratives *ini* "this" or *itu* "that", to describe the spatial situation. The use of *here* perhaps is the early strategy used by younger children to describe the spatial relation between objects.

5.3.2.4 Results

Figures 5.3, 5.4, and 5.5 provide the results from the production tasks by the young subjects.

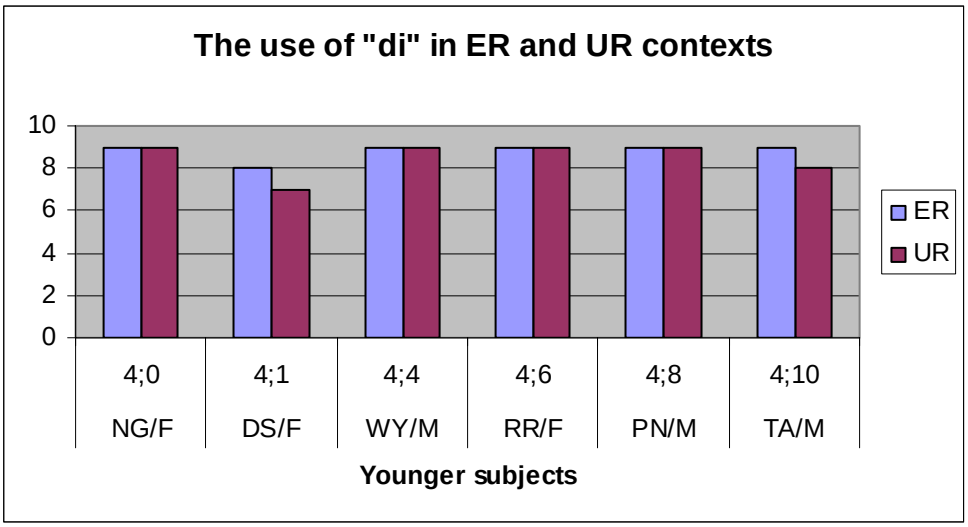


Figure 5.3: The use of *di* "expect" by the younger participants in ER and UR contexts.

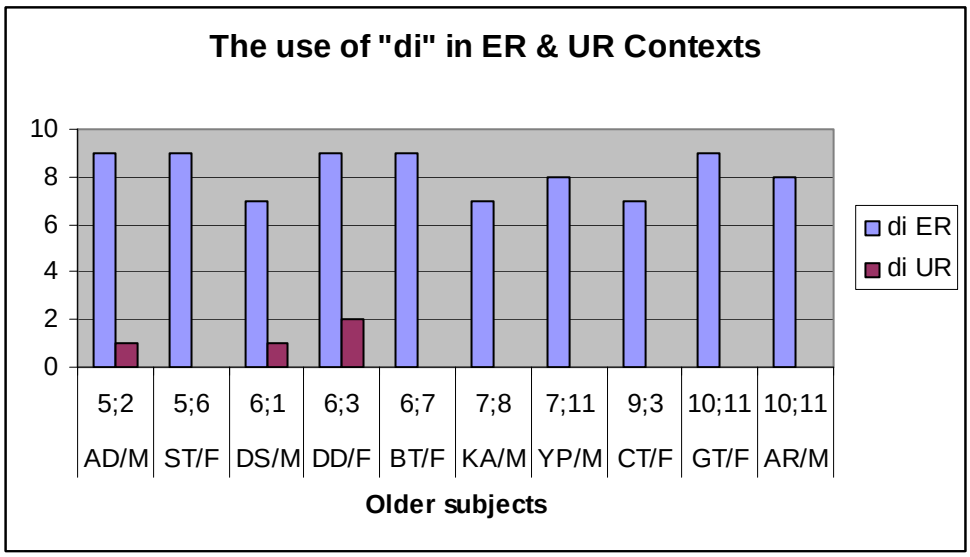


Figure 5.4: The use of *di* "expect" by the older participants in ER and UR contexts.

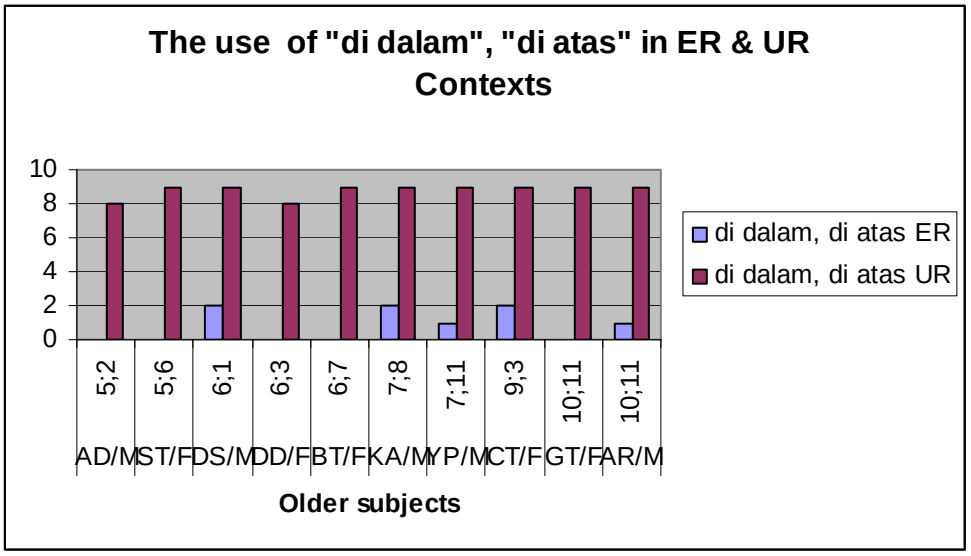


Figure 5.5: The use of *di dalam* "expect inside" and *di atas* "expect up" by the older participants in ER and UR contexts.

Figure 5.3 shows that the younger subjects (4; 0 – 5; 0) are insensitive to the difference between the *expected* and *unexpected* prepositions. As Figure 5.3 shows, the *expected* preposition *di* "expect" is used in ER and UR contexts by all the subjects. There is an insignificant difference of using the *expected* and *unexpected* prepositions in ER and UR contexts ($t(6) = 0.87$, $P < .05$).

For the older participants (5; 1 – 11; 0), the pattern is different from that of the younger participants. Figure 5.4 shows that the use of the *expected* preposition *di* "expect" is significantly higher in the ER contexts than in the UR contexts ($t(18) = 21.36$, $P > .05$), while the use of the *unexpected* prepositions *di atas/di dalam* "expect up/inside" is also significantly higher in the UR contexts than in the ER contexts ($t(18) = 25.02$, $P > .05$) as shown in Figure 5.5. These results again confirm my prediction that the *expected* preposition *di* is used in the ER contexts, while *di atas/di dalam* are used in the UR contexts. Based on the current findings, children seem to produce adult-like responses around five years old.

5.3.2.5 Discussion

Referring to the results above, the younger subjects (4; 0 – 5; 0) seem not to be able to distinguish the *expected* preposition *di* from the *unexpected* prepositions *di dalam, di atas*. In other words, the *expected* preposition *di* is used in the ER and UR contexts, i.e., the younger subjects overgeneralize the use of *di* to the unexpected contexts. Two questions should be raised now: does the overgeneralization of *di* indicate that the younger subjects only have not acquired the adult meaning of *di*? Or do they use *di* as a default form? I conducted a comprehension experiment to address these questions.

For the older subjects (5; 1 – 11; 0), the same pattern as adults showed that they are able to distinguish the *expected* from the *unexpected* relations. Put another way, the *expected* preposition *di* is used in the ER contexts, while the *unexpected* prepositions *di dalam, di atas* are used in the UR contexts by the older children.

Regarding the order of stimuli presented to the participants, it seems that the order did not affect the participants to specify the spatial relations between objects. What is important is the presence of the *expected* relation in the spatial relations.

5.3.3 Comprehension tasks

5.3.3.1 Participants

The same young participants (4; 0 – 11; 0) involved in the production experiment again participated in this study.

5.3.3.2 Stimuli

Since in this study the objective is to test the young participants' knowledge of spatial prepositions, i.e., to test their knowledge of locating a located object in relation to a reference object in ER and UR contexts, the stimuli employed in the previous study were again used except one objects' arrangement, i.e., *a picture on a book*, was excluded because of the nature of relations between the two objects. In that particular relation, it is difficult to ask the participants to put the picture in relation to the book since the picture is already a part of the book.

5.3.3.3 Procedure

This experiment was conducted one month after the production test. The reason is that I consider one month is sufficient for the children to forget the production tasks they did previously.

In this experiment, act-out tasks were used. The experimenter and the young participant sat at a same table (table 1). The objects were put randomly on a separate table (table 2) close to table 1. As in the production test, the experimenter took a located object, e.g., *a watch*, and put it on the table 1. The experimenter asked the participants to name it, e.g., *Apa ini?* "What is this thing?" They were also asked to name a reference object, e.g., *his or her hand*. Unlike the procedure in the production test, the experimenter now asked the participant to put the watch on his or her hand, e.g., Coba *taruh jamnya* ***di*** *tangannya!* "Put the watch on your hand, please!"

What I manipulated in this experiment was that I used the verb *taruh* "put" followed with *di* "expect"or *di atas/di dalam* "expect up/inside", not the verb *pakai*

"wear" followed with *di* "expect" or *di atas/di dalam* "expect up/up" in my instructions. The verb *taruh* "put" in Indonesian does not entail that someone has to wear something. If, for example, I used the verb *pakai* "wear" in my instruction, e.g., *pakai jamnya **di** tangan* "put the watch on your hand" the subjects must know how to wear it as people normally do. Thus, by using the verb *taruh* "put" I thought I could test the importance of the *expected* relation between the watch and the hand. If they put the watch on their hand as it normally happens, this indicates that the *expected* relation is crucial in Indonesian. But, if, for example, the watch is put on top of hand, i.e., not in a position as how the watch is normally worn, which is more appropriate as a response of *di atas*, to respond to the use of *di* in my instruction my prediction should be reevaluated.

The order of spatial relations asked to the participants followed the Latin square design used in the production experiment. As in the previous experiment, three trials, which were not included in the stimuli, were given to the participants before the actual experiment. If ER contexts are responded with *di*, e.g., the ring is put on a finger in a normal relation as a response to my instruction *taruh cincinya **di** jarimu* "put the ring on your finger", I scored it 1. And if UR contexts are responded with *di dalam* or *di atas*, e.g., the watch is put on top of a hand as a response to my instruction *taruh jamnya **di atas** tanganmu* "put the watch on top of your hand, I scored it 2. The experiment lasted for about thirty minutes for each subject.

5.3.3.4 Results

Figures 5.6 and 5.7 show the results of participants' knowledge of using the *expected* and *unexpected* prepositions in the ER and UR contexts.

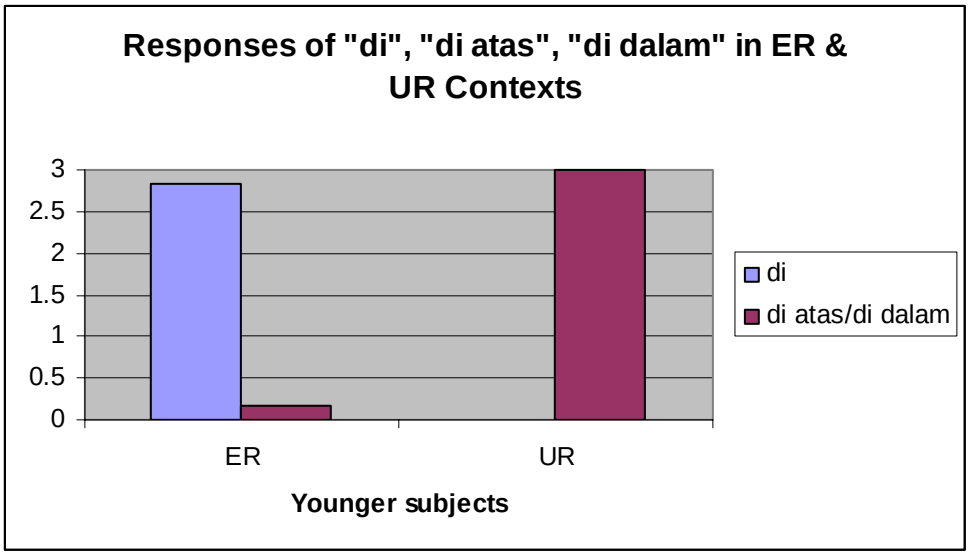


Figure 5.6: The comprehension of *di* "expect" in ER and UR contexts by the younger subjects.

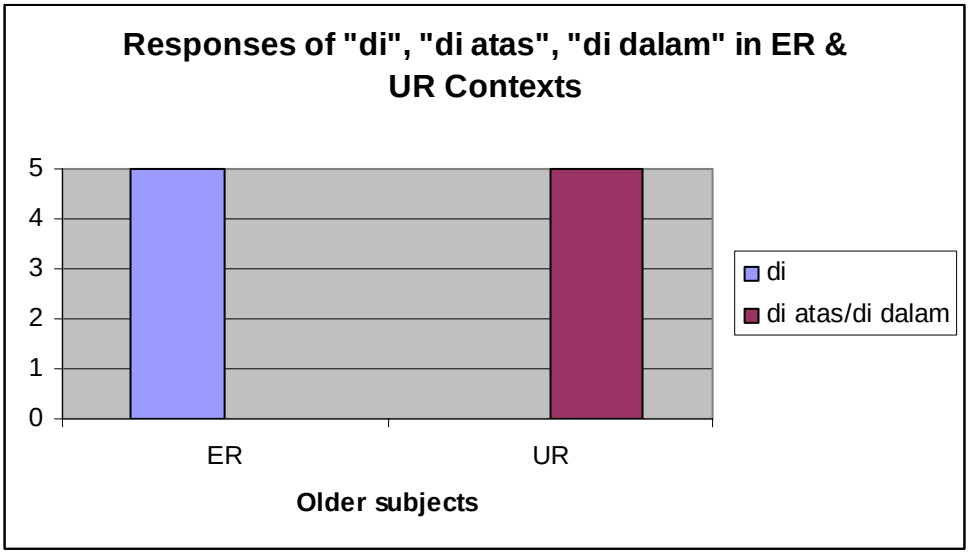


Figure 5.7: The comprehension of *di atas/ di dalam* "expect up/in" in ER and UR contexts by the older subjects.

Unlike the results shown by the younger participants in the production tasks, i.e., the younger subjects overgeneralized the *expected* preposition *di* "expect", the results in the comprehension test show that they do have knowledge of the *expected* preposition *di* and the *unexpected* prepositions *di dalam* or *di atas*. More specifically, their performance

based on my instruction using the *expected* preposition *di* "expect" is higher in the ER contexts than in the UR contexts, e.g., the ring is put on a finger as it is normally worn, the money is put in a wallet in a normal relation, as shown in Figure 5.6. Their performance based on my instruction using the *unexpected* prepositions *di dalam* or *di atas* is higher in the UR contexts than in the ER contexts, e.g., the watch is put on top of a hand in an atypical relation, the earring is put on top of her ear.

The same pattern is also observed in the older subjects' results. Their performance based on my instruction using the *expected* preposition *di* "expect" is significantly higher in the ER contexts than in the UR contexts, i.e., none of the older subjects used *di* in the UR contexts, as indicated in Figure 5.7. And their performance based on my instruction using the *unexpected* prepositions is significantly higher in the UR contexts than in the ER contexts, i.e., none of the older subjects used *di atas* or *di dalam* in the ER contexts. These results suggest that both the younger and older subjects do have the knowledge of the *expected* and *unexpected* prepositions. But, why did the younger subjects not produce the *unexpected* prepositions in their production task? I will try to answer this question in the general discussion section.

5.3.3.5 Discussion

Many scholars have studied possible relations between language comprehension and production, e.g., Fraser, Bellugi, and Brown, 1963; Shipley et al., 1969. Fraser, Bellugi, and Brown (1963 in Gerken and Shady, 1996), for example, investigated children's comprehension of different morphosyntactic forms in English, e.g., affirmative vs. negative, subject vs. object active, etc., by using picture selection tasks. They found

that the children selected the correct picture for each contrast more frequently than they produced the contrastive forms. Their findings suggest that the language comprehension may precede language production.

The results of the current study provide similar evidence as pointed out by Fraser, Bellugi, and Brown that children's comprehension precedes their production. Figures 5.6, and 5.7 show that the young subjects (4; 0 – 11; 0) have knowledge of *expected* and *unexpected* prepositions. In other words, the children, i.e., the younger and older children, are able to understand the use of *expected* and *unexpected* prepositions. In contrast, in their production tasks, especially for the younger subjects (4; 0 – 5; 0), this ability is absent.

One question should be posed now: if the younger subjects have such knowledge, why could they not use it in the production tasks? It seems that it is likely due to linguistic factors, e.g., morphological complexity. More specifically, the syntactic forms of the *unexpected* prepositions, e.g., *di dalam, di atas*, are more complex than that of the *expected* preposition form, e.g., *di*. Therefore, this fact prolongs their acquisition of the *unexpected* prepositions. As Johnston and Slobin (1979; 531-532) argue that several linguistic factors, e.g., lexical diversity, homonymity, morphological complexity, clear etymology, could delay the acquisition of spatial prepositions (further discussed in the general discussion below).

5.4 General discussion

The findings of current study, in addition to those by Carlson-Radvansky (1999), once again provide further evidence that functions, i.e., the *expected* functions of

artifacts, play crucial roles in the use of spatial terms. As can be seen from the results, especially the use of spatial terms by the older participants (5; 1 – 11; 0) in the production tasks, the presence of the *expected* function of objects influences their use of spatial terms in Indonesian. More specifically, when the *expected* relation is present, the *expected* preposition *di* "expect" is used to describe the spatial relations between objects, e.g., *a picture in a book, water in the glass, money in the wallet, a watch on wrist, a ring on a finger*, etc. On the other hand, when the *expected* relation is absent, e.g., *a cellphone in a glass, a comb in a book, a doll on a saucer*, etc., the *unexpected* prepositions *di dalam* "expect inside" or *di atas* "expect up" are used. Thus, the facts are further evidence that the *expected* relation is important in Indonesian.

Another important point that can be observed from the current findings is that the objects' function is not only restricted to the designed functions of objects, i.e., a bowl functions to contain, a table functions to support, as indicated in Carlson-Radvansky's study, but also to the functions that are typically connected to the objects, i.e., if the located objects are typically related to the reference objects such as *a watch on hand, earring on ear, money in the wallet*, etc.

What is another important lesson that we can learn from these findings? To answer this question let us look at what Bowerman and Choi found in their study of acquisition of topological relations in English, Korean and Dutch (2001: 490-491). They pointed out that English children consistently distinguished *containment* from *support*, e.g., *put in*, *put on*, from an early age, while Korean children were more attentive to the distinction between the *interlocking* relations (*kkita*) and various "looser" kinds of joinings including putting clothing onto different body parts from an early age. My study,

however, shows a different pattern. The children especially the younger subjects in their production tasks acquire the *expected* prepositions earlier than the *unexpected* prepositions. Thus, it seems that the learnability factor plays a crucial role in the acquisition of the *expected* and *unexpected* prepositions in Indonesian. Put another way, for children to discover the target grammar, i.e., the *expected* and *unexpected* prepositions, they go through exposure to sentences of their parents or of their linguistic community. The question now is: how to account for the learning process by children? The story below as suggested by Bowerman (2001; 497) may explain the learning process.

> Children construct spatial semantic categories over time on the basis of the way they hear words used in the input, and, in doing so, they draw on perceptual sensitivities and conceptual biases they bring with them to the task. Language input helps the learner decide which kind of similarities and differences among referent situations are important for purposes of selecting a word, but the sensitivities to these properties must of course ultimately be supplied by the child. Some properties are undoubtedly more accessible or salient to learners than others, and categories that depend on these will, all else being equal, be learned earlier and with fewer errors than categories that depend on properties that are cognitively or perceptually more obscure. Where the relevant properties are not obvious, because they are either low in salience or maturationally not yet available, children will make errors, either underextending or overextending words according to principles that are more readily available to them.

What specific factors affect the acquisition of the *expected* and *unexpected* prepositions in Indonesian? It appears that it is connected to children's conceptual and linguistic development. In other words, for children to use the *unexpected* prepositions appropriately their conceptual and linguistic knowledge has to be "mature" which generally correlates with their age. What I mean by "mature" here is in the sense of Borer and Wexler's Maturation Hypothesis (1987: 123-130), in which the maturation is biologically determined. The evidence for this argument can be seen in Figure 5.3 that even though the younger subjects (4; 0 – 5; 0) have the knowledge of *expected* and

unexpected prepositions (from the comprehension tasks) they still can not produce the two prepositions appropriately. The explanation for this fact seems to be related to the fact that their production ability has not yet become mature. On the other hand, the older subjects (5; 1 – 11; 0), like the adults, can produce the two prepositions accurately as Figures 5.4 and 5.5 shows. It is, I argue based on the results, because they have already had matured conceptual and linguistic knowledge.

The same line of argument to support my argument can be pointed out from Bowerman (2001; 491-497) conducting comprehension tests, i.e., non-verbal tasks, for young children between 18 and 23 months (20 learning English and 10 learning Korean). At this age, according to the parents, only six of English children and two of Korean children produced the target words for their languages.

Bowerman used a preferential-looking paradigm. The stimuli consisted of four videotaped actions to test if the children in each language understand the properties of events relevant to the two target words, i.e. containment for *(put) in* in English and tight fit or interlocking for *kkita* in Korean. In the first and third pair of stimuli, the matching scene was the same for the two languages. In the first pair, the peg is put in a block with holes into which the peg is put, and on a solid block. In the third pair, the book is put in a cover box, and on another book. For the contexts, where the peg is put in the holes of the block and the book is put in the cover, both *(put) in* and *kkita* were qualified in English and Korean. In the second and fourth pairs of stimuli, the containment and tight fit were split. In the second pair, a lego was put in a large plastic box in which *(put) in* matches for English, and a lego was put in another lego in which *kkita* is appropriate in Korean. In

the fourth pair, a ring was put in a basket in which *(put) in* was expected in English, and a ring was tightly put on a pole in which *kkita* matches in Korean.

The child sat on parent's lap facing two TV monitors mounted each other. A loudspeaker is placed between the two monitors through which the children could hear auditory input. If the English children understand the properties of *in*, they should look longer at scenes showing containment regardless of tightness. And if the Korean children understand *kkita* they should look longer at scenes showing tight-fitting relation regardless of whether the fit involves containment or surface attachment. The results showed that at the age between 18 and 23 months the English and Korean children understand *in* and *kkita* respectively (though the majority of the children in the two languages could not produce the target words). Thus, for English and Korean children to be able to produce the target words, they should have mature conceptual and linguistic knowledge, which starts around two years old according to the subjects involved in Bowerman's production elicitation test.

The other evidence supporting this argument is from the results shown in Figures 5.6 and 5.7 that only three of the older subjects (with initials KA, CT, and GT) show their hesitation to perform the use of *expected* and *unexpected* prepositions. For examples, when I asked them to put the earring on top of their ear they asked me back *di atas telinga apa di telinga* "is it on top of ear or on ear?". This fact could possibly imply that the three subjects' conceptual and linguistic knowledge have reached more advanced maturation than the other seven subjects in those Figures.

The argument that the patterns of the young subjects' use of the spatial prepositions are related to the conceptual and linguistic development is in agreement with

what Johnston and Slobin (1979) argue that when children cognitive capacity develops as their age increase their understanding of more complex concept also develops. Moreover, Johnston and Slobin (1979: 531-532) explain that there are four linguistic factors that could delay the acquisition of prepositions. They are lexical diversity, e.g., *next to, beside, by, close to* in English while only one form in Turkish, *yaninda*, clear etymology, e.g., *in back, in front* in contrast with *between*, morphological complexity, e.g., *on top of, in the middle of*, and homonymity, e.g., *back* and *front* are homonyms in the sense that they are used to encode featured and non-featured objects. Johnston and Slobin (1979: 532) further explain that children on the ground prefer one-to-one mappings between semantic concepts and surface forms. Thus, regarding the current study, the delay of the acquisition of *unexpected* prepositions in Indonesian by the younger subjects is apparently due to their immature linguistic knowledge, i.e., due to the morphological complexity of such prepositions, e.g., *di dalam, di atas*.

Johnston and Slobin (1979), however, do not predict such a delay in Indonesian. Recall that the average age when their subjects acquire the first group of locatives, i.e., *in*, *on* (also *under*, *beside*)) is between 2; 0 – 3; 0. At this age, the subjects in the four linguistic communities can distinguish the use of *in* from *on* systematically. Indonesian children, on the other hand, can start using the counterparts of *in* and *on* in Indonesian, i.e., *di, di dalam, di atas*, systematically at the age of 5; 0. For Indonesian children at the age between 4; 0 – 4; 10, as the results of the production tasks show, they can only use the *expected* preposition *di*. Recall also that there are two participants at the age 3; 10 and 3; 11 that cannot use *di*, but *sini* "here" instead. This may be due to the basic concepts relevant to the use of topological prepositions in Indonesian, which depend upon the

presence of the *expected* relation between objects. Based upon this concept, Indonesian distinguishes the *expected* preposition from the *unexpected* prepositions, which are syntactically more complex than that of the *expected* preposition. Once again, this is beyond Johnston and Slobin's prediction of the order of acquisition of locative prepositions.

Given the importance of the *expected* relation in Indonesian, I predict that the stages of the acquisition of topological prepositions in Indonesian are as follows.

Expected preposition (*di* "expect") < *Unexpected* prepositions (*di dalam* "expect inside", *di atas* "expect up")

The findings of the current study also lend further support to Feist's argument (2008: 117) that language acquisition, i.e., preposition acquisition by children, is through an evolution. But note again that what Feist defines as function is in the sense of "designed" function defined by Vandeloise and Piaget, i.e., the functions of a reference object to contain or support a located object. In her study, Feist involved 16 preschooled-aged children (mean age 56.5 months) and 8 13-year-old children (mean age 161 months). The stimuli used by Feist were twelve pictures depicting two Grounds, i.e., an ambiguous dishlike tray and a hand, paired with two Figures, i.e., a firefly and a coin, at three levels of concavity.

The stimuli were randomized and presented individually on a computer screen, interspersed with four catch trials and preceded by two training trials. When the picture was present on the screen the participant was asked if the Figure *in* or *on* the Ground.

The results showed that the influence of function varied according to the subjects' age. For the 13-year-old group, like adults in her earlier study, their use of *in* and *on* according to the labeling conditions, i.e., in the bowl condition and in the plate condition, was only there when responding to pictures depicting inanimate Ground. For the preschoolers, however, their across-the-board increase in the use of *in* in the bowl condition relative to the plate condition was observed. In short, Feist explains that when the subjects' conceptual and linguistic knowledge are mature, the acquisition of more complex concepts and more complex linguistics forms occur.

In relation to the current study, in the beginning children appear to acquire a very basic concept, i.e., *expected* relation. When their conceptual and linguistic knowledge get matured, they acquire the *unexpected* relation.

This study, however, is still preliminary. The stimuli, e.g., the comprehension tasks, need further evaluation. So far, what I manipulated was that the use of the verb *taruh* "put", which does not imply that somebody has to wear something in Indonesian, followed with *di* to test the prominence of the expected relation. In future investigation, for example, I should look at the subjects' responses when I ask them to put various located objects relative to a reference object, e.g., *a pencil* or *a rubber in a pencil box* and *key* or *money in a pencil box,* etc., using both the *expected* preposition *di* and *unexpected* preposition *di dalam* in turn.

For future studies, this study is imperative to be replicated in Balinese and Rongga, which, like Indonesian, also belong to the Austronesian language family. Since Rongga and Balinese belong to the same language family as Indonesian, I predict that the

expected preposition may be acquired earlier than the *unexpected* prepositions in the two languages as well. But, this needs to be investigated further.

5.5 Summary

We have seen now that the empirical findings of using the topological prepositions shown in Chapter 4 are supported with more convincing evidence, i.e., evidence from the acquisition of topological relations in Indonesian. The results suggest that the expectedness of spatial relation between objects do affect the acquisition of topological preposition in Indonesian. When the *expected* relation is there in the spatial relation between objects the *expected* preposition *di* "expect" is used to describe such a context. But, the *unexpected* prepositions *di dalam* "expect inside", *di atas* "expect up" are used when the *expected* relation is absent.

The conceptual and linguistic concepts influence the acquisition of both *expected* and *unexpected* prepositions in Indonesian. More specifically, to be able to produce the two prepositions children should have matured conceptual and linguistic knowledge. The delay of the acquisition of the *unexpected* prepositions in Indonesian may also be specifically caused by the complexity of syntactical forms of such prepositions, i.e., *di dalam* "expect inside", *di atas* "expect up", which are more complex than the *expected* preposition, i.e., *di* "expect".

This study also informs that the *expected* relations seem to be semantically motivated. This conclusion can be drawn from the fact that both the *expected* and *unexpected* relations in Balinese and Indonesian can be specified using the "locative"

applicative constructions. In Rongga, on the other hand, such an applicative construction is not found.

Lastly, the findings of the current study reevaluate the claims of both the strong universal conceptual categories or UCC, e.g., Piaget & Inhelder, 1956, Johnston & Slobin, 1979, Herskovits, 1982, 1986, and the universal tendencies or UT, e.g., Levinson et al., (2003), on the basic concepts relevant to the use of spatial prepositions. According to the UCC, the concept *containment* and *support* are basic in the use of spatial terms in English. The UT, however, claims that these concepts are not confirmed in the nine unrelated languages studied by Levinson et al. In fact, they found that the concept *attachment* (also *superadjacency, full containment,* and *subadjacency*) is important in those languages.

This study, however, reveals that those concepts, e.g., *containment*, *support*, *attachment*, are not relevant in Rongga, Balinese, and Indonesian. For example, in the cases of spatial relations between an earring and an ear, and between a ring and a finger, etc., according to UCC the relevant spatial concept in this situation is *support*, while according to UT the concept relevant to this context is *attachment*. In Rongga, Balinese, and Indonesian, nevertheless, what is important in these spatial relations is the expectedness of spatial relations between the objects. If the spatial relation between the objects is normal, the relation is *expected*, otherwise it is *unexpected*. The two spatial relations are coded with different prepositions in the languages. The *expected* preposition is used to code the *expected* relation, while the *unexpected* prepositions are applied to mark the *unexpected* relation. In short, the UCC's and UT's claims are invalidated in the present study.

In SECTION 2, i.e., the next four chapters, I shift to the topic of non-topological relations, i.e., frames of reference, in Rongga, Balinese, and Indonesian. I will explore whether the languages also share the same principle to code their non-topological relations. Additionally, I would also like to show whether the use of frames of reference in the languages has any cognitive effect to speakers' mind of the languages.

SECTION 2: Non-topological Relations

Chapter 6

Studies on Non-topological Relations

6.1 Introduction

I reviewed studies on topological relations in English and across-languages in Chapter 2. In this chapter, studies of non-topological relations, i.e., frames of reference, in English and other languages are discussed. Before discussing these studies, the definitions of frames of reference are provided in section 6.3, followed with a review of studies on English frames of reference in section 6.4.1, on Tzeltal frames of reference in section 6.4.2, and on Guugu Yimithirr frames of reference in section 6.4.3. Section 6.5 deals with a non-linguistic study of frames of reference. A critique of Levinson's study is presented in section 6.6. The chapter concludes with a brief summary.

6.2 Frames of reference

We have seen that languages mark their topological relations distinctly. It is also true that languages code their non-topological relations, i.e., their frames of reference, differently. Spatial nominals, e.g., *north, south*, *east, west,* etc., are usually used for an absolute frame of reference, while the complex prepositions, e.g., *in front of, in the back of*, etc., are used in intrinsic frames of reference, and the complex prepositions, e.g., *to the right, to the left*, are used in relative frames of reference. The examples 1-2 in Tzeltal (taken from Levinson, 2003: 147-148) and 3 in English illustrate absolute, intrinsic, and relative frames of reference respectively.

1. waxal ta **y-ajk'ol** xila te limite
   stand-of-vertical-cylinder PREP its-uphill chair the bottle
   "The bottle is standing uphill (i.e. south) of the chair.

2. nakal ta **s-pat** na te kerem-e
   sitting PREP its-back house the boy-PART
   "The boy is sitting behind the house (other side from the door).

3. The girl is **to the right** of the tree

The spatial nominal *yajk'ol* "south" is used in Tzeltal to establish absolute reference. The nominal phrase *spat* "its back" refers to the inherent feature of the house, i.e., the back part of the house, and establishes as intrinsic frame of reference in Tzeltal. The complex preposition *to the right*, based on the perspective of the speaker, establishes the relative frame of reference in English.

Interestingly, as we have seen, languages differ in using the principles of applying each of these frames of reference. More specifically, within the intrinsic system determining the inherent features of reference objects can be decided on a functional basis, e.g., English, or a shape-based system, e.g. Tzeltal. The principles of using the relative system depend on whether speakers of a language use a translation principle, e.g., Hausa, a reflection principle, e.g., English, or a 180^{o} rotation principle, e.g. Na Tar, one dialect of Tamil (Levinson, 2003). Regarding the absolute system, determining spatial orientation can be based on landmarks, e.g., Austronesian languages, an abstract system, e.g., Tzeltal, or an intermediate system between the landmark and abstract systems, e.g., the riverine system in Alaska (Levinson, 2003).

In addition to the spatial nominals and complex prepositions, there are also languages that employ place-names to specify the absolute frames of reference as Brenzinger (2008b: 4-5) describes.

In conveying spatial information on locations in the bush, for example, on hunting/collecting sites, Khwe refer to landmarks – mainly the water pans, which all have individual names. The mental map of an experienced Khwe hunter or collector includes names and positions of between one hundred and two hundred pans; he will memorize the location of many fossil drainage lines and is familiar with the major elephant tracks. Most of all, he will remember thousands of prominent trees. Khwe place-names, as a rule, are primarily names for water pans *óró-ca* and dug wells *//gáàna* – the main water sources in West Caprivi. One could expect a total of far more than 600 Khwe place-names for the core area of Khwe-land, which stretches from West Caprivi north into Angola and south into Ngamiland of Botswana. A Khwe elder once stated emphatically that in Khwe-land 'There is no place named, where there is no water'. It is the water sources that are named, and this is done mainly by referring to environmental features, such as plants, animals and physically features.

All the evidence shows that non-topological relations are also coded distinctly across languages. In Chapter 8, I will explore whether the frames of reference are only a matter of surface differences or if they also affect cognition.

6.3 Definition of frames of reference

Levinson (2003: 52) uses the rotation of objects as illustrated below to explain the logical structures, i.e., the properties, of intrinsic, relative, and absolute frames of reference. More concretely, the intrinsic facets of the reference objects provide an anchoring coordinate system to describe the spatial relation between a located object relative to a reference object. Thus, when the viewer and the whole array are rotated 180^{o}, the description of spatial relation between the ball and the chair remains the same, i.e., *the ball is* ***in front of*** *the chair*. But, when the reference object, i.e., the ground object, is rotated 180^{o} the spatial description changes, i.e., *the ball is* ***in the back of*** *the chair*. For the relative frame of reference, the rotation of the viewer and the whole array affects the spatial description, i.e., *the ball is* ***to the right of*** *the chair*, while the rotation of the reference object does not, i.e., *the ball is* ***to the left of*** *the chair*. Regarding the absolute

frame of reference, the rotation of the viewer and the reference object does not affect the spatial description, i.e., *the ball is* ***north of*** *the chair*. However, the spatial description between objects changes when the whole array is rotated 180°, i.e., *the ball is* ***south of*** *the chair*. In short, the rotation task can reveal the properties of the three fames of reference.

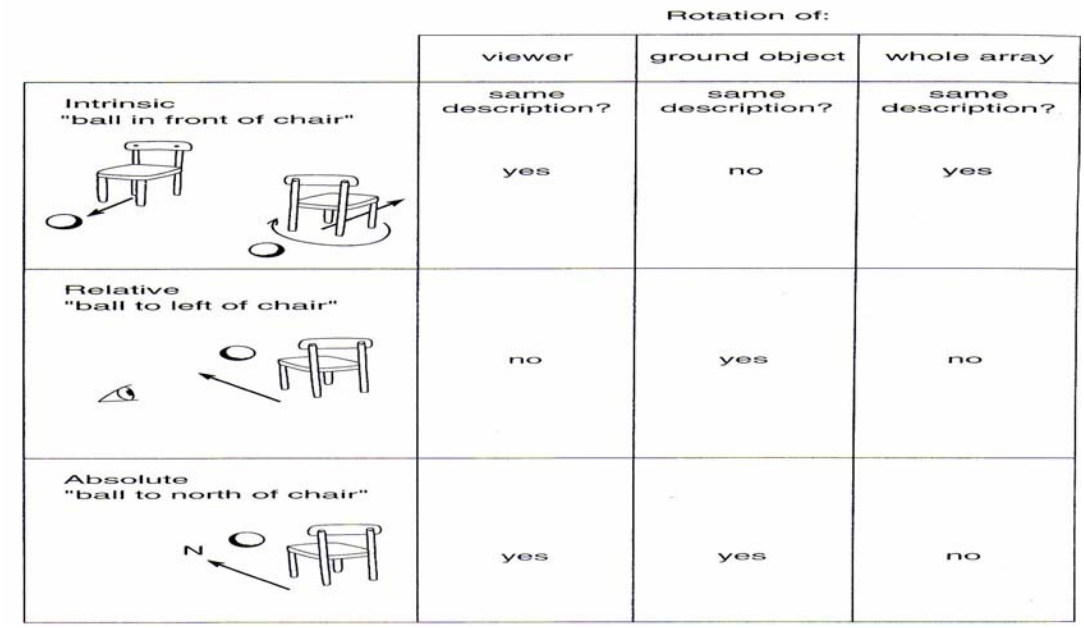


Figure 6.1: Object rotation tasks (Levinson, 2003)

The non-topological relations I investigate are frames of reference that involve a coordinate system in horizontal planes in the sense of Levinson (2003: 24-56). The definitions I provide here are mainly based on Levinson (2003: 41-92).

6.3.1 The intrinsic frame of reference

An intrinsic frame of reference involves inherent facets or sidedness of reference objects. The procedure to determine the inherent facets varies cross-linguistically. English, for example, determines the inherent facets based upon the functions of objects.

Thus, the front part of a TV refers to the side we attend to when we are watching it. For a car, the front is the part that canonically lies in the direction of motion. On the other hand, there are languages like Tzeltal that use the shape of the object, together with volumetric analysis or internal geometry, to decide the inherent facet. For example, a teapot's parts are identified by its shapes, i.e., the lid of the teapot is called its "mouth", the spout is named its "nose", the teapot handle is called its "ear", and the bottom part of the teapot is named its "bottom". Once the parts are identified intrinsically, they remain the same even though the object is rotated. In other words, the names of the teapot's parts do not depend on an observer's orientation.

This system, however, contrasts with, for example, Zapotec (MacLaury, 1989 in Levinson, 2003). In this language, the parts of a teapot are identified as follows. The "head" of the teapot is the top part of the object, i.e., the lid, the "foot" is its bottom, the handle is a "side" of the teapot, and the "belly" is the container part of the teapot. If now the object is rotated around horizontal axis, for example, the teapot lies now on its "belly", the teapot' parts are renamed, e.g., the "head" now refers to the "side", i.e. the handle.

Even though English and Tzeltal have different principles for determining the inherent facets of objects, the two languages behave the same in the sense that once the front part of the object is determined, that side will be the front part once and for all. For example, when a TV's front faces down, the front side will remain the same. It is unlike Zapotec, which determines the object's sides based on a relative position, e.g., the 'head' at the top, the 'foot' at the bottom, the 'side' for the handle. If the object is rotated around the horizontal axis, its facets are renamed (MacLaury, 1989 in Levinson, 2003: 78).

Furthermore, there are languages in which the morphology makes clear that human body or animals provide a prototype for the opposite sides. In this case, the speakers talk about the fronts, backs, sides, left, and right of other objects. Thus, the attribution of such facets can be used as the basis for a frame of reference. For example, having decided on the front, this can be used to anchor a system of opposition front, back, sides, etc.

6.3.2 The relative frame of reference

The relative frame of reference requires a viewpoint, a located object, and a reference object. In other words, this frame of reference requires triangulation of three points, and employs coordinates based on the speaker's viewpoint to specify the relation between the *Lo* and *Ro*. Thus, the English example *The ball is to the left of the tree* illustrates a relative frame of reference.

The relative frame of reference relies upon planes through the human body which establish sets of oppositions, i.e., up/down, front/back, right/left. This kind of coordinate system can be considered to center on the main axis of human body, i.e., front is anchored to the human chest. Having determined the front, the other directions can be found by clockwise rotation from front to right, back, and left (Herskovits, 1982). The use of the main axis of the body is one way to anchor the coordinates. Another possibility is to use human vision, i.e., the direction of gaze in defining "behind". Therefore, the relative frame of reference is closely related to human visual perspective.

Deciding the anchor is the first step in the employment of a relative frame of reference. In addition to the human main axis and human gaze, a secondary set of

coordinates is derived by mapping the coordinates on the viewpoint onto the reference object. The mapping could involve the translation, reflection, or 180^{o} rotation analysis as further illustrated in the following diagrams modified from Herskovits (1982).

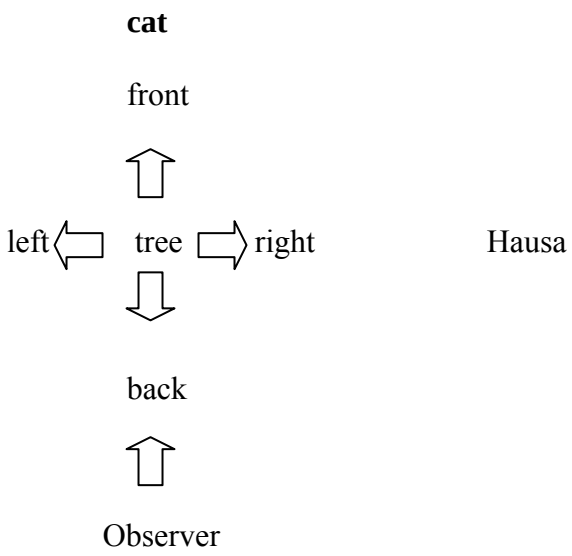


Figure 6.2: Translation analysis

In Figure 6.2, the observer or speaker simply translates the observer's egocentric axes to the reference object, e.g., *the tree*. The observer's front and back orientation are directly mapped to the front and back of the tree. This is an instance of translation analysis, i.e., the "coincidence situation" in Herskovits's term. In other words, there is a virtual point of observation coincident with the reference object, i.e., *the tree*, in this analysis. Hausa is a language that employs a translation frame of reference. To describe the location of a cat in terms of a tree in the figure, a Hausa speaker says *The cat is in front of the tree*.

The reflection analysis can be illustrated in the following figure.

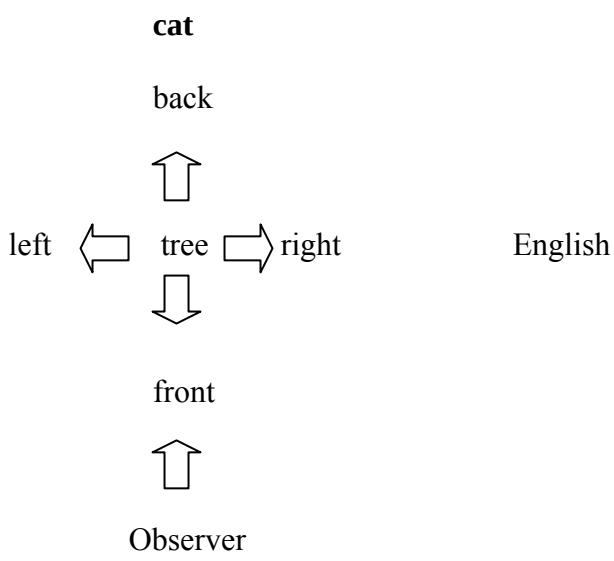


Figure 6.3: Reflection analysis

For an English speaker to specify the cat's location in relation with the tree in the figure, he or she says *The cat is in back of the tree*. The principle applied in this context, however, is different from that of Hausa. In this situation, the front of the tree is facing the observer, while the observer's right and left are directly mapped to the sides of the tree, i.e., it is counter-clockwise from the tree's front. Put another way, the use of *to the right* in this situation combines the point of view of the reference object encountered with the observer's point of view. The front and back axes are derived based on the tree's front (facing the observer) and back parts. But, the right and left axes have the same directions as the observer's right and left. Because of its complexities, this factor may contribute to the delay of acquisition of this projective relation in English.

The spatial relation between the cat and the tree just described can also be specified based on the 180^{o} rotation analysis as explained based on Figure 6.4.

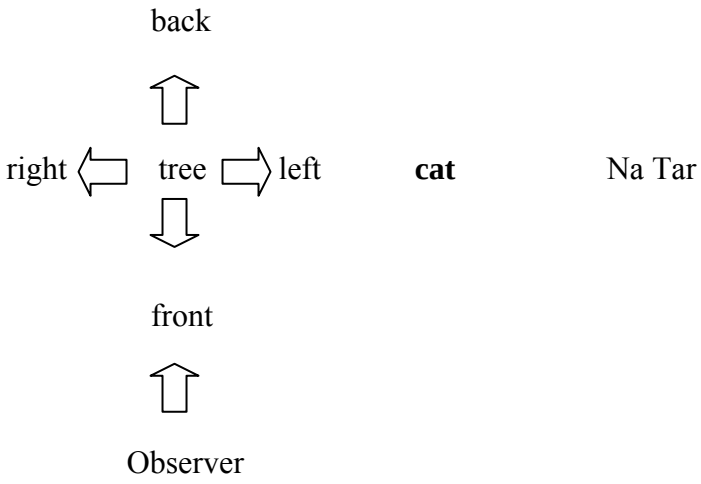


Figure 6.4: 180^{o} rotation analysis

Based on this analysis, the coordinates are mapped to the tree and then rotated 180^{o}. Hence, the tree's front is now facing the observer, and the right and left orientation are now decided with a clockwise rotation beginning from the front, i.e., the right of the tree is now to the observer's left. Herskovits calls this principle the canonical encounter situation, i.e., mirror order. This kind of relative frame of reference can be found in one dialect of Tamil, i.e., Na Tar caste, Ramnad district (in Levinson, 2003: 86). Thus, to express the spatial relation between the cat and the tree, a speaker of the dialect says *The cat is to the left of the tree*. According to Clark (1973), English children between six and nine years of age also produce this system.

6.3.3 The absolute frame of reference

An absolute frame of reference uses fixed bearings or cardinal directions corresponding to the directions related to compass bearings, e.g., *north, south, east,* and *west*. The cardinal directions, conceptually, are very abstract. In other words, they cannot be thought of as a proximate place or landmark (Levinson, 2003: 90). Thus, to describe a

spatial situation *The girl is to the left of the tree*, a speaker of the language employing an absolute frame of reference says *The girl is north/south/east/west of the tree* instead.

There are three different types of absolute systems (Levinson, 2003: 90-92). The first one is the absolute frame of reference which is based on a local landmark. Local landmarks can give us the same abstract properties especially within a restricted territory, but they do not have the same abstract properties as notions like 'north' as pointed out by Austronesian island languages which fix an east-west absolute axis by reference to the monsoons, but use a 'mountain-sea' axis to contrast with it. As one moves around such islands the east-west axis remains constant, while the mountain-sea rotates (Wassmann and Dasen 1998 in Levinson, 2003: 90). For example, if someone lives in Denpasar, which is located in the southern part of Bali Island, the north direction is towards the mountains, e.g., Mount Batur, Mount Agung, Mount Watukaru, etc., which range across the middle part of the island. But, if she/he moves to Singaraja, which is located in the northern part of the island, the north is again towards the mountains, i.e., it is towards south from people who live in Denpasar. The east and west directions remain constant, i.e., the east is towards the direction where the sun rises and the west is towards the direction where the sun goes down.

The second type of absolute frame of reference, in contrast to the first type, is based on a full abstract system. This absolute system is actually still based on local landmarks, but the system is abstracted away even when a speaker of the language is outside the territory of the landmarks. Tenejapan Tzeltal, for example, abstracts a north-south axis from the mountain incline of the local environment, but the axis remains constant outside the territory (Brown and Levinson, 1993a in Levinson, 2003: 91).

The last type of the absolute system combines both the first type, i.e. landmark-based absolute system, and the second type, i.e., the full abstract absolute frame of reference. For example, the riverine systems in Alaska, which use an abstract system within a vast drainage area, but are reset when crossing into another drainage system (Leer, 1989 in Levinson, 2003: 91).

The conceptual ingredients of absolute frames of reference are simple in the sense that such a frame of reference is binary in nature in which the located and reference objects are the arguments, and the coordinate system is based upon fixed bearings, which always have the origin on the reference object. Additionally, the absolute frame of reference supports transitive inference, i.e., the girl is south of the tree and the tree is south of the ball, so the girl is south of the ball. The intrinsic frame of reference on the other hand does not share this property. The relative frame of reference shares this property as far as the viewpoint is held constant (Levelt 1984 in Levinson, 2003: 48). Intrinsic systems are complicated by the multiplicity of object types, the differing degrees to which the asymmetries of objects allow the naming of facets, and the problem of 'unfeatured' objects. Relative systems are complicated by the psychological difficulties involved in learning left/right distinctions, the complexities involved in mapping secondary coordinates, and, because the relative expressions are often developed from intrinsic ones, they often display ambiguities across frames of reference like English in front (Levinson, 2003: 48-49).

6.4 Studies on frames of reference

As I said in Chapter 1, there is a European bias in the study of frames of reference. Most studies, e.g., Clark, 1973; Miller and Johnson-Laird, 1976; Jackendoff, 1983; Herskovits, 1982, are based on English and European languages and address the prominence of relative frames of reference, e.g., *The car is to the left of the tree*. In fact, there are languages that do not use the relative frame of reference or even the intrinsic frame of reference in their spatial description, e.g., Guugu Yimithirr.

In the following sections, I review three landmark studies of frames of reference. The first describes the English frames of reference (Herskovits, 1982), the second Tzeltal (Brown, 2001), and the third Guugu Yimithirr (Levinson, 2003).

6.4.1 Herskovits's study in English

According to some scholars, e.g., Clark, 1973; Miller and Johnson-Laird, 1976; Jackendoff, 1983; Herskovits, 1982, the relative frame of reference is prevalent in all languages. In English, for example, as Herskovits (1982: 217-220) points out, there are two possible axes to describe the relative frame of reference, i.e., basic and mirror orders. The basic order is defined in a "coincidence situation" when the speaker or observer and reference object coincide. Meanwhile, the mirror order is defined in the "encounter situation" as Clark (1973 in Herskovits 1982: 219) puts it.

> What are the characteristics of the most usual interaction between two people, John and Mary? …the most important property is that they will be facing each other a short distance apart. It is in this position that John and Mary are situated for the optimal perception of messages – both verbal and nonverbal – from the other person…If John and Mary were side-by-side, or back-to-back, these conditions would no longer be optimal.

To make it more concrete, the two axes are illustrated in the following figures (modified from Herskovits, 1982).

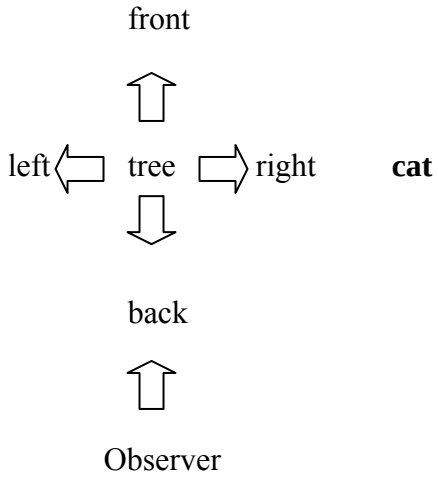


Figure 6.5: Coincidence situation

Thus, in *The cat is to the right of the tree*, there is a virtual point of observation coincident with the reference object *the tree*, i.e., the observer's front, back, left, and right are directly shifted to the ball. Thus, the basic order of axes can be determined using clockwise rotation beginning from the front, i.e., front, right, back, and left.

The encounter situation can be illustrated in the following figure.

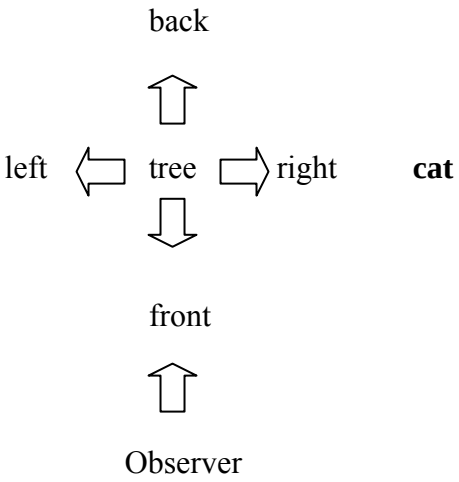


Figure 6.6: Encounter situation

The cat is to the right of the tree is also true in the encounter situation. The use of *to the right* in this situation combines the point of view of the reference object encountered with the observer's point of view by, following Levinson's explanation (2003: 85), "'flipping over' the egocentric coordinates as if they were on a sheet of acetate, and mapping them on the tree. Thus, we have the 'front' of the tree facing the speaker, with the 'right' of the tree to the observer's right".

According to Herskovits (1982), the spatial relation between the cat and the tree just described, can also be specified in the canonical encounter situation, i.e., mirror order. In this situation, the cat could be said to be *to the left of the tree*. Note that the *front* is still the space between the tree and the observer. But, *to the right* orientation is now derived by using clockwise rotation starting from the *front* (please see Figure 6.7 below). This fact points out the salience of the canonical encounter situation, i.e., mirror order.

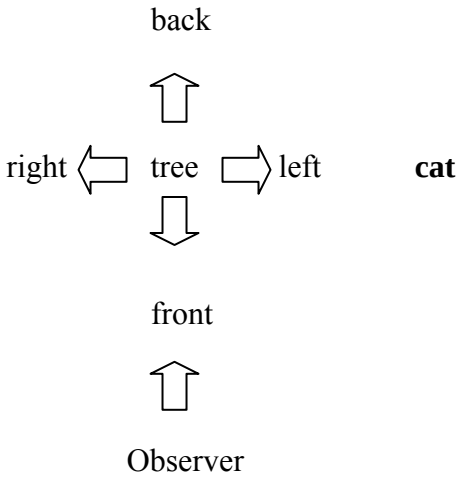


Figure 6.7: Canonical encounter situation

In addition to the relative frame of reference, English also uses the intrinsic frame of reference. Given a spatial situation, e.g, A girl is standing in front of a chair

(Bowerman, 1996), to describe the spatial relation between the girl and the chair, English speakers say *The girl is in front of the chair*.

However, there are languages where the relative and intrinsic frames of reference are not possible in describing the spatial relation between objects. Guugu Yimithirr is a language that does not employ the two frames of reference, but the absolute frame of reference instead as reviewed in section 3.3.3. Now, let's look at how Tzeltal encode its frames of reference.

6.4.2 Brown's study in Tzeltal

Brown (2001) studied the frame of reference used in the dialect of Tzeltal spoken by people in Tenejapa, Chiapas, Mexico. Tzeltal is a Mayan language. The Tenejapa territory lies on an incline from high south to low north, i.e., the elevation is from about 2,000 meters to under 1,000 meters (Levinson, 2003). This topography is abstracted in the use of an absolute frame of reference in the language. The directions across this territory are denoted *ajk'ol* "uphill" (roughly south), *alan* "downhill" (roughly north), and *jejch* "across" (either east or west). Thus, to describe the spatial relation between the bottle and the chair, i.e. the bottle is to the left of the chair/the bottle is south of the chair, a speaker of the languages says sentence 4 (taken from Levinson, 2003: 148).

4. waxal	ta	y-ajk'ol	xila	te	limite
stand-of-vertical-cylinder	PREP	its-uphill	chair	the	bottle

"The bottle is standing uphill (i.e. south) of the chair.

Note however that such a description does not rely upon an actual incline, i.e., in the context of the situation above, the bottle and the chair are on a flat surface. Such a description does not depend on visible features of environment as well. Such a description is effective to describe such a context in a house at night. Furthermore, the description is not necessarily applied in an actual incline territory. A speaker who is outside the territory also employs this frame of reference (Levinson, 2003: 149).

To elicit knowledge of frames of reference in Tzeltal, many different sources of information were used, e.g., overheard conversations, recorded natural talks, communicative tasks (Levinson, 2003: 149). One of the communicative tasks involved line drawings, which were based on original photo stimulus, e.g., a man standing to the right or left of a tree facing camera. These two photos were embedded with other two photos, e.g., a man standing next to a tree facing towards a tree or away from camera. The "director" and the "matcher" sat side by side, but were separated from each other by a screen. The "director" described particular photos, which the "matcher" could identify by using an absolute system.

Tzeltal also employs the intrinsic frame of reference. For example, to specify the location of a boy who is sitting behind a house, a Tzeltal speaker says sentence 5 (taken from Levinson, 2003: 147).

5. nakal	ta	s-pat	na	te	kerem-e
sitting	PREP	its-back	house	the	boy-PART

"The boy is sitting behind the house (other side from the door)

The relative frame of reference, e.g., *The boy is to the left of the tree, Take the first turning left*, etc., however, is not used in Tzeltal. In this dialect, speakers have terms

for right and left hands. But, they do not use the terms systematically to point the right and left visual fields.

6.4.3 Levinson's study in Guugu Yimithirr

In Guugu Yimithirr, in contrast to English and Tzeltal, almost all the spatial descriptions use cardinal directions, e.g., *north*, *south*, etc. Thus, to describe the spatial relation between the cat and the tree in the previous example an expression equivalent to "*The cat is north/south of the tree*" is expressed, to describe the spatial situation between the girl standing in front of the chair it is specified in the language by saying "*The girl is north/south of the chair*", if someone asks someone else to move over a bit, he or she says "*Move a bit east*", to instruct a carpenter to make a door jamb vertical the language speaker says "*Move it a little north*", or even when someone asks you to skip ahead in the book, he or she will ask you to "*Go further east*" etc (Levinson, 2003: 114).

To obtain data of frames of reference in Guugu Yimithirr, Levinson used different tasks. For example, one of the tasks involved one informant acting as a "director" to describe a route (marked with a cord) through a model town. The other informant acting as the "matcher" imitated the route in the same way as the "director" described. The "director's" laying out of the route was separated from the "matcher's" imitation with screen. Thus, the tasks involved presenting route and location descriptions.

To refer to such a coordinate system, the cardinal direction roots, which are spatial nominals, are used (taken from Levinson 2003: 116-117).

gungga- (northern edge)

jiba- (southern edge)

naga- (eastern edge)

guwa- (western edge)

The roots, i.e., the spatial nominals, can occur with morphological derivations. For examples, the roots can be attached with suffix-like endings (Levinson calls it o-form, R-form, and L-form).

o-form (unmarked or implicit start focus):

gungaarr "to/at the N"

jibaarr "to/at the S"

naga "to/at the E"

guwa "to/at the W"

These are the simplest forms used in route directions, e.g., turn west, and have a locative or allative interpretation, i.e., to bring to. The roots with R-form are also frequently used to imply a focus on the end-point of a trajectory.

R-form (end-point focus):

gunggarra "to/at a point in the N'

jibarra "to/at a point in the S"

nagaar "to/at a point in the E"

guwar "to/at a point in the W

Thus, when a speaker says that he would like to go to a beach, for example, it is sufficient for him to say *ngayu gunggarra thadaara* "I am going north". Note that in this utterance he does not need to be specific about the beach.

The third frequently used forms are the L-forms which are used to put some emphasis on the trajectory or vector, i.e., they used to describe a general direction of heading.

L-form (vector):

gunggaalu "nortwards"

jibaalu "soutwards"

nagaalu "eastwards"

guwaalu "westwards"

In addition, the root forms are also inflected with local cases to specify source, goal, and location, which provide basic topological and motion contrast.

Dative, locative, allative: *-bi/-wi*

Allative: *-ga* (unproductive)

Ablative: *-mun*/*-nun*

The example of such inflection can be seen in example 6 (taken from Levinson, 2003: 120).

6. yii wanggaar-mun wunaarna table-bi telephone yii
here top-ABL lie+REDUP table-LOC telephone here

wunaaran walmba-wi wanggar-mun
lie+REDUP division-LOC top-ABL
"Here on top, on the table it's lying, the telephone is lying on the table, on top"

This example is a response to *"Where is the telephone?"* What the example shows is that the language, instead of using relative and intrinsic frames of reference, uses the topological relations (in addition to pervasive use of an absolute frame of reference).

More specifically, the example informs us that the combination of a simple locative case *–wi* on the reference object "table" together with a positional verb *wunaarna* "lie" is sufficient to imply that the telephone is on the table. However, to make it more explicit, the speaker has used the intrinsic nominal *wanggar* "top" combined with the ablative case *–mun*.

Given the fact that the use of cardinal directions is pervasive in Guugu Yimithirr, i.e., it is not accompanied with relative or intrinsic frames of reference, it can be stated that this language can be said to employ a complete absolute system in describing its frame of reference (Levinson, 2003). This complete absolute system is less familiar to us. Hence it is worth describing in this study.

6.5 Non-linguistic study of frames of reference

The diverse patterns of spatial reference across languages seem not only to indicate different surface forms, but suggest differences in cognitive functioning, i.e., recall memory, of speakers of different languages. To test this possibility, Levinson (2003: 154-159) gave a non-linguistic task, e.g., the "animal" task, to his Dutch (n= 37) and Tenejapan (n= 27) subjects.

6.5.1 Method

The "animal" task is aimed to differentiate the absolute coding from relative coding in memory involved in recall. The stimuli consisted of two identical sets of four animals, e.g., *pig, cow, horse*, and *sheep*, of species which the subjects were familiar with. From the set of four, three were aligned in a pre-randomized order, all heading in

lateral direction on Table 1. The subjects were trained to memorize the array before it was removed. After three-quarters of a minute delay, they had to reorder the objects exactly as they saw earlier, first with correction during pre-test trials on Table 1, then without correction under rotation during trials on Table 2, i.e. the subjects, after the three-quarters of minute delay, rotated 180^{o} to face Table 2 to reconstruct the order of the animals they saw earlier on Table 1.

6.5.2 Results

95% of the Dutch subjects used relative order consistently, while 75% of the Tenejapan subjects used absolute order. The remainder failed to recall the direction consistently. The fact that Tenejapan subjects were less consistent than Dutch ones is explained by Levinson (2003; 159) saying "this may be due to various factors: the unfamiliarity of the situation and the tasks, the 'school'-like nature of a task performed by largely unschooled subjects, or to interference from an egocentric frame of reference that is available but less dominant. Only two Tenejapan subjects consistently used relative orders on four out of five trials. This pattern is essentially repeated across the experiments."

However, despite the inconsistencies, what the findings reveal is that the diverse surface of spatial reference has serious consequence to human cognitive style. This consequence is also tested in this study.

6.6 A critique of Levinson's study

Li and Gleitman (2002) criticized the conclusion that language has any effects to spatial reasoning or language affects thought (Levinson, 2003, Whorf 1941, 1946). Whorf says:

> Language and culture are constantly influencing each other. But in this partnership the nature of the language is the factor that limits free plasticity and rigidifies channels of development in the more autocratic way (Whorf, 1941/1956, p.156 in Li and Gleitman, 2002).

Li and Gleitman, on the other hand, hypothesized that it could be that "cultural differences in modes of thought render certain linguistic usages handier than others, and thus influence their prominence and frequency of use" (Li and Gleitman, 2002: 268). To test this possibility, Li and Gleitman added varying spatial circumstances or landmark cues, but they held the language constant, i.e., English. Forty English speaking subjects (undergraduate students at University of Pennsylvania) participated in one of their experiments, i.e. landmarks in the reference world beyond the tabletop with blinds down and up; and outdoors. Ten subjects were tested in an indoor condition with the blinds down, ten in indoor condition with the blinds up, and twenty were tested outdoors in a grassy area with more landmark features, i.e., two apartment houses, one large house, and a church surrounding them. The subjects had to order objects, i.e., the Animals-in-a row task. The results show that in the indoor condition with the blinds down the subjects behaved the same as those of the Dutch speakers in Brown and Levinson study (1993) where the subjects used a relative frame of reference. The subjects in the other indoor with the blinds up and outdoor conditions, however, behaved differently. About half of the subjects, i.e., n=5 in the indoor condition with the blinds up and n=10 in the outdoor condition with rich landmarks, preferred a relative solution and the other half, i.e., n=5 in

the indoor condition with the blinds up and n=10 in the outdoor condition with rich landmarks, opted for an absolute solution. Recall that 75% of Tenejapan subjects used the absolute system in Levinson's study.

Li and Gleitman further asked a question: Can landmark information, if it is salient enough, more completely determine the degree to which a single population solves spatial problems from an egocentric versus allocentric, i.e., absolute, perspective (Li and Gleitman, 2002: 280)? To answer this question, they conducted another experiment, i.e., "duck pond" experiment. There were forty new subjects participating. Twenty were in each of two conditions, i.e., twenty in a relative duck group and twenty in an absolute duck group. All the participants were tested individually in indoor conditions where the blinds were always up. A replica, i.e., two kissing ducks on a paper lake, was put on the stimulus table, to the right/south of each subject. It was always in the same place. Thus, for the relative duck subjects, the replica was always to their right in the stimulus and recall tables and for the absolute duck group the replica was always on the south side of the stimulus and recall tables. In this fashion, Li and Gleitman hypothesized that the presence of the landmark, i.e., the two kissing ducks, would reduce the bias of their subjects in using the relative and absolute systems. The subjects had to memorize the ordered animals on the stimulus table and reconstruct the order in the same way they saw earlier on the recall table. Li and Gleitman found that for the relative duck condition the subjects reconstructed the order in the same way done by the Dutch subjects, in which they used a relative solution (Brown and Levinson, 1993). For the absolute duck condition the subjects used an absolute system, which was the same as Tenejapan Tzeltal

speakers investigated by Brown and Levinson (1993). Li and Gleitman concluded that language has no effects on spatial reasoning, but landmark contexts do.

In response to Li and Gleitman's critique, Levinson et al. (2002) replicated Li and Gleitman's experiments, i.e., outdoors. The experiment was conducted in open space outside a canteen at the University of Nijmegen. In this location, the north-south/east-west is evident, i.e., to the east is large tower block, to the west is a café, to the north is the main library, and to the south is the university canteen. Twenty local university students participated. There were two non-linguistic tasks that twenty subjects had to do, i.e., Animals-in-a-row and motion-maze tasks. For the Animals-in-a-row task, the individual subject was shown an order of animals on the stimulus table. Then they rotated 180^{o} and reconstructed the previous animal order on the recall table. A 30 second delay was provided between the presentation of the stimulus and the reconstruction of the order. For the motion-maze, the experimenter demonstrated a motion along a path by a plastic toy man manually, but precisely on the presentation table. Before the demonstration, the experimenter said "Now this little man is going to go for a walk from this cross. Watch carefully because I want you to remember how he goes". After 30 second delay after the demonstration the subject had to rotate 180^{o} and walked to the recall table. The subject was asked where the man would end up if he had followed the path previously shown. The participant could either point at or name the label for one of the eight possible end points.

The results showed that a significant majority of the subjects in the Animal-in-a-row tasks used a relative system. The result was similar with that of Dutch subjects in the indoor condition with the blinds up reported by Pederson et al. (1998). For the motion-

maze, the results also showed that the subjects used a relative solution predominantly. The results were again similar as those of Dutch subjects in the indoor condition studied by Levinson (in press).

How to explain the discrepancy of results between Li and Gleitman and Levinson et al.? Levinson et al. (2002: 171-172) offered two possible explanations.

One possibility is simply that the subject pool Li and Gleitman used in the University of Pennsylvania is much more heterogeneous than our pool of subjects in the University of Nijmegen – students no doubt come from all over the States and beyond, but Li and Gleitman apparently screened their subject pool, which they characterize as "a single cultural and linguistic subgroup, so this explanation seems unlikely.

The second more plausible explanation is that Li and Gleitman's simplified task was simply too transparent to their participants, who attempted to second-guess the intentions of the investigator. This interpretation is supported by the fact that 70% of their participants in the blinds-up and outdoor conditions asked the experimenter which of the two solutions they should choose, showing that they were aware of both.

Regarding the results of Li and Gleitman's duck pond experiment, Levinson et al. pointed out that Li and Gleitman think that an absolute system is defined by landmarks. Levinson et al. contend that "true absolute systems have nothing to do with landmarks – the geometry of such systems does not consist of a line converging on a landmark, instead it has infinite parallel lines constituting an abstract 'slope' across an environment (Levinson et al., 2002: 172). Therefore, the replica, i.e., the kissing ducks on a letter pond, used by Li and Gleitman in their experiment cannot be considered as a landmark in the normal sense since it is relatively small and relocated in different locations. Levinson et al. further argued that since the replica has intrinsic features, i.e., the internal arrangement of the features are constant even tough it is viewed with varied orientation

they considered the landmark as an intrinsic system, not absolute as Li and Gleitman thought. Levinson et al. then replicated Li and Gleitman duck pond experiment.

To do so, Li and Gleitman's absolute condition was retested. In this condition, the replica was always on the south side of the stimulus and recall table, i.e., when the subject faced the stimulus table, the replica was at his/her right side and when the subject faced the recall table the replica was at his/her left side.

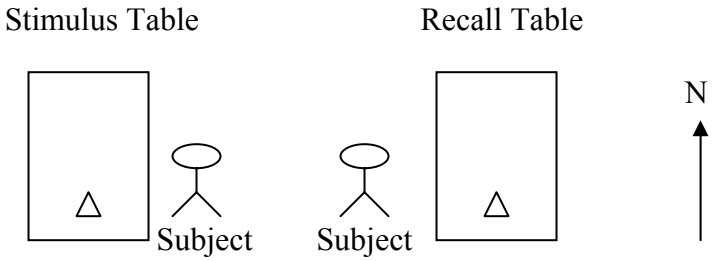


Figure 6.8: Absolute condition retested by Levinson et al. (2002)

Twenty new participants from Max Planck Institute participated in this experiment. Half of them were assigned to the Three Animal condition. In this group, they were presented three animals with particular order and direction on stimulus table and had to reconstruct them on the recall table. The other half were assigned to the Four Animal condition. They were presented three animals with particular order and direction on the stimulus table. At the recall table, they had to choose three out of four animals that they saw earlier and reconstruct their order. Note that there was a different memory load in this group than that of the Three Animal group.

The results showed that in the Three Animal group, the participants were cued by the replica, i.e., the subjects used the intrinsic system or absolute according to Li and Gleitman. But, in the Four Animal group, the subjects opted for the relative system.

Levinson et al. explained the later finding that when the memory load was slightly upgraded, the subjects preferred to use the reference frame that is predominantly used in their language. Based upon these findings, Levinson et al. reaffirmed their claim that language effects spatial reasoning.

6.7 Summary

The claim that the relative frame of reference is universal, e.g., Clark, 1973; Jackendoff, 1983; Li and Gleitman, 1999, has not been confirmed. As can be seen, for example from Guugu Yimithirr, the language does not employ the relative and intrinsic frames of reference to describe the spatial relations between objects. Instead, speakers rely exclusively upon an absolute frame of reference. These facts motivate me to investigate the frames of reference further in Rongga, Balinese, and Indonesian as discussed in more detail in Chapter 8.

Chapter 7

The Grammar of Frames of Reference in Rongga, Balinese, and Indonesian

7.1 Introduction

This chapter describes the grammar of frames of reference expressions in Rongga, Balinese, and Indonesian. The description of frames of reference in Rongga, Balinese, and Indonesian is presented in section 7.2. The linguistic and cultural significance of spatial terms in Rongga and Balinese is also addressed in section 7.3. Section 7.4 overviews how the frames of reference in the three languages are coded followed with a brief summary in section 7.5.

7.2 The grammar of frames of reference in Rongga, Balinese, and Indonesian

The spatial nominals, e.g., B: *kaja/kelod*, etc." north/south"; R: *zhele/lau* etc., "north/south", are used to describe the absolute frame of reference in Rongga and Balinese, while the complex prepositions, e.g., *di sebelah kiri, di sebelah kanan* "expect left side, expect right side", are employed to express the relative frame of reference in Indonesian. Note that the cardinal terms in Balinese, e.g. *kaja/kelod,* etc. "north/south", can be used without the *expected* preposition *di* particularly in everyday contact. The preposition *di* however must be used with the cardinal terms in formal Balinese, e.g., *di dajan, di delod, di dangin, di dauh,* etc., "expect north, expect south, expect east, expect west". In Rongga, however, the expected preposition *one* cannot be extended to its cardinal terms, e.g., **one zhele*, "expect north, **one lau*, expect south", etc.

The three languages employ complex prepositions to express the intrinsic frame of reference, e.g., R: *olo wena, muzhi wena* “front side, back side”; B: *di muka, di duri* “expect front, expect back”; I: *di depan, di belakang* “expect front, expect back”. To explain the syntactic composition of the complex prepositions, i.e., the intrinsic and relative frames of reference, I use the same phrase structure rules discussed in 3.3.2.

S	⟶	NP	VP	
NP	⟶	Det.	N	
N	⟶	(AP)	N	(PP)
PP	⟶	**P [P**	**N]**	**N** (complex preposition/intrinsic system, e.g. B: *di muka* “expect front”; I: *di depan* “expect front”)

Note that the *expected* preposition *di* “expect” is extended to the syntactic forms of the intrinsic frame of reference in Balinese, e.g., *di muka, di duri* “expect front, expect back”, and Indonesian, e.g., *di depan, di belakang* “expect front, expect back, but not in Rongga, e.g., *olo wena, muzhi wena* “front side, back side”. Specifically, the syntactic forms of the Balinese intrinsic system are derived by combining the *expected* preposition *di* “expect” and the nouns, i.e. places *muka* “front” and *duri* “back”. The evidence that *muka* and *duri* are nouns, i.e. places, can be tested by the fact that *muka* and *duri* can occur with other prepositions as well, e.g., ***ke*** *muka*, ***uling*** *duri* “to the front, from behind”. The other syntactic evidence can be seen from the fact that *muka* and *duri* can also occur with the possessors *cange*, *cie*, etc. “my, your” in Balinese, e.g., *muka* ***cange***, *durin* ***cange*** “my front, my back”. When *di* and *muka*, *duri* are combined they function syntactically as complex prepositions, i.e., *di muka, di duri*, since, based on the phrase structure rules, they are followed by nouns in complex prepositional phrases (***di muka*** *kursie*, ***di durin***

umahe “expect front of the chair, expect back of the house”). As in Balinese, the Indonesian complex prepositions, i.e., *di depan, di belakang* “expect front, expect back”, are also composed by combining the *expected* preposition *di* “expect” and the nouns, i.e., places *depan* and *belakang*. The evidence that *depan* and *belakang* are nouns, i.e., places, can be seen from the facts that *depan* and *belakang* can also occur with other prepositions, e.g., ***ke*** *depan,* ***dari*** *belakang* “to the front, from behind’. Moreover, as in Balinese, *depan* and *belakang* can occur with the possessors *mu*, *dia*, etc. “my, her/his” as well, e.g., *depan* ***mu,*** *belakang* ***dia*** “your front, her back”. As in Balinese, when *di* is combined with *depan* and *belakang* they function syntactically as complex prepositions, i.e., *di depan, di belakang*, for the reason, based on the phrase structure rules, they are followed with nouns in complex prepositional phrases, e.g., ***di depan*** *mobil,* ***di belakang*** *rumah* “expect front of the car, expect the back of the house”.

Semantically, the meanings of *di muka, di duri* in Balinese are composed of the meanings of *di* “expect” and *muka* “front” and *duri* “back”, which refer to the inherent sides of the reference objects. The same is also true in Indonesian that the meanings of *di depan, di belakang* are derived by the meaning of *di* “expect” and *depan, belakang*, which are also associated with the inherent facets of a reference object.

It is nevertheless unclear in Rongga why the *expected* preposition *one* cannot be extended to *olo wena*, i.e., ***one olo wena* “in front of”, although *one* can also be used to refer to a place like Balinese and Indonesian, e.g., *one sekola* “at school”. When I asked my Rongga consultants if I can say *one olo wena*, all of them said “no”. Syntactically, the complex prepositions *olo wena* and *muzhi wena* are derived from the nouns *olo* “front”, *muzhi* “back” and the noun *wena* “side”. As I said before that *wena* can also mean

"under", e.g., *zhale wena* "down under". Semantically, the meanings of *olo wena* "front side" and *muzhi wena* "back side" are derived from the literal meanings of *olo* "front", *muzhi* "back", which are also associated with the inherent sides of a reference object, and the literal meaning of *wena* "side".

The complex prepositions expressing the relative frames of reference in Indonesian, i.e., *di sebelah kanan* "expect right side", *di sebelah kiri* "expect left side", are derived from the preposition *di* "expect" and the noun phrases *sebelah kanan* "right side" and *sebelah kiri* "left side". The syntactic evidence that *sebelah kanan* and *sebelah kiri* are noun phrases, i.e., places, can be seen from the occurrence of the two phrases with the preposition *dari* "from", i.e., ***dari*** *sebelah kanan,* ***dari*** *sebelah kiri*. The other evidence that *sebelah kiri* and *sebelah kanan* are noun phrases can be seen from the fact that the head of the noun phrase, i.e., *sebelah* "side", in Indonesian is a noun, which is modified by the adjectives *kiri* and *kanan*. Note that the two phrases are "frozen" in the sense that *sebelah* must occur with *kanan* or *kiri* in Indonesian. When *di* "expect" is followed with *sebelah kanan* "right side" or *sebelah kiri* "left side", they syntactically function as complex prepositions since they are followed with nouns in complex prepositional phrases. In casual speech, however, the use of *sebelah* in the complex prepositions is optional. But, in formal Indonesian, *sebelah* must be used.

Regarding the semantic composition of *di sebelah kanan* and *di sebelah kiri*, their meanings are derived from the meanings of *di* "expect" and *sebelah kanan* "right side", *sebelah kiri* "left side", which can be associated with either the inherent sides of a reference object or the right and left sides of a speaker. The following examples illustrate the constructions of frames of reference in the three languages.

Absolute:

1. one	wula	Agustus	1955	ja'o	la'a	sekolah	**mena**	Bajawa	
in	month	August	1955	I	go	school	east	Bajawa	
"In August 1955, I went to school in Bajawa (at east)."									R

sekop-e	**daja-n**	kandang	sampi-e	B
shovel-the	north-lig[12]	cage	cow-the	
"The shovel is north of the cow's cage."				

Relative:

buku	itu	**di**	**sebelah**	**kanan**	TV		I
book	that	expect	side	right	TV		
"The book is to the right of TV."							

Intrinsic:

anak	ndau	berdiri	**olo**	**wena**	kursi		R
child	that	stand	front	side	chair		
"The girl is standing in front of the chair".							

anak	cenik	ento	m-jujuk	**di**	**muka**	kursi-e	B
child	little	that	act.-stand	expect	front	chair-the	
"The girl is standing in front of the chair".							

anak	kecil	itu	berdiri	**di**	**depan**	kursi	I
child	little	that	stand	expect	front	chair	
"The girl is standing in front of the chair".							

These examples show that the spatial terms function as adverbial places. While the spatial terms for absolute frames of reference, i.e., the spatial nominals, function to describe a location of *Lo* in relation with *Ro* in Balinese, the spatial descriptors as part of nominal structures can serve other syntactic functions such as the head of an NP as in 2, a relational nominal, i.e., a nominal that is used to express spatial meanings, in 3, an object of prepositions in 4, and adverbial nominal in a clause as in 5 (Arka, 2005b: 8-9).

[12] lig.= ligature

2. **daja**-n cang-e B
north-lig me-the
"north of my position"

3. **dauh** umah cang-e B
west house me-the
"in a location west of my house"

4. uli **kauh** B
fromwest
"from west"

5. celeng-e m-celep **kelod** B
pig-the act-enter south
"The pig entered south, e.g. into the bush".

In Rongga, the spatial unit (especially the prepositions used in vertical planes such as *zheta* "+up and +distant", *zhili* "+down and +distant"), in addition to functioning as the head of adverbial phrases, e.g., *zheta Ruteng* "in Ruteng", can also function as an argument-taking predicate as in 6. Note that *zheta* in example 6 may also be a verb. This needs further checking.

6. ata sederhana mbiwa mbai **zheta** mbiwa dano mbai **zhale**
person simple not too up not also too low

landiata menengah ndau ngaja melaju
but person middle that speak Malay
"A simple person is not too high not too low, but in the middle in Malay".
(Authobiography of Pak Anton Gelang)

To specify an intrinsic frame of reference, the complex prepositions, e.g., *in front of, in the back of,* etc., are employed. Other examples are shown in 7.

7. peli **olo** **wena** kadhera R
bottle front side chair
"The bottle is in front of the chair".

botol-e	**di**	**muka**	kursi-e	B
bottle-the	expect	front	chair-the	

"The bottle is in front of the chair"

botol	itu	**di**	**depan**	kursi	I
bottle	that	expect	front	chair	

"The bottle is in front of the chair".

7.3 Significance of spatial terms in Rongga, Balinese, and Indonesian

This section describes briefly the linguistic and cultural significance of spatial terms used especially in Rongga, Balinese, and Indonesian. More detailed explanation of spatial terms in the three languages will be provided in Chapter 8.

7.3.1 Linguistic significance

In Balinese, spatial terms are among the syntactic categories learned early by children as pointed out by Wassmann and Dasen (1998). The spatial terms (especially the terms used for frames of reference) are crucial in Balinese. If someone is not familiar with its frame of reference, e.g., absolute frame of reference such as north/south orientation, he or she can have problems in extended talk since the spatial orientations are based upon the cardinal and inter-cardinal orientations. Thus, if someone is not sure about north and south, the question he or she asks first is where the mountain or the sea is because these two landmarks are used as the points to refer to north (mountain) and south (sea). Once the north is identified, the rest of the orientations are determined using clockwise orientations, i.e., from north to east, south, and west.

The importance of this frame of reference in Balinese is shown in Balinese greetings, which usually ask about the directions where someone is going as shown in the following dialogue.

8. A: Nyoman k-ija?
Nyoman to-where?
"Nyoman, where (are you ging) to?"

B: **n-kaja-an**/*kaja
act-north-loc[13]
"(I'm going) toward the north"
(Arka, 2005b: 7)

In these examples, prefix *k-* "to" is attached to the root *ija* "where", which is used to ask the direction to where someone is going. The prefix *n-* (also *m-*) is a marker for active verbs. Since the Balinese active verbs are commonly preceded with such a nasal prefix, therefore the verbs are also called nasal verbs. Hence, the prefix *n-* is also called a nasal verb marker. Suffix *–an*, that must be attached to the verb in this context, indicates that the verb is a locative motion verb.

Like Balinese, spatial expressions are also part of greetings in Rongga, However, it is not as common for Rongga people to ask about north or south as Balinese people do. It may be that the north orientation is clear in Rongga since the mountain, which is also used as a point to determine the north, is visible in Tanarata, where the language is mainly spoken.

To respond to the question *"Where are you going?"* a Rongga speaker must assess the verticality of the places where they are going. If, for example, the place is topographically relatively higher than the place where the encounter takes place the spatial terms used in vertical planes, e.g., *zheta* "+up and +distant", *zhili* "+down and + distant", are used. But, if the place where the speaker wants to go to is on a horizontal plane, the absolute terms are applied, e.g., *mena Bajawa* "Bajawa in the east". This issue will be further discussed in Chapter 8.

[13] loc= locative

Since Indonesian speakers use a relative frame of reference dominantly, absolute directions are absent. Instead of using the north/south as the anchor of horizontal orientations, the reliance on right/left orientation is more salient. Historically, Indonesian is derived from Malay. Indonesian as the official language was established to bridge the cultural and linguistic gap among over 200 ethnicities. Thus, it is possible that the role of landmarks to describe the spatial orientation is not important in the language.

7.3.2 Cultural significance

The significant spatial orientation in Balinese is rooted in the Balinese Hinduism belief, where mountains, which are associated with *kaja* "north" or *kangin* "east", are considered as sacred places. Hinduism believes that Gods live there. This belief underlies many cultural practices in Bali in relation to what are considered to be proper positions (Arka, 2005b: 7). For example, when someone is sleeping, his or her head must be towards the north or east side of the room or bed (as I and my family also do here in the United States). Another example is when someone is building a family temple, it must be located at the northeast of the compound. Besides, the temple site is more elevated than other buildings in that compound. Unlike mountains, the sea is considered as a "lower place", hence a non-sacred place. Seas are associated with *kelod* "south".

A similar cultural practice also holds in Rongga as Arka (2005b: 7) describes.

> The spirit of the dead person is believed to go to the mountain of Mbengan, a mountain located in the north of Rongga territory. The direction of the head when someone sleeps or when corpse is buried must be towards the mountain, and the feet must be directed to the location of the closest river. God (*Mori*) is believed to be around everywhere, not necessarily at the top of the mountain. Good and evil spirits could be on the mountains as well as in the river. However, the location for the disposal of bad things is in the river.

On the other hand, Indonesian, functioning as the official language, does not share the cultures of Balinese and Rongga. Like English and most European languages, which emphasize the importance of egocentric, anthropomorphic spatial concepts in their cultures, Indonesian uses right/left orientations in its spatial description.

7.4 Overview of coding the frames of reference in Rongga, Balinese, and Indonesian.

Given spatial situations as shown in examples in 9 below, how do we interpret the location of *Lo* in terms of *Ro* in the three languages?

9. anak ndau neko **muzhi wena** kursi R
childthat hide back side chair
"The child is hiding at the back of the chair".

anak ento m-keb **di** **duri-n** kursi-e B
childthat act-hide expect back-lig chair-the
"The child is hiding at the back of the chair".

anak itu ber-sembunyi **di** **belakang** kursi I
childthat act-hide expect back chair
"The child is hiding at the back of the chair".

Since the three languages use the intrinsic frame of reference, to be able to interpret the location of the girl in terms of the chair one should be familiar with how the inherent facets of objects are determined in the three languages. As in English, the inherent facets of a chair are based on functional concepts, i.e., the back of the chair is the part that is used to lean our back when sitting on the chair. Thus, the spatial constructions in 9 inform us that the child must be hiding behind the back part of the chair.

What if we are now given a spatial situation such as a bottle is to the right/north of a chair/ball? How do we specify the location of *Lo*, i.e., *a bottle*, in relation with *Ro*, i.e.,

a chair or a ball, in the three languages? To be able to specify the location of the bottle in terms of the chair or the ball, one should know what frame of reference is appropriate in such a context. In Rongga, the location of the bottle is described by using the cardinal points, e.g., *kasa zhele/mena/lau/zhale wena* "north/east/south/west side of". (*kasa* and *wena* mean "beside" and "side" respectively, while *zhele/mena/lau/zhale* mean "north", "east", "south", "west"). But, how are the cardinal terms decided in Rongga? Since the cardinal terms are associated with the mountain, i.e., Mbengan, one should know where the mountain is at the time of speaking. Once the north is decided, the rest cardinal points are decided using clockwise rotation, i.e., north, east, south, and west.

The same system of describing the location of the bottle is also applicable in Balinese, which also uses the cardinal terms *kaje*, *kangin*, *kelod*, *kauh* "north, east, south, west". In addition to the cardinal terms, Balinese, unlike Rongga, employs inter-cardinal terms such as *kaje kangin*, *kelod kangin*, *kelod kauh*, *kaje kauh* "northeast, southeast, southwest, northwest".

Indonesian, in contrast with Rongga and Balinese, uses a relative frame of reference dominantly. But, what system of relative frame of reference is used, i.e., reflection, translation, or 180^{o} rotation principle, varies from context to context. More detailed uses of the frames of reference in the three languages will be discussed in Chapter 8.

7.5 Summary

Unlike topological relations in Rongga, Balinese and Indonesian, where the languages share the same topological concept, i.e., the expectedness of spatial relation

between objects, the three languages uses different concepts in practicing their frames of reference. Additionally, the syntactic forms of the frames of the reference in the languages are also different, i.e., while the *expected* preposition *di* is extended to the intrinsic frames of reference in Balinese and Indonesian, the extension of *one* is not found in Rongga's intrinsic frame of reference.

In contrast with Indonesian which relies upon a relative frame of reference, Balinese and Rongga employ absolute frames of reference. However, the difference in using the fixed bearings can also be observed in the these two languages, in which Balinese is more detailed in its cardinal points since it also uses inter-cardinal terms (in addition to its main cardinal terms, e.g., *Wayan ngaja kanginan* "Wayan (went) to northeast direction). In addition to the relative frame of reference in Indonesian and the absolute frame of reference in Rongga and Balinese, the intrinsic frame of reference is applied in the three languages in the contexts where a located object is spatially related to a reference object with intrinsic features.

In the next chapter, I will present my study using linguistic and non-linguistic tasks to examine the frames of reference used in the languages. The use of non-linguistic tasks, i.e., the animal-in-a-row, is aimed at pointing out if the different use of frames of reference has cognitive effects in spatial reasoning.

Chapter 8

Non-topological Relations in Rongga, Balinese, and Indonesian

8.1. Introduction

In the first section of this dissertation, i.e., Chapters 1-5, I pointed out that Rongga, Balinese, and Indonesian share the same concept, i.e., the expectedness of spatial relation between objects, in marking their topological relations. In this chapter, I will explore if the same concept is also shared in describing the non-topological relations, i.e., the frames of references, in the three languages. This chapter is organized as follows. The limitation of previous approaches to the frames of reference is addressed in section 8.2. Section 8.3.1 discusses the linguistic frames of reference in the languages, while section 8.3.2 deals with the non-linguistic frames of references. Some evidence from the acquisition of frames of reference is presented in section 8.3.3. This chapter concludes with a brief summary.

8.2 Limitations of previous approaches to the non-topological relations

A European bias is evident in the study of frames of reference. Most studies, which are based on English and European languages, assume a relative frame of reference as exemplified in the sentence *The cat is to the left of the tree*. These studies claim that the relative frame of reference is universal, e.g., Clark, 1973; Jackendoff, 1983, Talmy, 1983; Herskovits, 1986; Landau and Jackendoff, 1993. These studies have a long tradition. They are discussed repeatedly in a limited number of themes as follows (Levinson, 2003: 10-11).

1. Human spatial thinking is always *relative* in character, not absolute (Miller and Johnson-Laird, 1976).

2. Human spatial thinking is primarily *egocentric* in character (Piaget and Inhelder 1956; Clark, 1973; Miller and Johnson-Laird, 1976; Lyons, 1977).

3. Human spatial thinking is *anthropomorphic*: spatial coordinates are derived from the planes through our body, giving left and right, front and back, up and down as the primary planes (Kant, 1991 [1768]; Clark, 1973; Miller and Johnson-Laird, 1976; Lyons, 1977: 690-1).

The attitude is summed up by Poincaré (1946: 257 in Levinson, 2003: 9): "Absolute space is nonsense, and it is necessary for us to begin by referring space to a system of axes invariably bound to the body".

Thus, consequently, to learn a language is a matter of mapping the lexical words to this universal, i.e., innate, concept as Clark (1973: 28) put it.

> [T]he child acquires English expressions for space and time by learning how to apply these expressions to the a priori knowledge he has about space and time…The exact form of this knowledge, then, is dependent on man's biological endowment – that he has two eyes, ears, etc., that he stands upright, and so on – and in this sense it is innate.

But in fact, there are languages that do not employ the relative and intrinsic frames of reference. Guugu Yimithirr, as studied by Levinson (2003), for example only employs the absolute frame of reference. In this language, speakers use a fixed coordinate system, e.g., *north, south, east, west*, to refer to a location of *Lo* in relation to *Ro*. However, unlike the western tradition in determining the privileged position of north, which is based upon the magnetic-compass and their tradition of map-making, there is no clear priority to any axis in this language (Levinson, 2003).

Since there is no relative frame of reference, e.g., *to the right/to the left*, or intrinsic frame of reference, e.g., *in the front of/ in the back of* featured objects, in Guugu Yimithirr, for a speaker to describe *Lo* in relation with *Ro* will use the absolute frame of reference, e.g., X is north of Y, X went north, etc. In this sense, the X's location or X direction is fixed irrespective of speaker's view point.

Moreover, as I pointed out in Chapter 6, the use of an absolute frame of reference in the language does not just reflect a different way the speakers of the language speak about frames of reference. Rather, it has a deep cognitive effect in their mind, i.e., it affects their non-linguistic conceptual structures. To examine this, Levinson (1992) tested the speakers' cognitive functioning, e.g., their recall memory. Levinson administered non-linguistic tasks, e.g., Animals-in-a-row task, to the speakers of the language. The results show that the speakers of Guugu Yimithirr did prefer the absolute system in their ordering of the animals. In short, Levinson concluded that language has effects on spatial reasoning.

In the next sections, I explore the use of frames of reference in Rongga, Balinese, and Indonesian. Additionally, I also point out if the use of frames of reference in the languages has serious consequence to the cognitive styles of speakers of the languages.

8.3 The non-topological relations in Rongga, Balinese, and Indonesian

I showed in the first part of this dissertation that Rongga, Balinese, and Indonesian share the same concept, i.e., the expectedness of the spatial relation between objects, in their topological relations. This is not surprising because the three languages belong to the same language family, i.e., the Austronesian language family. In the next

section, I would like to identify whether the three languages also share the same concept in their non-topological relations. The non-topological relations I explore in this study are frames of reference used by speakers in the three languages in horizontal and vertical planes.

8.3.1 Linguistic frames of reference in Rongga, Balinese, and Indonesian

8.3.1.1 Methodology

8.3.1.1.1 Participants

My study is based on the knowledge of four Rongga speakers in Tanarata, as well as three Balinese monolinguals and three Indonesian monolinguals who I worked with in Bali. In my interview with Balinese consultants, I used Balinese since they do not speak Indonesian fluently and also to minimize the interference of Indonesian on the knowledge they provided. I used Indonesian with my Indonesian consultants for the same reason. Indonesian, however, was used in my interview with my Rongga consultants because I do not speak Rongga. To obtain true knowledge of the Rongga language and culture, I included elder speakers, who have intact linguistic and cultural knowledge of Rongga. Young speakers of Rongga tend to switch to neighboring languages, or even to Indonesian for prestige and economic reasons.

8.3.1.1.2 Definition of data

The frames of reference data used in this study are those involving spatial nominals as in *The girl is **north/south** of the chair* for the absolute frame of reference,

and complex prepositions as in *The girl is **in front/back of** the chair* for the intrinsic and *The girl is **to the left/right of** the tree* for the relative frames of reference respectively.

8.3.1.1.3 Linguistic tasks

I elicited linguistic data for frames of reference using the rotation of objects illustrated by Levinson (2003: 52). Specifically, I used various objects, e.g., *a bag, a TV, a chair, a tree, a ball, a bottle*, to create spatial relations that require a particular coordinate system to describe such contexts. Specifically, a ball was put at a chair's front. I then asked my language consultants to describe the location of the ball in relation to the chair in each language. The chair is then rotated 180^{o}. I again asked them to specify the current spatial relation between the two objects in each language. I did the same procedure for different featured and un-featured objects, e.g., *a book* and *TV, a ball* and *a bottle*, etc. I had a list of spatial contexts, e.g., *a backpack is north/south of a chair*, *a bottle is north/south of a ball*, for each participant. When he/she described a particular spatial context with an absolute frame of reference, I marked the context with an A. But, when it was marked with a relative frame of a reference, I marked it with a R. I did the tasks in each of my language consultant's living room.

Additionally, I also used the "asking directions" technique. For example, I asked my language consultants to tell me how to go to a particular place, e.g., a particular shop, someone's house, etc. In this procedure, I made sure that my language consultants are familiar with the places (but I pretended that I did not know them). All the conversations were recorded with a tape recorder. My language consultants were naïve about the hypothesis that I tested, i.e., what frames of reference they predominantly use in such a

task. In this fashion, I expected that I could get their natural linguistics knowledge in using the dominant frames of reference in each language.

8.3.1.2 Rongga's linguistic frames of reference

Rongga speakers have significant cultural practices that contribute to the use of an absolute frame of reference. In this culture, a mountain, i.e., Mbengan, which is located on the northern part of Tanarata, is considered to be a sacred place. Therefore, when someone sleeps or is dead his head must be heading in the direction of the mountain. The feet on the other hand must be directed to the sea, which is the location of disposal of bad things. The sea is located on the southern part of Tanarata. This cultural significance is also practiced in the spatial orientation in Rongga. To describe a location of *Lo* in relation to *Ro*, it is specified with the cardinal points, e.g., *zhele* "north", *mena* "east", *lau* "south", and *zhale* "west", further discussed in the next section.

8.3.1.2.1 Rongga's linguistic frames of reference in horizontal planes

The use of spatial terms, i.e., the cardinal points *zhele* "north", *mena* "east", *lau* "south", *zhale* "west/down", in horizontal planes is dominant in Rongga. *Zhele* is associated with the location of mountain, i.e., Mbengan, which is in the northern territory of Rongga. As *mena* "east" in Rongga is associated with the direction where the sun rises, the other directions are determined using clockwise rotation, i.e., *zhele* "north", *mena* "east", *lau* "south", *zhale* "west". In this section, I used the object rotation technique to obtain knowledge of the frames of reference used by Rongga speakers. The spatial situation to describe was a bottle to the right/north of a chair.

To specify the spatial relation between the bottle and the chair, the cardinal term *zhele*, i.e. *kasa zhele wena*, is used as can be seen in example 1.

1. botol ndau **kasa** **zhele** **wena** kursi
   bottle that beside north side chair
   "The bottle is north of the chair".

Note that *kasa* is used with *zhele wena* and the other cardinal terms. In the intrinsic terms, e.g., *olo wena, muzhi wena*, however, *kasa* is not used. If the bottle is moved to the south side of the chair, the spatial situation is described in example 2.

2. botol ndau **kasa** **lau** **wena** kursi
   bottle that beside south side chair
   "The bottle is south of the chair".

The same cardinal terms are applied when I used different objects. Specifically, when the chair is replaced with a ball and the bottle remained in the same place, i.e., the bottle was north of the ball, the following expression was provided by all Rongga consultants.

3. botol ndau **kasa** **zhele** **wena** bola
   bottle that beside north side ball
   "The bottle is north of the chair".

And when I moved the bottle so that the bottle was on the south side of the ball, sentence 4 was provided by my Rongga consultants.

4. botol ndau **kasa** **lau** **wena** bola
   bottle that beside south side ball
   "The bottle is south of the chair".

Further evidence that the absolute frame of reference is dominant in Rongga can also be seen in the description of location of a man relative to a tree as illustrated in the Figure 8.1 below.

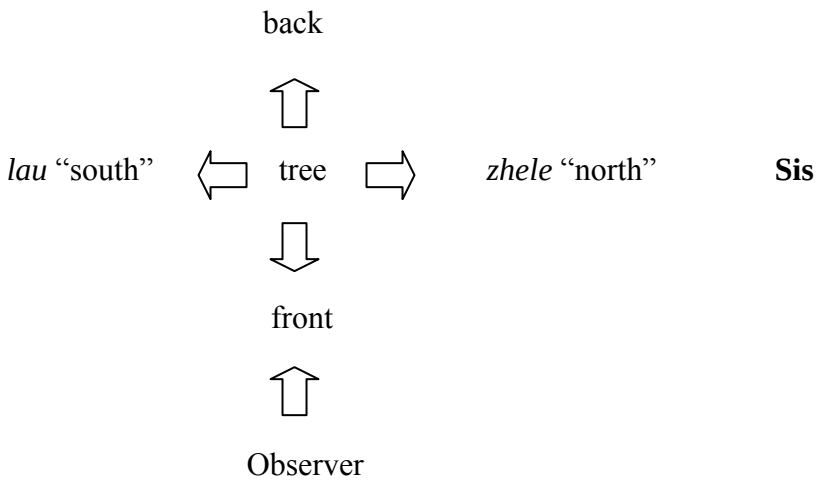


Figure 8.1: The use of cardinal terms in horizontal planes

In this situation, the cardinal terms *kasa zhele/mena/lau/zhale wena* "north/east/south/west of" are also applied as illustrated in example 5.

5. Sis kasa **zhele** wena kaju
Sis beside north side tree
"Sis is north of the tree".

Moreover, the predominant use of fixed bearings, i.e., cardinal terms, in Rongga can also be seen from referring to a place. When someone is referring to a place, he/she always uses the fixed bearings *zhele*, *lau*, etc. "north, south, etc." as expressed in sentences 6 and 7.

6. one wula Agustus 1955 ja'o la'a sekolah **mena** Bajawa
in month August 1955 I go school east Bajawa
"In August 1955, I went to school in Bajawa (at east)".

7. bulan Oktober 1958 ja'o pili ne raja tau
month October 1958 I elect by king make

tendu kursus Pamong Praja wula zhua latih
follow course public service month two training

zhele Ruteng
north Ruteng
(Arka, 2004b)

To express example 6, the speaker was in Wae Lengga, which is situated west of Bajawa. Therefore, to refer to Bajawa the cardinal term *mena* "east" must be used. If the speaker now moves to Bajawa and refers to Wae Lengga, the term *zhale* "west" must be used now. The same system of using the cardinal terms can also be observed in example 7. In this example (I have modified the spatial term here based on my language consultants' knowledge. In his article, Arka used the term *zheta* "up" for *zhele* "north", which based on my elicitation is more appropriate to use *zheta* in vertical planes), the speaker is in Tanarata, which is located south of Ruteng.

According to Arka (2005b: 5), given the facts in examples 6 and 7, "the spatial terms in Rongga are (almost) all *relative*, depending on the position of the speaker, hence *ego-centric* "(my emphasis). However, what he precisely means by *relative* is not clear. What he means by *relative* here, I think, is in a general sense, i.e., the use of cardinal points depends upon the location of the speaker in relation to a place as pointed out in the examples above.

It is also unclear what Arka means by *egocentric*. It is true that the egocentric-based system, i.e., the relative frame of reference, can be observed in Rongga (as I

address later), though it is not dominantly practiced in Rongga. Given his discussion on Rongga spatial reference, it is unlikely that what Arka means by egocentric is the relative frame of reference in the same sense I explain here. Although he defined the egocentric system, Arka (2005b) in fact never discusses this frame of reference.

As defined previously, the frame of reference system employed by Rongga speakers in the examples of referring to places, i.e., examples 6 and 7, is the absolute frame of reference because the system uses the fixed bearings, which are related with natural landmarks such as mountain, sea, etc. In other words, the absolute frame of reference in Rongga is landmark-based.

The dominant use of the cardinal terms can also be observed from the second linguistic task I used, i.e., asking directions. As I said before, in this task I asked questions about a location of a place to my language consultants, e.g., someone's house, a shop, etc. To get natural responses from them I created natural stories. In the middle of the talk I asked about a direction to go to a particular place. What I targeted in this task was to point out whether my language consultants use an absolute frame of reference or a relative frame of reference in describing the direction. I asked three Rongga speakers. Two of them were in Tanarata. The conversation took place in Seminari, a Catholic retreat house. The conversation took place in front of my room. Please note that when my language consultants were using the cardinal terms to describe the direction I asked them which one is the north. They pointed out that the direction towards the mountain, which is behind the Seminari, was the north. The other directions, according to my consultants, were determined using clockwise rotation. The other conversation was in Bali. The conversation took place at my language consultant's house, i.e., in his living room. All of

them consistently used the cardinal terms. The following are the responses I got from them (only the relevant parts of the conversation are presented here).

8. Researcher: vende mbo ko Pa Yanani?
where house the PaYanani
"Where is Pak Yanani's house".

Participant: la'a molo **mena** teru molo zheta
go to east continue to up

ndia ko mbo Pa Yanani
there the house Pak yanani
"Go to east and then go up. Pa Yanani's house is there".

9. Researcher: vende mbo ko Pa Tua?
where house the Pa Tua
"Where is Pa Tua's house?"

Participant: la'a molo **mena** one jembatan gheo **zhale**
go to east expect bridge turn west

se ito manga lazha sangga gheo **mena**
little small exist road cross turn east
"Go to east, at the bridge turn west a little bit. Then there is a cross road, then turn east".

10. Researcher: vende Bank Permata Ivan?
where Bank Permata Ivan?
"Where's Bank Permata, Ivan?"

Participant: la'a teru **mena** tako ndau one lazha sangga
go continue east after that expect road cross

gheo pe **zhele** teru molo **zhele** manga lampu
turn to north continue to north exist light

toro ko bank kasa **mena** lampu toro
red the bank side east light toro
"Go to east. Then, turn north at the cross road.
Keep going north. Then there is a traffic light. The bank is east of the traffic light".

The examples show that the cardinal terms are again used in describing the location of a place. Specifically, the expressions *gheo mena/zhele/zhale* "turn east/north/west" are used. This is in contrast to English. If an English speaker is asked such questions, he/she will use a relative frame of reference, i.e., he/she uses such an expression as *turn right/left*. In a wider spatial context in English, e.g., the road signs in Kansas (Pye in conversation), however, the use of cardinal terms are commons, e.g., I 70 east/west. This could indicate that English actually uses the cardinal terms as well, but restricted to wider spatial contexts or wider world orientations.

Recall now examples 3 and 4 above. If the bottle in the examples is put in front or back of the chair, are the cardinal terms still used? To specify such spatial situations, the intrinsic frame of reference is used as illustrated in examples 11 and 12.

11. peli **olo** **wena** kursi
    bottle front side chair
    "The bottle is in front of the chair".

12. peli **muzhi** **wena** kursi
    bottle back side chair
    "The bottle is at the back of the chair".

Note that in these examples *wena* "side" is used. The use of *wena* may mark the intrinsic frame of reference. As the examples show that Rongga, like English, uses complex prepositions *olo wena* "front side" and *muzhi wena* "back side" to describe the location of the bottle relative to a feature of the chair.

Determining the front and back sides of reference objects is based on the intrinsic features of the *Ro*. Accordingly, the front side of a chair, as generally conceived across languages, is the side with its arms and with the surface on which we sit. On the other

hand, the back of the chair is the vertical surface against which we lay our back when sitting on it. Thus, the determinative of the intrinsic features of objects in Rongga, as in English, is function-based.

To further confirm this knowledge, I tested frames of reference in different contexts. When I was standing in front of a TV, i.e., the part of the TV we usually attend to, I asked him to describe my location in relation to the TV. In my current position, *olo wena* "front side" was applied. Then, I moved my position to the back part of the TV, i.e., the part with no monitor and other functional buttons, he used *muzhi wena* "back side". I also used a house as the *Ro* during the rotation tests. I was standing in front of the house, i.e., the part of the house with an entrance door, then I moved my position to the back of the house, i.e., the part that does not have an entrance. The use of *olo wena* "front side" and *muzhi wena* "back side" which is based on such intrinsic features is confirmed. It further shows that the determination of front and back sides of a *Ro* in Rongga is based upon the functions of the *Ro*.

What about the other two sides of the *Ro*, i.e., the sides other than the front and back sides? These sides will be referred to by using the cardinal terms such as *kasa zhele/mena/lau/zhale wena* "north/east/west side". Of course, one should be familiar with the cardinal system in Rongga, which uses a mountain-sea "north-south" axis as a primary axis. Specifically, its cardinal system is based on the location of mountain and sea which are located north and south sides of Rongga territory. When *zhele* "north" and *lau* "south" are settled, *mena* "east" and *zhale* "west" can be pointed by clockwise rotation.

Now, if the chair in the context *peli **olo wena** kursi* “The bottle is in front of the chair” is removed and a ball is placed there instead, how is the spatial relation between the bottle and the ball marked in Rongga? Two different responses were given. The relevant spatial situations can be expressed using either the intrinsic frame of reference, e.g., *the bottle is in front of me*, or the absolute frame of reference, e.g., *the bottle is east of the ball*, as can be seen in examples 13 and 14 below.

13. peli **olo** **wena** bola
    bottle front side ball
    “The bottle is in front of the chair”.

14. botol ndau **kasa** **mena** **wena** bola
    bottle that beside east side ball
    “The bottle is east of the ball”.

The use of a relative frame of reference, e.g., *kasa leu/kasa wana* “left/right side of”, is also possible in Rongga, especially when the spatial specification of a located object is related to a person. For example, during my rotation test, I was sitting on a chair and asked my language consultant to describe the location of my backpack that I put on the floor to the right side of the chair, i.e., the backpack was at my right side. He specified the spatial relation by saying example 15.

15. tas ndau **kasa** **wana** Arya
    bacakpack that beside right Arya
    “The backpack is on the right side of Arya”.

But, when I moved from the chair and left the backpack in the same location, the spatial relation of the backpack and the chair is expressed by using *kasa zhele wena*“north

of", e.g., *Tas **kasa zhele wena** kursi* "The back pack is north of chair". When I asked him why *kasa zhele wena* is applied to describe the spatial relation between the backpack and the chair, i.e., when I was not sitting on the chair, he said that objects like a chair, a TV, or even animals do not have right/left hands like humans. Thus, the practice of relative reference is very restricted in Rongga, i.e., the use of the relative frame of reference in Rongga is restricted to the context when someone describes a spatial relation of an object relative to humans that have right/left sides. In other words, although Rongga does have the words left and right, i.e., *leu* and *wana*, the words are not used in spatial orientation dominantly in the language.

The question now is: what principle is used by Rongga speakers to use the right/left orientation, i.e., the relative frame of reference? Based on all responses of my language consultants, they employ the 180^{o} rotation principle. To make it more concrete, let's see Figure 8.2.

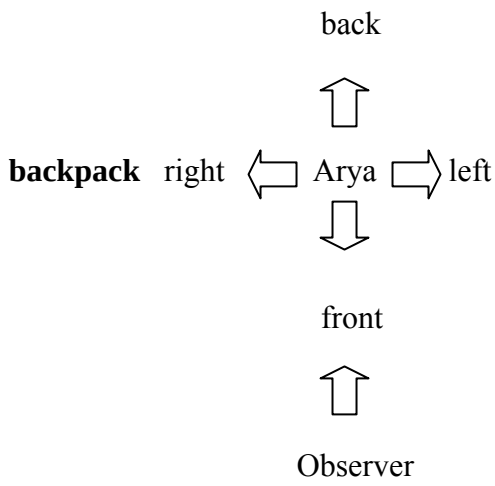


Figure 8.2: 180^{o} rotation analysis in Rongga

Based on this analysis, the coordinates are mapped to the reference object, i.e., Arya, and rotates him 180^{o}. Hence, the *Ro front* is the space between the observer and Arya, and the

right and left orientation are now decided with a clockwise rotation beginning from the *front*, i.e., the right of the *Ro* Arya is now to the observer's left. Herskovits calls this principle the canonical encounter situation, i.e., mirror order. This kind of relative frame of reference, as mentioned previously, can also be found in one dialect of Tamil, i.e., Na Tar caste, Ramnad district in Levinson, 2003: 86. Clark (1973) also reported that English children between six and nine years of age also produce this system.

Before leaving the discussion, one question as to the horizontality of a plane should be raised: how is the plane conceived as horizontal (in contrast to vertical for example)? It seems that the horizontality of a plane is not necessarily in a precise axis. Tanarata is conceived as a flat area. Therefore, the description of spatial relation between objects or places within the area uses the absolute frame of reference (in addition to the intrinsic frame of reference of course). However, it is not an easy task for a foreigner to decide that the spatial relations between objects should be specified in the horizontal or vertical planes since he/she should be familiar with the topography of Rongga. In the next sub-section, I present the use of spatial terms in the vertical planes in Rongga.

8.3.1.2.2 Rongga's linguistic frames of reference in vertical planes

Before proceeding to linguistic terms used in vertical planes in Rongga, I need to clarify first what I mean precisely by "vertical planes". Levinson (2003: 75-76) addresses the use of frames of reference in the vertical planes. More concretely, when a fly is on top of a bottle, the use of the three frames of reference coincides. Thus, to describe the location of the fly relative to the bottle, "the fly is in line with the top of the bottle

(intrinsic), it appears above the bottle in my visual field (relative), and it is higher in the axis defined by gravity (absolute) (Levinson, 2003: 75).

What I mean by the vertical planes here is not in the same sense as that of Levinson. Precisely, it is related to the verticality of topography of Tanarata. Tanarata, the place where Rongga is mainly spoken, is surrounded by hills and some places located on the hills. This geographical fact makes Rongga speakers use particular spatial terms to refer to places that are topographically higher or lower than the place where the encounter takes place. In the following paragraphs I describe how such topography, i.e., the vertical planes, is referred to by using particular spatial terms.

The specification of spatial relation of objects related to the vertical planes (especially in the wide world orientation) uses *zheta* "up and far away", i.e., [+distal] [+elevated][14]), *zhele* "up not far away", i.e., [+elevated] [-distal], *zhale* "down under and not far", i.e., [+down under] [-distal], and *zhili* "down under and far away", i.e., [+down under] [+distal]. The use of these spatial terms roots in the topography of Tanarata, which is located between hills.

In the examples to follow, *zheta* is applied to specify the location of places, e.g., Ngeko and Leke that are considered "up there and far" from the speaker. In example 16 and 17 the speakers are in Kisol and Waelengga respectively, and the distance between the places of speaking, i.e., Kisol, Waelengga, and the places that are referred to, i.e., Ngeko, Leke, is "up and far" from the speakers. "Far" in this context is determined psychologically and on a metric system, i.e., it is based on how many kilometers the places are from Kisol and Waelengga. Thus, the two places, i.e., Ngeko and Leke, are psychologically conceived as "far".

[14] I follow Arka (2003) in using the terms [+distal], [+elevated], etc.

16. ema ja'o wa'u pu'u **zheta** ata Ngeko
mother I come from up people Ngeko
"My mother came from Ngeko". (Arka, 2003)

17. ma'e ndi'i **zheta** Leke bhoda mai
not live up Leke because come

ndi'i we ndia Sere ramba we'ene kazhi
live at there Sere close with him
"…not to live in Leke, (because) if (I) live in Sere (here), (I'd be) close to him" (Arka, 2004b)

But, when the places referred to are psychologically conceived "up there and not far" from the speakers, *zhele* is applied to specify their location as can be seen in the following example.

18. le jam sembilan ke'e zhenge dere mai
part o' clock nine may hear sing come

zhele mai kala
up come forest
"At (about) 9 o'clock a song coming from the forest up there was heard".

19. zheke hiwa wutu ja'o pu'u one kepala desa
after year resign I from at head village

pili wali ne sizha ata pu'u **zhele** Komba….
elect again by they people from up Komba….
"After years I resigned as the village head, I was elected again by the community as the head of the village….". (The Autobiography of Bapak Antonius Gelang in Arka, 2004b)

In example 19, when saying the sentence the speaker is in Waelengga and the referred place, i.e., Komba, is psychologically considered "up and not far" from the speaker, i.e., compared to Ngeko, Ngeko is up and further than Komba from Waelengga.

Figure 8.3 (modified from Arka, 2004b) to follow is to further illustrate the use of *zheta* and *zhele* based on the contexts just explained.

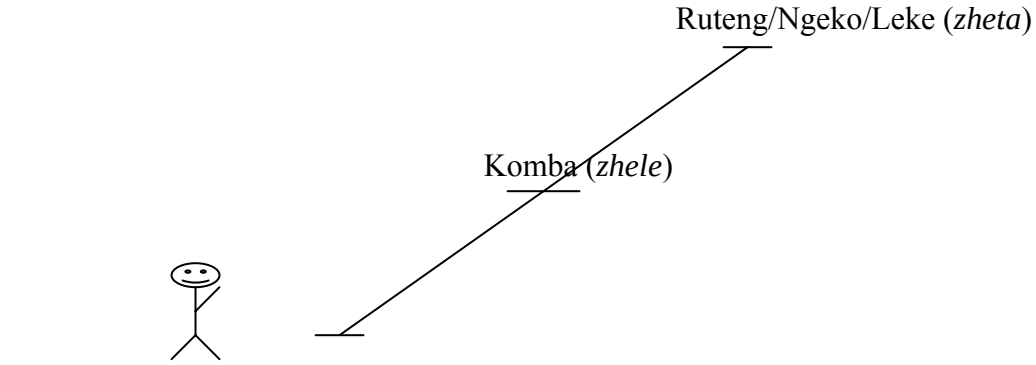


Figure 8.3: The use of the prepositions *zhele* and *zheta* in vertical planes

In contrast to *zheta* and *zhele* (in the context of vertical planes), *zhale* and *zhili* are applied to specify places that are psychologically conceived as "down under and not far" and "down under and far" respectively. The use of *zhale* "down under and not far" can be seen in example 20. When expressing the sentence, the speaker is in Mount Bheku.

20. jadi ja'o ndi'i **zhale** mai Leko Lembho
so I live down come Leko Lembho
"...so I came down and lived here in Leko Lembho". (The Autobiography of Bapak Antonius Gelang in Arka, 2004b)

For further illustration of the use of *zhale*, please see Figure 8.3 below.

Zhili is practiced to specify a location of a place that is "down under and far" from the speaker as in *Hiwa 1950 ndau ja'o la'a sekola* ***zhili*** *Ndua,* ***zhili*** *Fo'a ina mena Fo'a mbiwa dhu ko kelas enam* "In 1950, I went to school in Ndua because there is no sixth grade in Fo'a". In the context of this sentence, *Ndua* and *Fo'a* are considered to be "down under and far" from the speaker, i.e., The speaker is in Waelengga when telling his

autobiography. Compared to Ndua and Fo'a, Leko Lembho is nearer to the speaker. The visualization of the use of *zhale* and *zhili* can be seen in Figure 8.4 as follows.

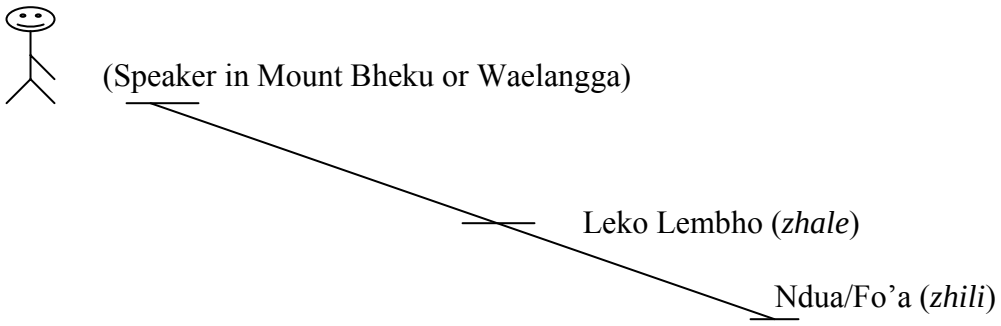


Figure 8.4: The use of the prepositions *zhale* and *zhili* in vertical planes.

In addition, *zhili* is also used in association with water such as a river. This is because the location of the river is always "down under and far" from the speaker. Furthermore, when referring to places outside Flores such as Bali, Australia, etc. *zhili* is preferred (Arka, 2004b). This is because the location of the places is across water, i.e., sea. The following examples provide evidence for this explanation.

21. yo.. kita ata ngazha Wayan pu'u **zhili** Bali…
ok we person name Wayan from down Bali
"Alright… the person we call Mr. Wayan, (who) comes from Bali". (Arka, 2004b)

22. **zhili** wena nua sizha ndau manga alo
down down kampong they that exist river

mezhe…
big
"Down behind their kampong, there is a big river… ". (Arka, 2004b)

Recall that Arka (2005b) claims that the use of frames of reference is almost entirely relative. The evidence that we just saw, i.e., the use of spatial terms that depends on the actual verticality of places referred to, I think, partly drives him to derive such a

claim. In other words, what he means by "relative" is in general sense, i.e., the use of the absolute terms *zhele/lau* "north/south" or the vertical terms depends on the position of a speaker relative to a place referred to, not in the sense of the relative frame of reference defined by Levinson (2003).

Nevertheless, the use of spatial terms in the context of vertical planes is rather hard for a foreigner since it requires him to be familiar with the topography of Rongga territory on one hand, and to conceive which places are considered "far" or "near" on the other hand.

To summarize, Rongga employs absolute and intrinsic frames of reference. Moreover, given the fact that the absolute frame of reference is based on landmarks, e.g., the mountain Mbengan, it is concluded that Rongga's absolute system is landmark-based. In addition to the two frames of reference, Rongga also has spatial terms that are used in the vertical planes.

8.3.1.3 Balinese's linguistic frames of reference

Spatial orientation is extremely important in Balinese. Many authors have reported this, e.g., Reuter 1996, Wassmann and Dasen, 1998. The importance of spatial orientation seems to relate not only to physical landmarks, e.g., mountain, sea, but also to cultural, religious, and social space (Wassmann and Dasen, 1998). In Balinese, the orientation *kaja* (translated into *utara* "north" in Indonesian and *north* in English) is associated with the direction towards the central mountain in Bali, i.e. Gunung Agung. *Kaja* is derived from *ke* "towards" and *aja* "hill" or "mountain" (Wassmann and Dasen, 1998: 692). Gunung Agung is believed by Balinese people to be a place where Hindu

Gods live. In contrast to *kaja*, which is considered as a sacred place, the direction towards the sea *kelod* is believed less sacred. *Kelod* is derived from *ke* "towards" and *laut* "sea" (Wassmann and Dasen, 1998; 692). Please note that not the sea itself is considered as an unsacred place, but the direction. In Balinese cultural and religious practices, the sea water is believed to be pure. The term *kelod* is translated into *selatan* "south" in Indonesian and *south* in English.

However, the *kaja* and *kelod* directions in Balinese are not fixed. If we look at the Balinese map in Figure 8.5 below, for Balinese people who live in the southern part of the island *kaja* (indicated by 1) is towards the mountains peppered in the middle part of the island that splits the island into two (shown by the double lines in the figure), while *kelod* (indicated by 3) is towards the sea in the southern part of the island. In this sense *kaja* and *kelod* are used in exactly the same as *utara* and *selatan*, and *north* and *south* in Indonesian and English respectively. These bearings are fixed when those people move outside their territory, or even outside Bali. But, for people who live in the northern part of the island, *kaja* is towards the south now because the location of the mountain is in the south part of their territory.

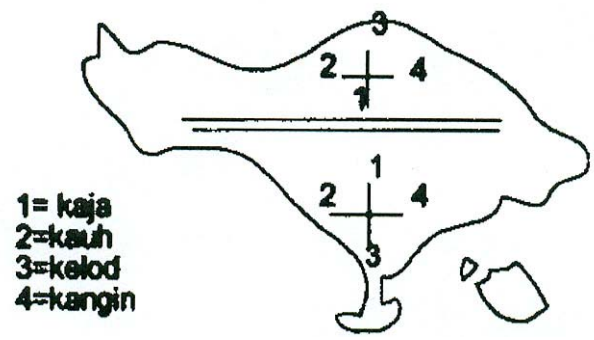


Figure 8.5: The orientation of *kaja* "north" and *kelod* "south" relative to mountains (Arka, 2005b)

Unlike *kaja* and *kelod*, *kangin* (indicated by 4) orientation (I translate it here as "east"), which is associated to the place where the sun rises and is also considered sacred, and *kauh* (indicated by 2) orientation (I translate it as "west"), which is associated to the place where the sun sets down are fixed for people living in the southern and northern parts of Bali island.

In the eastern part of Bali, i.e., eastern tip of the island, the spatial system is local, i.e., the reference of *kaja* and *kelod* changes from place to place. In the village of Seraya, for example, as the map in Figure 8.6 shows, *kaja* (indicated by 1) "north" in this village is towards the mountain Seraya, which is in the northern part of the village, and *kelod* (indicated by 3) "south" is towards the sea, which is in the southern part of the village. *Kangin* (indicated by 4) "east" refers to the direction where the sun rises, and *kauh* (indicated by 2) "west" is referred to the direction where the sun goes down. In other words, for Seraya villagers the directions *kaja, kelod, kangin, kauh* "north, south, east, west" are the same as people living in the southern part of the central Bali Island. But if we look now at the Batukaseni and Banyuning villages, *kaja* (indicated by 1) is still towards the mountain and *kelod* (indicated by 3) is still towards the sea. But, the position of the mountain used as a reference for *kaja* in these two villages is different from that used in Seraya village, i.e., the mountain in Batukaseni and Banyuning villages is now towards the West, not towards the North as in Seraya village. Furthermore, the location of the sea also shifts from the South in Seraya village to the East in Batukaseni and Banyuning villages. Note also that *kangin* "east" designating the direction where the sun rises in Seraya village now designates the North in Batukaseni and Banyuning villages.

Thus, in this sense the *kaja, kelod, kangin, kauh* directions are highly local in the villages in the easternmost part of Bali Island.

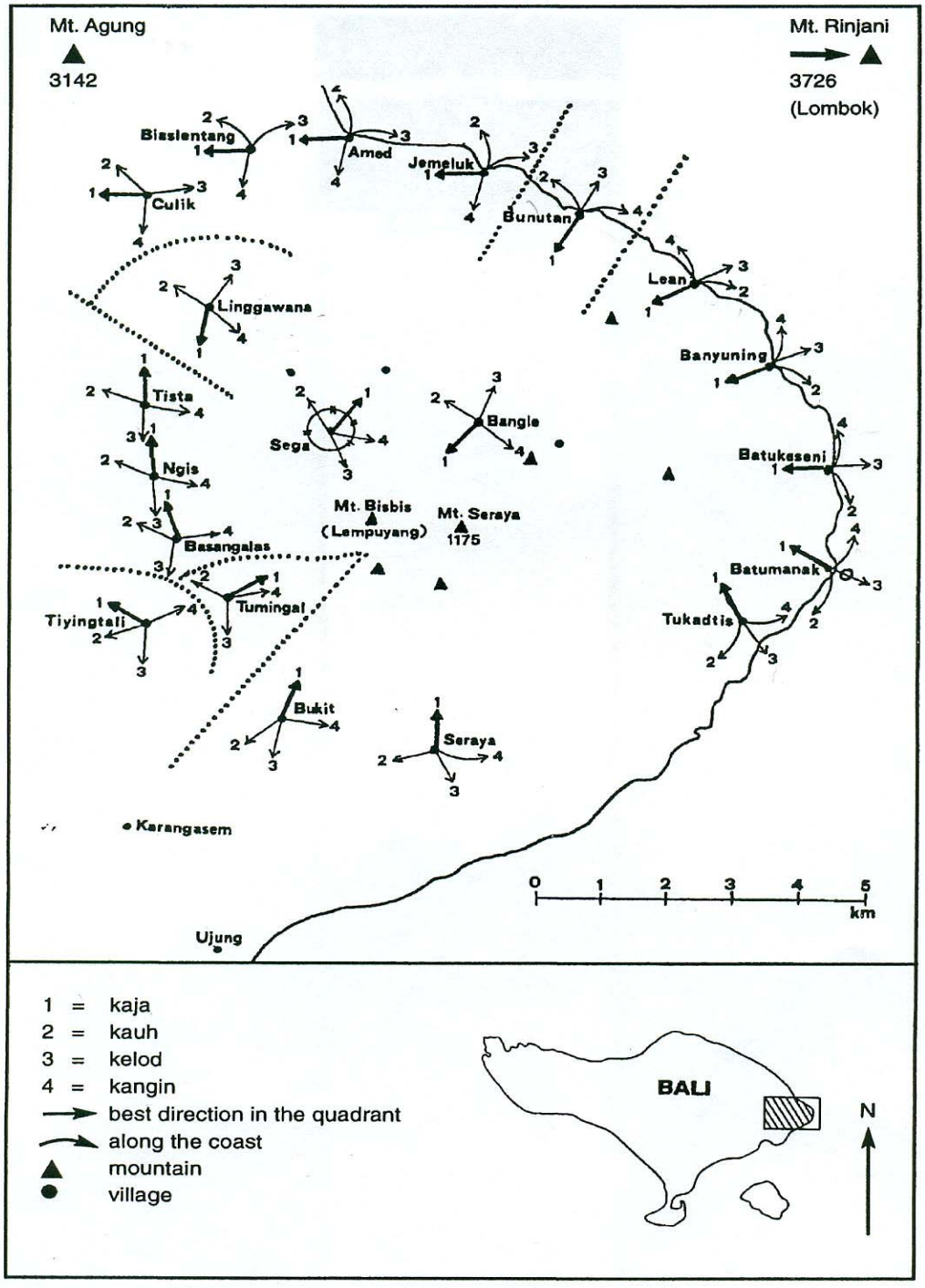


Figure 8.6: The topographical adaptations of Balinese spatial orientation system around the North-East Peninsula (Wassmann and Dasen, 1998)

But, what landmark is used for spatial orientation when Balinese people are outside Bali, e.g., they are in Lawrence, Kansas, where there is no mountain? In this case, they use an absolute system, i.e., they still use the cardinal directions, e.g., north, east, etc. The cardinal directions themselves are now determined using an east-west axis, which is based on the directions where the sun rises (east) and where the sun goes down (west). The other directions, i.e., north and south, are decided by using clockwise rotation beginning from the east. My wife and I for example always use this absolute system in our everyday spatial orientation here in Lawrence. When we park our car, my wife always directs me to park the car north, east, south, or west of another car. When we describe the location of shoes relative to other shoes, a knife in relation to the stove, the location of a TV remote relative to a book, etc. we use the cardinal directions. And when my wife asked me where Budig Hall is, I told her that the building is north of Anschutz Library, or when I sat next to her and asked her to move a bit, I said "Move north/south a bit".

In addition to the main cardinal terms, i.e., *kaja* "north", *kangin* "east", *kelod* "south", and *kauh* "west", there are also inter-cardinal terms such as *kaja kangin* "northeast", *kelod kangin* "southeast", *kelod kauh* "southwest", and *kaja kauh* "northwest". These inter-cardinal terms correspond to particular colors and Gods in Balinese Hindu as Figure 8.7 (Wassmann and Dasen 1998) shows.

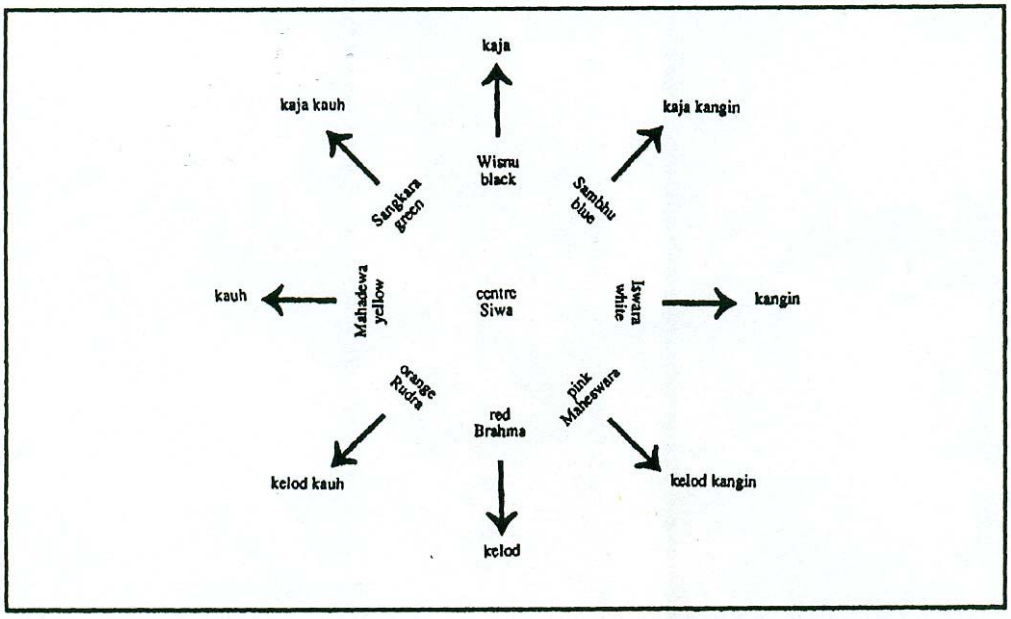


Figure 8.7: The Balinese Spatial Orientation System (Wassmann and Dasen, 1998)

The figure illustrates Balinese religious life. Balinese Hinduism believes in one God, the almighty God. The almighty God, in their belief, has powers associated with different Gods with different locations. For example, as Figure 8.6 shows, the God *Sambhu* is located at the northeast, the God *Maheswara* is at the southeast, at the centre is the location for the God *Siwa*, etc. To worship each God, a temple was erected by people living at the local society. Many aspects of Balinese life follow this scheme as Wassmann and Dasen (1998: 693) describe.

Villages are built prototypically along *kaja kelod* line, with the main temple (Pura Bale Agung) and the temple of the purified village ancestors (Pura Puseh) on the mountain side and the cemetery on the sea side. Each temple is aligned in the same ways, as well as the various shrines within the temples along both axes. The houses of a family compound are similarly oriented, with the family temple in the most sacred corner, situated *kaja kangin*. The head of the family lives on the *kangin* side of the compound, and everyone sleeps with his or her head oriented towards *kaja* or *kangin*. The layout of various parts of the house and of the furniture follows similar rules: the kitchen will be built *kelod* and the animals and the rubbish can be found in the least sacred corner, *kelod kauh*.

The inter-cardinal terms are also commonly used in everyday communication as illustrated in the following dialog.

A: k-ija iye Wayan?
to-where he/she Wayan
"Where is wayang going?"

B: **n-kaja** **kangin-an**
act.-north east-loc.
"(He/she is) going to East North"

As the example illustrates, the term *kaja kangin* is used as a response to someone who is asking to which direction a person is going. In short, the Balinese cardinal directions are deeply rooted at Balinese Hindu physical, cultural, religious, and social practices.

8.3.1.3.1 Balinese's linguistic frames of reference in horizontal planes

Since the cardinal directions are crucial in Balinese, they are frequently used in spatial orientations. To see some evidence, I did some tests with my language consultants. Recall that all my language consultants are Balinese monolinguals. The objective of involving Balinese monolinguals is to validate Wassmann and Dasen's findings showing that the relative frame of reference is also used by their subjects, though not dominantly.

The examples I present here are based on the linguistic tasks, i.e., the rotation and asking direction tasks, I did with my Balinese consultants. The procedures I did for my Balinese consultants were the same as that of my Rongga consultants. Thus, given a

spatial situation between *Lo* the bottle and *Ro* the chair, i.e., the bottle is to the right/north of the chair, my language consultants provided me with the following responses.

23. botol-e **daja**-n kursi-e
bottle-the north-lig chair-the
"The bottle is north of the chair".

When I moved the bottle to the south side of the chair, i.e., the bottle is to the left of the chair, the absolute frame of reference was again applied.

24. botol-e **delod** kursi-e
bottle-the south chair-the
"The bottle is south of the chair".

To further confirm the use of the absolute frame of reference, I replaced the chair with a ball. I asked my consultants to describe the position of the bottle that I placed north and south of the ball. The following responses were given.

25. botol-e **daja**-n bal-e
bottle-the north-lig ball-the
"The bottle is north of the ball".

26. botol-e **delod** bal-e
bottle-the south ball-the
"The bottle is south of the ball".

Note that, as in Rongga, I used a chair and a ball in this test. The purpose was that to see if the potential sidedness of the objects, e.g., the right and left sides of the chair, might affect the selection of a frame of reference by my Balinese consultants in describing a located object relative to a reference object.

Wassmann and Dasen (1998), however, did a study on the acquisition of frames of reference in Balinese, which shows that the relative frame of reference can still be observed in Balinese, although not dominantly. Let's see their experiments, which are relevant to my discussion in this sub-section.

Wassmann and Dasen conducted two different tasks in their study (1998: 702-704). In the first task, i.e., Animals in-a-Row, a series of three animals to which the subjects are familiar with, e.g., duck, goat, frog, tortoise, was provided to their subjects on the first table for five successive trials following a demonstration trial. The objects, i.e., animals, were oriented alternately to the right, i.e., *kaja*, and to the left, i.e., *kelod*. The subjects were instructed to remember the arrangement. They were asked to reproduce the previous arrangement on the second table after a 30-second delay.

In their second experiment, i.e., Steve's Mazes, a drawing of landscape including a house, rice-fields and trees was presented to the subjects on the first table. A path was indicated on it with a meandering line stopping a short distance from the house. The researcher explained to the subjects that they had to find the way to the house without having to cross the woods or the rice-fields. The researcher indicated the solution by tracing the remaining path on the drawing with a finger. The researcher told the subjects to memorize the remaining path. On the second table, three cards were placed, showing different path segments, one representing the relative solution, another showing the absolute solution, one representing an irrelevant solution. The task consisted of five of these drawings in addition to a demonstration trial.

The criteria for evaluating the results are as follows. If the subjects, out of five trials, give four or five answers of a single type, they are classified as A or R (A=

absolute; R= relative); if they give three answers of one type, they are classified respectively as A- or R-.

Regarding the subjects, the experiment involved twenty-eight subjects, i.e., eight children aged 7 to 9 (up to 2 years of schooling), eight children aged 11 to 15 (2 to 5 years of schooling) and twelve adults between 20 and 60 years of age (up to 6 years of schooling)), with a virtually equal distribution between sexes.

Wassmann and Dasen (1998) pointed out that in their first experiment, the subjects used the absolute solution, while in the second experiment only one quarter of the subjects provided the systematic response of absolute frame of reference, and most of them mix absolute and relative. Another quarter produced systematic response of relative frames of reference.

Given Wassmann and Dasen's findings, I am interested in investigating further the use of relative of reference in Balinese. To do so, I used a "asking direction" technique. The reason why I did not replicate Wassmann and Dasen technique is that when I did trial tests with my language consultants (using similar drawings that I made myself), it seemed that my language consultants did not understand what I was asking them to do. It may be due to their educational background. Recall that they are elementary and junior high school graduates. Therefore, I decided to conduct my own technique, i.e., asking directions, which is simpler than the one conducted by Wassmann and Dasen. This technique, nevertheless, still enabled me to elicit their responses using different frames of reference when answering my questions about the location of places. Another reason I used this technique is that I needed to obtain natural linguistic responses from my consultants.

There were three participants. Their ages were between 20-30 years old. They were all monolinguals. I asked my language consultants about the location of somebody's house in my village. I made sure that my language consultants know the person's house (but, I pretended that I did not know the person's house). My participants were naïve about my hypothesis. In asking the question, I tried to ask naturally. I talked about somebody that I had not seen for a long time. In the middle of our talks, I then asked him where the person's house was. I did this procedure individually and in a different place from the other participants.

The results show that all responses given by my language consultants used the absolute frame of reference, i.e., all of them use *kaja*, *kelod*, etc. in their directions, as shown in examples 27-29 (I present the relevant parts of our talks here).

27. Researcher: dije umah ye-e Yan?
where house him-the Yan
"Where is his house Yan?

Participants: uling umah Mangaye **n-kelod**-an
from house mangaye act.-south-loc.

nyen tepuk umah Adik **delod** umah ye-e
later see house Adik south house his-the
"Go south from Mangaye's house. You will see Adik's house.
His house is south of Adik's house".

28. Researcher: dije ragan-e n-tongos jani
where he/she-the act.-stay now
"Where does he stay now?"

Participants: ditu **delod** jero-n Ngurah-e
there south house-lig Ngurah-the
There, south of Ngurah's house".

29. Researcher: De n-tawang umah ragan-e
De act.-know house he/she-the
"Do you know where his house is?"

Participants: n-tawang BliMan umah Bli Kadek-e
act.know Bli Man house Bli Kadek-the
"Do Bli Man (researcher's name) know Bli Kadek's house?

Researcher: n-tawang
act.-know
"(I) know"

Participant: **n-kelod-an** ditu **daja-n** Pura Sakenan-e
act.-south-loc there north-lig Temple Sakenan-the
"Go south there, it is north of the Temple Sakenan".

Why did Wassmann and Dasen find that the relative frame of reference in their second study? I do not have much to say here. It might be related to the interference of Indonesian in Balinese. But, Wassmann and Dasen (1998) do not describe whether their subjects are monolinguals or bilinguals. It is common that Balinese speakers frequently use the right/left orientation (Wassmann and Dasen also acknowledged this). But when they use it, they switch to Indonesian. This is the reason why I paid attention to the bilinguality factor in this study.

Balinese has native words for right and left, i.e., *tengawan* and *tengebot* respectively, which are only used to refer to body parts, e.g., *lima tengawan* "right hand", *lima tengebot* "left hand, *nyonyo tengawan* "right breast, *nyonyo tengebot* "left breast". But, they are not used to refer to spatial orientations. To validate this conclusion, I did some tests. Like the test I did in Rongga, I sat on a chair and I put my backpack on the right and left side of the chair, i.e., the location of the backpack corresponds to north and south side of the chair. I asked my language consultants to describe the position of the

backpack in relation with the chair and me. None of them used the right/left orientation in the spatial contexts either between the backpack and the chair, or between the backpack and me. In those contexts, the cardinal directions, i.e., *kaja*, *kelod*, etc., were used. This indicates that the relative frame of reference is not applicable in Balinese.

Further evidence that the absolute frame of reference is extremely important in Balinese, as I pointed out before, can be seen from the use of the cardinal points in everyday greetings shown in the examples below (repeated from the previous examples).

30. A: Nyoman k-ija?
Nyoman to-where?
"Nyoman, where are you going to?"

B: **n-kaja-an**/*kaja
act-north-loc[15]
"(I'm going) toward the north" (Arka, 2005b: 7)

Recall now the spatial situation between the bottle and the chair above. When the bottle was placed in front or in back of the chair, as in Rongga, the intrinsic frame of reference was employed as illustrated in examples 31-32. Determining the front or back part of *Ro* in Balinese, like Rongga and English, is function-based.

31. botol-e **di** **muka** kursi-e
bottle-the expect front chair-the
"The bottle is in front of the chair".

32. botol-e **di** **duri-n** kursi-e
bottle-the expect back-lig chair-the
"The bottle is in the back of the chair".

[15] loc= locative

One remark should be given here about the extension of the *expected* preposition *di* to the intrinsic frame of reference. As I said before, the use of *di* in the intrinsic frame of reference may be motivated by the fact that *di* is also used to refer to general places, e.g., a restaurant, a school, etc. Therefore, it is present in the intrinsic system. Moreover, *di* can also be extended to the absolute frame of reference especially in formal Balinese. But in everyday contact, the cardinal terms are used without *di*.

The same frames of reference are also applied when I tested with other *Ro*, e.g., a TV. When I was standing in front or at the back of the TV, the intrinsic frame of reference was used as well. However, the absolute frame of reference was applied when I was standing at the other sides of the TV, i.e., the sides correspond to north, south, etc. In this situation, the cardinal terms *kaja*, *kelod*, etc. are used.

Recall that the north/south alignment applies to beds in Balinese (also to building temples of a village or the houses of a family compound). In Balinese, the directions *kaja/kelod* "north/south" are applied to the geography of a human body as well, i.e., the north is associated with the head and the south is associated with the feet. Therefore, the beds should also be placed in the *kaja/kelod* or mountain/sea alignment so that when someone is sleeping the head remains towards the mountain and the feet are towards the sea. The same principle also applies when building the houses of a family compound. The family temple is built in the direction *kaja kangin* "northeast", while the kitchen is towards the sea or south. This principle, however, is not applicable to a TV for example because the TV is not believed to have cultural or social values as the human head and feet. In contrast to Rongga, Balinese does not have spatial terms that are used in vertical planes.

In short, based on the findings here, Balinese speakers use absolute and intrinsic frames of reference. In other words, the non-dominant use of relative frame of reference in Balinese, as pointed out by Wassmann and Dasen (1998), is not confirmed. The nature of the tasks, i.e., Steve's Mazes, used by Wassmann and Dasen might affect the selection of a frame of reference. Recall that in their Steve's Mazes tasks the participants had to choose one of the three solutions, i.e., the relative, absolute, or irrelevant solution. Due to the difficulty of the tasks, as admitted by the participants, and the educational background of the participants it might be that the participants at some points guessed one of the solutions. Therefore, their choice may not reflect their actual knowledge of frames of reference. Furthermore, since the absolute frame of reference in Balinese is based upon landmarks, e.g. mountains, it can be said that Balinese absolute system is, as in Rongga, landmark-based as well.

8.3.1.4 Linguistic frames of reference in Indonesian

8.3.1.4.1 Indonesian's linguistic frames of reference in horizontal planes

To reveal the frames of reference employed in Indonesian, I used the previous techniques in Rongga and Balinese, i.e., the object rotation and asking question techniques. Let me begin with the object rotation tasks.

When I asked my language consultants to describe the position of the bottle in relation to the chair, i.e., the bottle is to the right/north of the chair, various responses were given by my language consultants as can be seen in examples 33-34.

33. botol itu **di sebelah** **kanan** kursi
    bottle that expect side right chair
    "The bottle is to the right of the chair".

34. botol itu **di** **sebelah** **kiri** kursi
bottle that at side left chair
"The bottle is to the left of the chair".

Two of my language consultants provided me the spatial description this situation like example 33, i.e., they used *di sebelah kanan* "to the right", while one of them gave description like example 34, i.e., he used *di sebelah kiri* "to the left". I further tested their knowledge by providing another spatial situation. I put a book next to a TV, i.e., the book is to the right of the TV from my position, and a bottle next to a gas stove, i.e., the bottle is to the right of the gas stove from my position. Interesting responses were given by my language consultants. In the former context, the same responses as examples 33-34 were given by the same language consultants. More specifically, two of them said that the book is to the right of the TV, while one said the book is to the left of the TV. In the latter context, in contrast to the former context, all my language consultants gave me the same responses as illustrated in example 35.

35. botol itu **di** **sebelah** **kanan** kompor gas
bottle that expect side right stove gas
"The bottle is to the right of the gas stove".

Before I concluded the principles that explain the use of frames of reference in the tasks, I again created another spatial context. This time, I replaced the chair in the previous situation with a ball and the bottle remained in the same position. The three language consultants gave me the following responses.

36. botol itu **di** **sebelah** **kanan** bola
bottle that expect side right ball
"The bottle is to the right of the ball".

Moreover, the similar response with example 36 was given by the three consultants when I was standing to the right of a tree as can be seen in example 37 below.

37. Arya berdiri **di** **sebelah** **kanan** pohon
Arya stand expect side right tree
"Arya is standing to the right of the tree".

Since I am interested in finding out the knowledge that triggers the various responses given by my language consultants, I asked them individually. The two, who consistently used *to the right* in all the contexts, explained "from where I stand, the bottle or the book is more *to the right* to the chair, the TV, the stove, the ball, or the tree". A different perspective, however, is given by the language consultant, who used *to the left* in the first two contexts, but *to the right* in the last three contexts. When I asked why he used *to the left* in the first two contexts, but *to the right* in the last three contexts, he said "I look at the chair and TV like humans. They have the right and left sides. When I was facing the objects, I imagine I was facing humans. Therefore, I used *to the left* in the first two contexts because the located objects are at the actual left side of the reference objects. In the last three contexts, however, when I was facing the objects, i.e., *the stove, the ball*, and *the tree*, I was not facing humans because they do not have the right and left sides. Consequently, I used my own right, i.e., *to the right*".

Based on the explanations given by the last language consultant, i.e., the one that used right/left orientation inconsistently, the "animacy" of reference objects seems to

influence the selection of right/left orientation in Indonesian. But the choice of which objects constitutes to have right/left sides like humans seems to be strongly personal. To confirm this conclusion, more subjects with earlier ages should be involved in a future study.

Given the evidence above, it seems that two principles of using the right/left orientation are possible in Indonesia, i.e., the reflection and 180^{o} rotation principles, as illustrated in Figures 8.8 and 8.9.

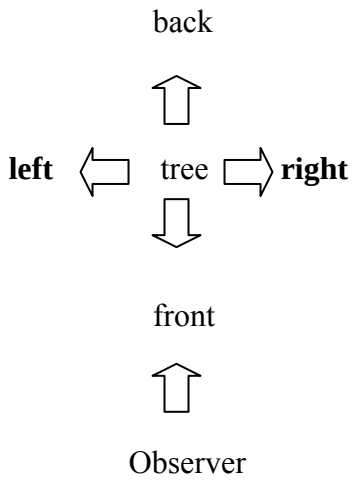


Figure 8.8: Reflection analysis in Indonesian

In this situation, the front of the tree is the space between the tree and the observer, i.e., the space near the observer. The observer's right and left sides are directly mapped to the sides of the tree, i.e., it is in counter-clockwise rotation beginning from the tree's front. The rotation principle is explained based on Figure 8.9 below.

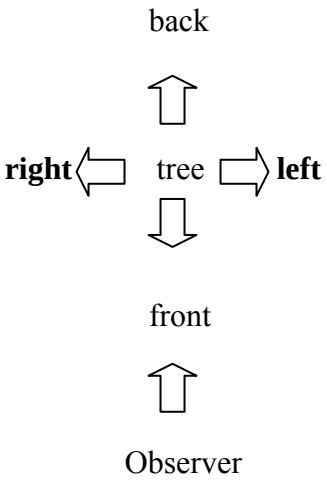


Figure 8.9: 180^{o} rotation analysis in Indonesian

Based on this analysis, the coordinates are mapped to the tree and then rotate them 180^{o}. Hence, the tree's front is now facing the observer, and the right and left orientation are now decided with a clockwise rotation beginning from the front, i.e., the right side of the tree is now to the observer's left.

Further evidence that the relative frame of reference is prominently used in the language can be pointed out from the direction technique I used. As in Balinese and Rongga, I had very natural talks with my language consultants. At the right moment, I asked a question about new places that I pretended I did not know. I had talks with my language consultants individually at different places. They were naïve of what I was testing. The relevant parts of the talks are presented here.

38. Researcher: dimana Gramedia yang di Gatsu
where Gramedia that expect Gatsu
"Where is the Gramedia (book store) on Gatsu (street)?"

Participant: Pak tau BNI Gatsu kan
Mr know BNI Gatus right
"You know BNI at Gatsu, right?"

Researcher: ya
"Yes"

Participant: **di** **sebelah** **kiri** BNI Pak
expect side left BNI Mr.
"It is on the left side of BNI at Gatsu".

39. Researcher: dimana tempat-nya Millenia As
where place-the Millenia As
"As, do you know where Millenia is?"

Participant: di perempatan Diponogoro **belok** **kiri**
expect crossroad Diponogoro turn left

Milenia di depan Century Bank
Milenia expect front Century Bank
"Turn left at the Ponogoro crossroad. Milenia is in front of Century Bank".

40. Researcher: kalau dari Hero di mana letak-nya Milenia
if from Hero expect where place-the Milenia
"If I come from Hero, where is Millenia?"

Participant: terus lurus di Teuku Umar **di** **sebelah**
keep straight expect Teuku Umar expect side

kanan di depan Telkomsel
right expect front Telkomsel
"Keep straight on Teuku Umar (street). Milenia is on the right side in front of Telkomsel".

In addition to the relative frame of reference, the intrinsic frame of reference is also employed in Indonesian. When the bottle is placed in front of or behind the chair the complex prepositions *di depan* "in front of" or *di belakang* "at the back of" is used as examples 41-42 show.

41. botol itu **di** **depan** kursi
bottle that expect front chair
"The bottle is in front of the chair".

42. botol itu **di** **belakang** kursi
bottle that expect back chair
"The bottle is at the back of the chair".

The intrinsic frame of reference was also used when a book was put in front or at the back of a TV, or when I was standing in front or at the back of the TV. Other objects that are conceived to have intrinsic features are buildings, e.g., a school, a house, a temple, a church, etc., a computer printer, a refrigerator, etc. Determining the front or back part of reference objects in Indonesian is the same as that in Rongga and Balinese, which is function-based. The front part of buildings is the side with an entrance, a printer's front is the side where the print out is printed, the front part of a refrigerator is the side with a door to open or close the refrigerator. Additionally, un-featured objects such as a stone or a tree can be conceived to have the front and back sides. The front side of a stone is the part that is near an observer or the part that is metaphorically conceived to face an observer. In short, given the evidence above, Indonesian uses the relative frame of reference predominantly.

8.3.2 Non-linguistic frames of reference

We have seen that the frames of reference for horizontal spatial orientation in Rongga, Balinese, and Indonesian are different from one language to another. While Rongga and Balinese employ the absolute frame of reference predominantly in addition to the use of intrinsic frames of reference, the use of the relative frame of reference in Rongga is also observed, though in a very limited context. The restricted use of the relative frame of reference in Rongga is perhaps influenced by my use of Indonesian. In Balinese, as the findings here point out, the relative frame of reference is absent.

Indonesian on the other hand uses the relative frames of reference prominently in addition to the use of intrinsic frame of reference.

The question now is: are the differences in using the linguistic frames of reference only a matter of surface differences, or are there any consequences of these differences to the cognitive functioning in the speakers' mind of the three languages? As I pointed out in chapter 7, Levinson (2003) has answered these questions. He claims that the use of different frames of reference is not only a matter of using the systems differently. Rather, it affects spatial reasoning as well.

Since one of my research questions is to test my language consultants' cognitive functioning, i.e., recall memory, I also employed a non-linguistic task, i.e., ordering objects, inspired by the one used by Levinson (2003), which was designed to probe the conceptual structures of non-linguistic spatial representation motivating different cognitive functioning, i.e., recall memory. The hypothesis tested in this task is if there is congruence between the frame of reference used in each language and that used in memory. Specifically, if a linguistic community uses the relative frame of reference in their language, I expect that the same frame of reference is used in memory as well. But if the society uses the absolute frame of reference predominantly, the society is expected to employ the absolute frame of reference as well. Once again the language consultants were naïve about the hypothesis.

8.3.2.1 Methodology

8.3.2.1.1 Participants

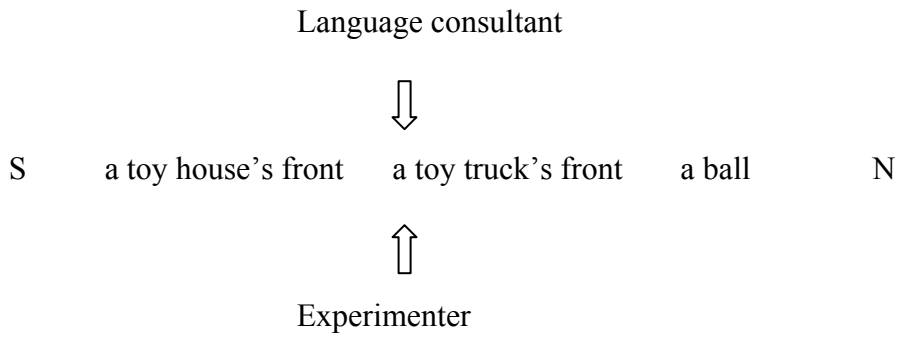
The same participants participated in the linguistic tasks again involved in the non-linguistic tasks. They volunteered for this study.

8.3.2.1.2 Non-linguistic tasks

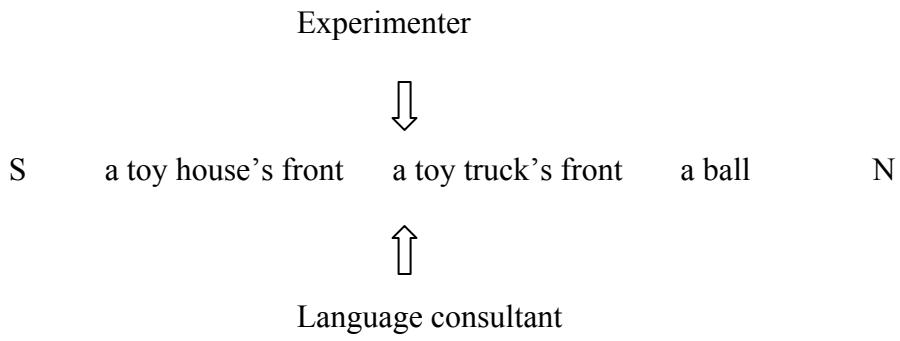
The non-linguistic task I used was similar to the one used by Levinson (2003). The tasks were simplified. It is simplified in the sense that I only used three different objects to be ordered by the participants. In this task the subjects had to identify the stimulus or the original order of the objects and reconstruct the previous order of the objects, i.e., recall memory.

8.3.2.1.3 Procedure

The method I employed was as follows. I and my language consultant sat at a same table, i.e., the table was in the north-south axis. We were facing each other. I then arranged three different featured objects, e.g., *a toy truck, a toy house, and a ball*, on the table based on their intrinsic features, i.e., the truck is in front of the house, the ball is in front of the truck, as illustrated below.



I told my language consultant to look at the position of the objects and remember it well. After that, I took the three objects and switched seats with him. There is an interval of three-quarters of a minute delay between the stimulus presentation and the rotation (following Levinson). I had a conversation during the delay. The purpose of such an interval is to minimize specific short-term memory effects that could trigger the participants to use relative orientation since a visual image automatically encodes an egocentric viewpoint (Wassmann and Dasen, 1998: 702). But a visual image is normally replaced by new visual information and has a natural decay period of below 30 seconds (Baddeley, 1990: 31 in Wassmann and Dasen, 1998: 702). I then asked him to arrange the same objects exactly in the way he saw them earlier. The response he gave me, for example, was shown below.



In addition to the featured objects, un-featured objects were also used, e.g., a *bunch of keys, an eraser, and a book*. The experimental procedure I did for the un-featured objects was the same as that for the featured objects. The reason for using both featured and un-featured objects was to see whether the features of the objects affected the ordering of the objects especially for participants opting for the absolute solution. In this fashion, I expected that I could tap the language consultants' cognitive functioning, i.e., their recall memory. I had a list of participants' names. When a participant opted for

a relative solution, I marked him R, but if he opted for an absolute solution I marked him A. The summary of original objects' ordering and subjects' reordering of the objects, i.e., both featured and un-featured objects, is presented in the figures below. The number in brackets shows the number of subjects' reodering of objects.

No.	Original featured objects' ordering	Subjects' reordering of featured objects	Frames of reference
1.	house's front, truck's front, a ball	R: house's front, truck's front, a ball (3)	Absolute system
2.	house's front, truck's front, a ball	B: house's front, truck's front, a ball (3)	Absoute system
3.	house's front, truck's front, a ball	I: a ball, truck's front, house's front (3)	Relative system

Figure 8.10: Subjects' reordering of featured objects in R= Rongga, B= Balinese, I= Indonesian

No.	Original un-featured objects' ordering	Subjects' reordering of un-featuredobjects	Frames of reference
1.	keys, rubber, book	R: keys, rubber, book (3)	Absolute system
2.	keys, rubber, book	B: keys, rubber, book (3)	Absoute system
3.	keys, rubber, book	I: book, rubber, keys (3)	Relative system

Figure 8.11: Subjects' reordering of un-featured objects in R= Rongga, B= Balinese, I= Indonesian

8.3.2.2 Results and discussion

The results of reordering of featured and unfeatured are can be seen in the Figures 8.12 and 8.13.

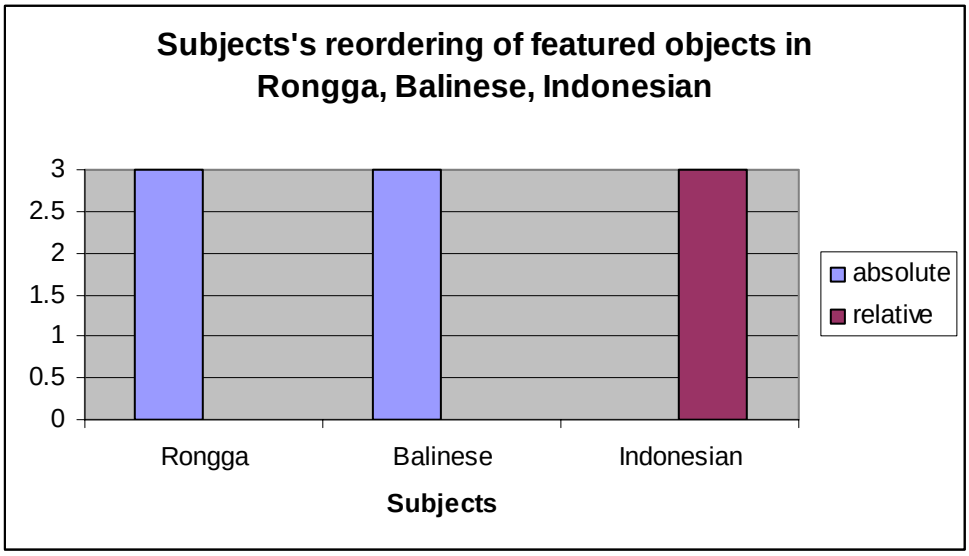


Figure 8.12: Subjects' reordering of featured objects in Rongga, Balinese, and Indonesian.

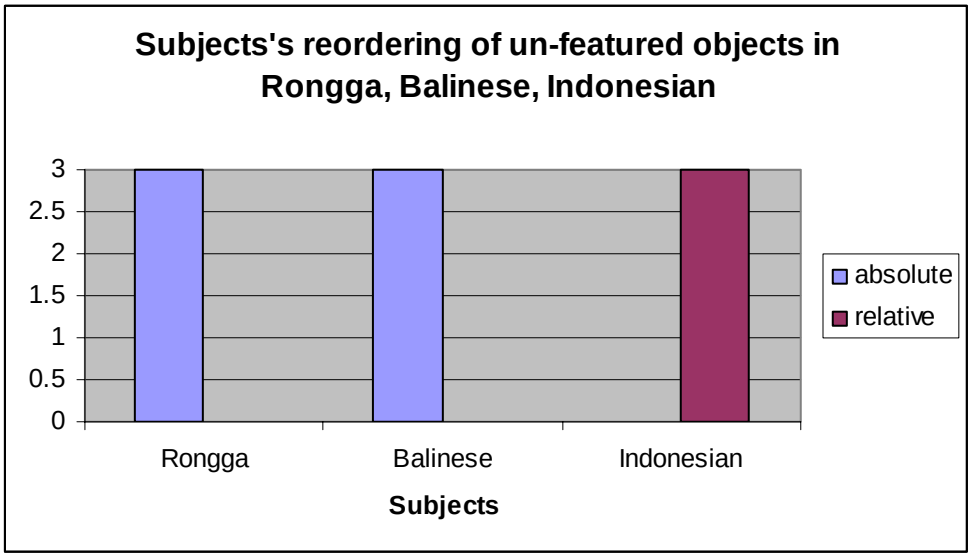


Figure 8.13: Subjects' reordering of un-featured objects in Rongga, Balinese, and Indonesian.

For the featured objects, as the results in Figure 8.12 show, all Rongga and Balinese subjects' reordering of objects were based on the fixed bearings as illustrated below.

Language consultant

S a toy house's front a toy truck's front a ball N

Experimenter

(Original position of objects)

Experimenter

S a toy house's front a toy truck's front a ball N

Language consultant

(Subjects' reordering of objects)

In contrast to the reordering of the Rongga and Balinese subjects, all the Indonesian subjects used the right/left orientation in reordering the objects.

Language consultant

S a toy house's front a toy truck's front a ball N

Experimenter

(Original position of objects)

Experimenter

S a ball a toy truck's front a toy house's front N

Language consultant

(Subjects' reordering of objects)

More interestingly, especially for Rongga and Balinese reordering of the objects, the positions of the objects were exactly the same as the ordering I provided initially which was based on the objects' intrinsic features. This indicates that the results might be affected by the presence of those features, not the fixed bearings, i.e., the absolute frame of reference, per se. To verify this, I provided objects with no intrinsic features to all my language consultants.

The results for the un-featured objects show that it seems that the features of objects do not affect the ordering of objects. All my Rongga and Balinese subjects ordered the objects using the absolute solution as shown below.

Language consultant

S keys rubber book N

Experimenter

(Original position of objects)

Experimenter

S keys rubber book N

Language consultant

(Subjects' reordering of objects)

For my Indonesian subjects, consistent with their ordering of objects with intrinsic features, they preferred to employ the relative frame of reference as illustrated below.

Language consultant

S keys rubber book N

Experimenter

(Original position of objects)

Experimenter

S book rubber keys N

Language consultant

(Subjects' reordering of objects)

What the evidence shows is that the favored frames of reference in the three languages seem to root deeply at the cognitive faculty for speakers of the languages. Put another way, the distinct linguistic frames of reference used in the languages are not a matter of

surface differences. Rather, they could have cognitive effects on spatial reasoning as well. Thus, the findings of these experiments lend further support to Levinson' claim, i.e., that language affects spatial reasoning.

To confirm that the different frames of reference have distinct underlying conceptual systems, I would like to discuss some evidence from the acquisition of frames of reference in the next sub-section.

8.3.3 Evidence from the acquisition of frames of reference

Due to a limitation of time, I did not investigate the acquisition of the frames of reference in Rongga, Balinese, and Indonesian. However, I would like to incorporate Wassmann and Dasen's findings of their study on the acquisition of frames of reference in Balinese here.

The subjects of the experiments involved twenty-eight subjects (140 trials). Eight children aged 7 to 9 (up to 2 years of schooling), eight children aged 11 to 15 (2 to 5 years of schooling) and twelve adults between 20 and 60 years of age (up to 6 years of schooling), with a virtually equal distribution between sexes. Moreover, a simplified version of the Animal task, i.e., two figurines instead of three, 5- to 10-second delay, was administered to ten children aged 4-5 years. Wassmann and Dasen (1998) conducted two experiments, i.e., Animal-in-a-Row Task and Steve's Mazes Task. I summarized the experimental procedure of the two experiments in section 8.3.1.3.1.

Wassmann and Dasen's study shows that in the Animal task the subjects showed systematic response of absolute frame of reference. In the second task, nevertheless, only one quarter of the subjects provided the systematic response of absolute frame of

reference, and most of them mix absolute and relative. Another quarter produced systematic response of relative frames of reference. For the first task, the results of the 4- to 5-year-old children can be added. All the children used the absolute solution in the task. In short, despite the result of the second task, Wassmann and Dasen findings are the same as my findings that the absolute system is dominantly used in Balinese.

Regarding the relative solution used by most of the participants in the second task, Wassmann and Dasen explain that it might be related to the nature of the first task which is easier than the second task as, according to Wassmann and Dasen, expressed by the participant explicitly: 'There [on the first table] the animals are looking towards *kaja*; here [on the second table] they are also looking *kaja*' (Wassmann and Dasen, 1998: 704). In the second task, as Wassmann and Dasen explained, "subjects who mainly provide absolute answers explain that they have memorized an image of the path, and they sometimes describe its shape, 'it's like the letter U', 'like a belly curved towards *kauh'*. Those who give relative answers talk about following the path, for instance, from left to right" (Wassmann and Dasen, 1998: 704). Unfortunately, Wassmann and Dasen did not mention about the language used by the subjects using left or right, i.e., it is not clear whether they used Balinese left and right terms or Indonesian left and right terms. I suspect, as I said before, that the use of the relative solution by the participants in the second task might be affected by the bilinguality of the participants. Specifically, their use of right/left solution in the second task may be influenced by Indonesian, which relies upon the right/left orientation.

8.4 Summary

Rongga and Balinese use spatial nominals, e.g., *kaja/kelod/kangin/kauh* "north/south/east/west", in the grammar of their absolute frames of reference. In Indonesian's relative frame of reference, the complex spatial prepositions are used, e.g., *di sebelah kanan/di sebelah kiri* "expect right/left side". And to describe the intrinsic frame of reference, the three languages use the complex spatial prepositions, e.g., R: *olo wena/muzhi wena* "front side/ back side"; B: *di muka/di duri* "expect front/expect back"; I: *di depan/di belakang* "expect front/expect back".

Although Rongga and Balinese use the landmark-based absolute system in their frame of reference, a difference can still be found. The Balinese absolute system is more detailed than the Rongga system in the sense that Balinese has the inter-cardinal terms, which are not found in Rongga. Furthermore, the practice of the inter-cardinal terms in Balinese is common, e.g., Balinese greetings. The employment of the absolute systems in Rongga and Balinese are related to the religious, social, and cultural practices in the two languages. Indonesian, in contrast to Rongga and Balinese, uses the relative system in its frame of reference.

Moreover, the use of distinct frames of reference in the languages has serious cognitive consequence. More concretely, the use of linguistic frames of reference by the speakers of the languages affects the use of the frames of reference in their memory. This evidence suggests that the claim that the relative frame of reference is universal is not validated in this study (in addition to the studies by Wassmann and Dasen (1998), Brown (2001), Levinson (2003)).

Chapter 9

Conclusions, Implications, and Suggestions

At the outset of this study, I stated three research questions: 1) What concepts underlie and inform the systems of spatial reference in Rongga, Balinese, and Indonesian, 2) Is there any evidence from spatial language acquisition that supports the findings in this study? If yes, what are the implications of such evidence to the previous studies of topological relations? 3) Is there any affect of spatial systems, i.e., frames of reference, on cognitive functioning, i.e., recall memory, of speakers in the three languages?

This chapter summarizes the findings relevant to the research questions. The findings of topological relations confirm that the expectedness of spatial relations between objects plays a crucial role in the topological relations of Rongga, Balinese, and Indonesian. Based upon that concept, the topological relations in the languages divide into two categories: *the expected* relations, where the spatial relations between objects are normal or expected and the *unexpected* relations, where the spatial relations between objects are not normal or expected.

The empirical findings for topological relations gain support from the acquisition of topological prepositions in Indonesian. More concretely, the expectedness of spatial relations affects how the topological terms are acquired by children to specify the spatial relations between objects. When the spatial relation between objects is expected, the *expected* preposition *di* "expect" is used to describe such a relation, otherwise a set of the *unexpected* prepositions is employed, e.g., *di dalam* "expect inside", *di datas* "expect up". Moreover, both conceptual and linguistic knowledge is necessary in the acquisition

of spatial prepositions by children. The subjects should be "matured" conceptually and linguistically to be able to use the *expected* and *unexpected* prepositions in Indonesian. As the results suggest, children's conceptual and linguistic knowledge of topological prepositions matures at approximately the age of five years old.

While the three languages share the same system for their topological relations, their use of frames of reference is based upon different underlying concepts. Indonesian employs the relative frame of reference dominantly, while Rongga and Balinese use the absolute frame of reference. Even though Balinese and Rongga use the landmark-based absolute frame of reference predominantly, the difference can still be noted in the two systems. Specifically, the Balinese absolute frame of reference is more detailed than that of Rongga in the sense that Balinese uses the internal cardinal terms, which Rongga lacks. The employment of the absolute systems in the two languages is rooted in the religious, social, and cultural practices.

Quite interestingly, the distinct uses of frames of reference in the three languages are not only a matter of using the systems in different ways, but in fact affect the cognitive functioning, i.e., recall memory, of the speakers in the three languages. This conclusion can be drawn from the results of the non-linguistic tasks which showed the dominant use of the absolute frames of reference in Rongga and Balinese and the relative frame of reference in Indonesian in the linguistic tasks, i.e., the object rotation and asking direction tasks, as well as in the non-linguistic tasks, i.e., the ordering objects. Put another way, there is congruence between using the frames of reference in the linguistic and non-linguistic tasks. Moreover, the different underlying concepts of frames of reference also affect the acquisition of frames of reference. Wassmann and Dasen (1998) pointed out

that Balinese children learn to use the spatial orientation very early in life, i.e., their subjects use the absolute terms such as north, south, east, west etc. prominently.

In terms of the syntactic forms of frames of reference, while the *expected* preposition *di* is optional in the Balinese absolute system, i.e., *di* is not used with the cardinal terms in casual speech, but obligatory with the cardinal terms in formal ones, in Rongga the *expected* preposition *one* is not used with its cardinal terms. Rongga is also different from Balinese and Indonesian in terms of the syntactic forms of the intrinsic system. The *expected* preposition *one* is not extended to the intrinsic system in Rongga, but in Balinese and Indonesian *di* is extended to their intrinsic system. Moreover, *di* is extended to the relative system in Indonesian as well. This suggests that the absolute systems in Rongga and Balinese are monomorphemic or "unmarked", i.e., expected, while the intrinsic systems in the three languages are polymorphemic or "marked", i.e., unexpected. Recall that the "unmarked" and "marked" relations can also be observed in the topological relations in the languages, i.e., the *expected* relation is monomorphemic or "unmarked", whereas the *unexpected* relation is polymorphemic or "marked". The expectedness marking seems to be common in these languages. It however does not seem to be common in other languages, e.g., English, Guugu Yimithirr. In English, for example, there is no specific marking whether *a rock* is put on the *ground* or on a *bed*, i.e., in both cases, the preposition *on* is used to describe the spatial relations between the *rock* and the *ground* or between the *rock* and the *bed*. What matters in the culture of English speaking people is that the rock is supported by the ground or the bed.

The syntactic evidence, i.e., the monomorphemic forms of topological prepositions *one, di, di* and of absolute systems in Rongga and Balinese, e.g. R: *zhele,*

mena, etc.; B: *kaja, kangin*, etc., may also suggest the prominence of expected spatial relations in the languages. Recall that the *expected* prepositions are used to describe spatial relations between objects with designed *purpose* and normal *relation* and between object with part-whole relations, i.e., non-human objects.

What are the implications of the findings of the current study? Topologically, the findings of the present study do not confirm either the strong universal conceptual categories or the universal tendencies claims. Recall that according to the former proposal, which is based on English and European languages, the concepts *containment* and *support* are universal, and according to the later proposal the concept *attachment* is important in the nine unrelated languages, e.g., Basque, Dutch, Ewe, Lao, Lavukaleve, Tiriyó, Trumai, Yélî Dnye, and Yukatek. More specifically, recall again that when the earring is on the ear in a typical relation or an earring is attached to the top of the ear, the concept *support* will be predicted by the strong universal conceptual categories, while the concept *attachment* will be predicted by the universal tendencies. The two proposals, however, are not true in Rongga, Balinese, and Indonesian. In these languages what matters is the expectedness of the relation between objects, i.e., the relation is *expected* when an earring is in a typical relation with the ear, but it is *unexpected* when the earring is attached to the top of the ear, not such concepts as *containment*, *support*, or *attachment*.

In relation to the non-topological relations, the claim that the relative frame of reference is universal is not confirmed as well. Even though Indonesian relies upon the relative frame of reference, such a system is not employed in Balinese. In Rongga, the relative system is used, but only in very restricted contexts. As suggested by the results of both linguistic and non-linguistic tasks, the absolute system is dominant in Rongga.

The next implication is related to the study of Language Universalism, i.e., Language Universal and Linguistic Relativity. What it means by Linguistic Relativity is "a philosophical position which claims that experience in the form of culturally mediated human interests plays a crucial and determinative role in cognitive functioning; it is to be contrasted with universalist rationalism, which contrarily emphasizes innate biological and psychological determinism" (Foley, 1998: 169). It is true that there is diversity in the semantics of spatial reference across languages. Moreover, as I said repeatedly, the diversity is not only a matter of surface differences, but has an impact on the cognitive functioning of speakers of different languages as can be seen in the early acquisition of language-specific properties of spatial information by children, i.e., the *expected* relations in Indonesian, the tight-fitting relations in Korean, and the concepts *containment*, *support* in English. Further evidence that using the spatial reference systems across languages is not a matter of using them in different ways can also be seen from the congruence of using particular frames of reference in both linguistic and non-linguistic tasks. Thus, the diverse semantic content of spatial reference across languages pointed out by other scholars and the findings of this study further support the claim of the Principle of Linguistic Relativity in the sense of the neo-Kantianism claiming that "the organizing mental categories arise from different theories, language, or cultural systems which, reflecting human interest, in turn impose order on sensible experience (Foley, 1998; 169-170). What I am attempting to highlight here is that linguistic input may play some crucial role in establishing human cognitive functioning. Therefore, it should be given more emphasis in the study of spatial language and other linguistic domains as well as Foley (1998: 228) states "experience in the form of expressive devices for spatial

information provided by the language one learns and speaks plays a critical channeling role in the way one habitually thinks about, recognizes, and remembers spatial concepts".

However, my study of topological relations is still preliminary. I need to work more on, for example, my comprehension tasks. So far, what I manipulated was the use of the verb *taruh* "put", which does not imply that somebody has to wear something in Indonesian, followed with *di* "expect", *di dalam* "expect inside", or *di datas* "expect up" to test the prominence of the *expected* relation. In the future investigation, for example, I should look at the responses of the subjects when I ask them to put a located object in expected relation contexts, e.g., *a pencil in a pencil box*, using both the expected preposition *di* and the *unexpected* preposition *di dalam* more systematically. In this fashion, I expect I can further test the distinction between *di* and *di dalam*. Specifically, based on the findings of my previous study, the subjects should put the pencil in the pencil box as in a normal relation as a response to my instruction using *di*. By using *di dalam* in the same context, I will be able to test whether the subjects put the pencil in the box or not. Additionally, other responses, e.g., the subjects may ask me back "*di* or *di dalam*?" will also be beneficial to assess the importance of the expectedness of spatial relation between objects. Recall that in my previous study I obtained a similar response, e.g., they asked me back "*di* or *di atas*?", when I asked the subjects to put the earring on top of an ear.

Furthermore, the acquisition study of topological prepositions should be replicated in Balinese and Rongga to further settle that the same pattern of the acquisition of topological prepositions can be revealed in the two languages, which belong to the same language family as Indonesian, i.e., the Austronesian family.

Additionally, in my future study I need to redesign my stimuli so I can test the expected relation in full sense as I defined in Chapter 4. In the acquisition study, I just tested the expected relation involving human-made artiacts.

Regarding the frames of reference, I should include more subjects in my future study to further confirm the principles, i.e., the 180^{o} rotation, reflection, or translation principle, used by Indonesian speakers in using the relative frame of reference, for example. Moreover, I need to do my own studies on the acquisition of frames of reference in the three languages and replicate Wassmann and Dasen's experiments.

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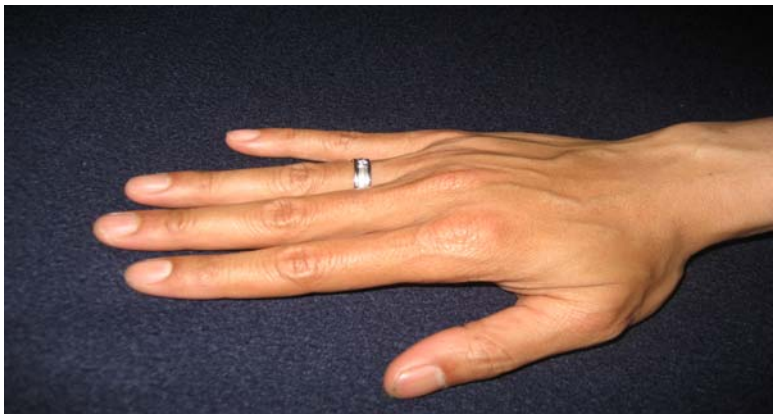
Appendix A: Aryawibawa's Topological Pictures

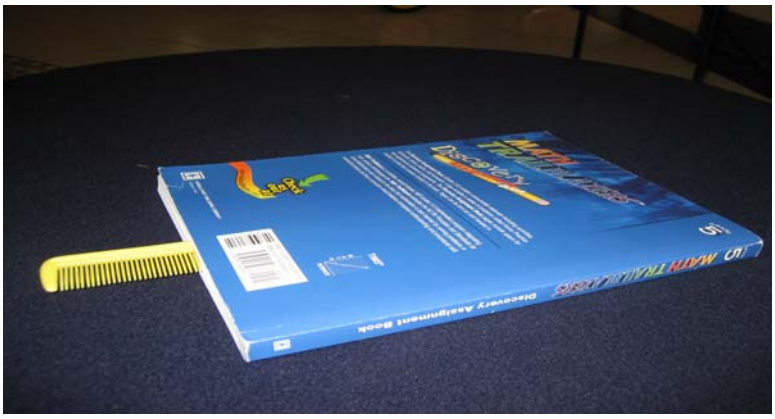
Picture 1

Picture 2

Picture 3



Picture 4



Picture 5

Picture 6

Picture 7

Picture 8

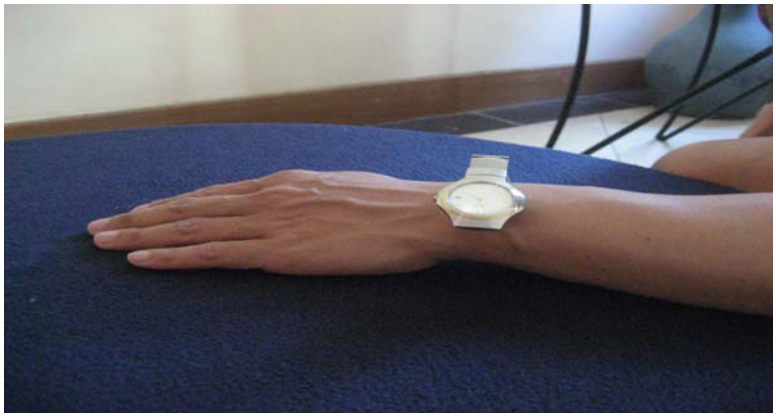
Picture 9

Picture 10

Picture 11

Picture 12

Picture 13



Picture 14

Picture 15

Picture 16

Picture 17

Picture 18