AN ASYMMETRY IN THE ACQUISITION OF TAGALOG RELATIVE CLAUSES

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Acknowledgments

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Abstract

The putative subject advantage in relative clauses (RCs) found in many languages is manifested in faster reading and reaction times, higher accuracy in production, and earlier acquisition of sentences involving RCs in which the agent has been relativized (e.g., ‘the boy that is hugging the girl,’ referred to henceforth as ARCs), compared to RCs in which the theme has been relativized (e.g., ‘the boy that the girl is hugging,’ henceforth TRCs).

This dissertation investigates whether an ARC advantage can be found in the comprehension and production of Tagalog RCs by adults and children. A relatively understudied language, Tagalog exhibits interesting properties with respect to RCs. The Tagalog focus system systematically brings to prominence one argument or another, and in declarative clauses, it has been found that theme arguments tend to be made prominent more than agent arguments. If this prominence holds within RCs, we predict a TRC advantage, contrary to the cross-linguistically observed ARC advantage. Four experiments were conducted to investigate the production of declarative clauses, the comprehension of RCs, the imitation of RCs, and the production of RCs. The findings from this dissertation point toward an ARC advantage in the comprehension, imitation, and production of Tagalog RCs. The results, combined with what has been found previously for other languages, suggest that semantic prominence is a key determinant for the relative difficulty of RCs, and that it can explain an ARC advantage manifested in different languages, including Tagalog.
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<thead>
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<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1st person</td>
</tr>
<tr>
<td>2</td>
<td>2nd person</td>
</tr>
<tr>
<td>3</td>
<td>3rd person</td>
</tr>
<tr>
<td>I</td>
<td>noun class I (Avar)</td>
</tr>
<tr>
<td>II</td>
<td>noun class II (Avar)</td>
</tr>
<tr>
<td>III</td>
<td>noun class III (Avar)</td>
</tr>
<tr>
<td>ABS</td>
<td>absolutive</td>
</tr>
<tr>
<td>ACC</td>
<td>accusative</td>
</tr>
<tr>
<td>ADV</td>
<td>adverbial marker</td>
</tr>
<tr>
<td>AF</td>
<td>agent focus</td>
</tr>
<tr>
<td>AGR</td>
<td>agreement</td>
</tr>
<tr>
<td>AP</td>
<td>antipassive</td>
</tr>
<tr>
<td>ASP</td>
<td>aspect marker</td>
</tr>
<tr>
<td>AUX</td>
<td>auxiliary</td>
</tr>
<tr>
<td>BF</td>
<td>benefactive focus</td>
</tr>
<tr>
<td>CL</td>
<td>classifier</td>
</tr>
<tr>
<td>DAT</td>
<td>dative</td>
</tr>
<tr>
<td>ERG</td>
<td>ergative</td>
</tr>
<tr>
<td>FOC</td>
<td>focus</td>
</tr>
<tr>
<td>GER</td>
<td>gerund</td>
</tr>
<tr>
<td>IF</td>
<td>instrumental focus</td>
</tr>
<tr>
<td>INTR</td>
<td>intransitive</td>
</tr>
<tr>
<td>IPFV</td>
<td>imperfective</td>
</tr>
<tr>
<td>LK</td>
<td>linker</td>
</tr>
<tr>
<td>LAT</td>
<td>lative</td>
</tr>
<tr>
<td>LF</td>
<td>locative focus</td>
</tr>
<tr>
<td>NFOC</td>
<td>non-focus</td>
</tr>
<tr>
<td>NOM</td>
<td>nominative</td>
</tr>
<tr>
<td>NPST</td>
<td>non-past</td>
</tr>
<tr>
<td>OBL</td>
<td>oblique</td>
</tr>
<tr>
<td>PASS</td>
<td>passive</td>
</tr>
<tr>
<td>PFV</td>
<td>perfective</td>
</tr>
<tr>
<td>PROG</td>
<td>progressive</td>
</tr>
<tr>
<td>PRTCP</td>
<td>participle</td>
</tr>
<tr>
<td>PSA</td>
<td>primary syntactic argument</td>
</tr>
<tr>
<td>PST</td>
<td>past</td>
</tr>
<tr>
<td>Q</td>
<td>question</td>
</tr>
<tr>
<td>RC</td>
<td>relative clause</td>
</tr>
<tr>
<td>RP</td>
<td>recent perfective</td>
</tr>
<tr>
<td>REL</td>
<td>relativizer</td>
</tr>
<tr>
<td>SG</td>
<td>singular</td>
</tr>
<tr>
<td>TF</td>
<td>theme focus</td>
</tr>
<tr>
<td>TR</td>
<td>transitive</td>
</tr>
</tbody>
</table>
Chapter 1. Introduction

Studies on the acquisition and processing of relative clauses (RCs) have received much attention especially in regard to the asymmetries found among different types of RCs. Specifically, subject RCs exhibit an apparent advantage over direct object RCs—they are faster to read, easier to produce, and acquired earlier. This dissertation investigates whether such an asymmetry is found in RCs in Tagalog, a language largely understudied in the fields of acquisition and psycholinguistics. This is the first experimental study to investigate both the comprehension and production of Tagalog RCs.

In this chapter, I first review the relevant literature on RCs. In Chapter 2, I then present the relevant morphosyntactic facts in Tagalog (§2.1), and explain how Tagalog would help answer my research questions (§2.2). The subsequent chapters report the results from a production task on declarative clauses (Chapter 3), a comprehension experiment on RCs (Chapter 4), an imitation experiment on RCs (Chapter 5), and a production experiment on RCs (Chapter 6). Chapter 7 presents an overall conclusion and discussion of the findings.

1.1 Subject-Object Asymmetry in RCs

The putative subject advantage in RCs is manifested in faster reading and reaction times, higher accuracy in production, and earlier acquisition of sentences involving the relativization of transitive subjects as (1), compared to those involving relativization of direct objects like (2). These are commonly referred to as a subject RC and a direct object RC, respectively; however, in this dissertation, I refer to the relativization of the transitive subject as agent RC (ARC) and the relativization of the direct object as theme RC (TRC).\(^1\)

\[
(1) \text{ the boy [ that } _\text{ saw the girl } ] \quad \text{Agent relative clause (ARC)}
\]
\[
(2) \text{ the boy [ that the girl saw } _\text{ ]} \quad \text{Theme relative clause (TRC)}
\]

\(^{1}\) I use these terms in order to make the so-called subject RCs and direct object RCs comparable to RC patterns in Tagalog without committing to particular theoretical view on Tagalog syntax. Currently, there is a debate over what constitutes a grammatical subject in Tagalog—a question that is far from resolved. Given that the vast majority of studies on the acquisition of RCs have tested subject RCs that involve relativization of agents, and direct object RCs that involve relativization of themes, and given that the thematic role of arguments in Tagalog is uncontroversial, I label RCs in Tagalog according to the thematic role of the relativized element.
The asymmetry in favor of subject patterns has its roots in Keenan and Comrie’s (1977) well-known typological work on the Noun Phrase Accessibility Hierarchy (NPAH), as shown in (3).

(3) Subject > Direct object > Indirect object > Oblique > Genitive > Object of comparison

According to the NPAH, if a language allows the relativization (and other extractions) of one NP type on the hierarchy, it should allow the relativization of all NPs to the left in (3). For example, if the language can relativize the direct object, the relativization of the transitive subject should be possible as well, but the opposite need not be true: if a language allows the relativization of the subject, it may or may not allow relativization of other NPs. All languages are predicted to allow subject RCs.

The NPAH was later associated with findings from work on language processing, child language acquisition, and second language acquisition, which all documented the difficulty associated with TRCs compared to ARCs. King and Just (1991) used a moving-window self-paced reading task, in which native English-speaking adult participants were asked to read a set of sentences word-by-word (Table 1).

<table>
<thead>
<tr>
<th>Participants</th>
<th>Adult native speakers of English (N = 46)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sentences</td>
<td>ARC</td>
</tr>
<tr>
<td></td>
<td><em>The reporter [that the senator attacked _] admitted the error publicly after the hearing.</em></td>
</tr>
<tr>
<td></td>
<td>TRC</td>
</tr>
<tr>
<td></td>
<td><em>The reporter [that _ attacked the senator] admitted the error publicly after the hearing.</em></td>
</tr>
<tr>
<td>Tasks</td>
<td>Non-cumulative moving-window self-paced reading task</td>
</tr>
<tr>
<td></td>
<td>Participants read a set of sentences word-by-word, recalled the final word of each sentence, and answered a comprehension question about the target sentence.</td>
</tr>
<tr>
<td>Results</td>
<td>Recall accuracy: ARCs more accurate than TRCs</td>
</tr>
<tr>
<td></td>
<td>Comprehension accuracy: ARCs more accurate than TRCs (84% vs. 62%)</td>
</tr>
<tr>
<td></td>
<td>Reading time: ARCs faster than TRCs</td>
</tr>
</tbody>
</table>
Each set of sentences was followed by a comprehension question that enquired about the last sentence in the set, which contained either an ARC or a TRC. The results showed participants had higher accuracy in response to comprehension questions about ARCs than TRCs, and they read ARCs significantly faster than TRCs. Participants also had more difficulty recalling the final word of the sentence if the sentence contained TRCs, suggesting that TRCs put more demands on working memory.

Studies that used elicited production in English have found a similar subject advantage. Zukowski (2009) tested 10 typically developing (TD) children aged 4;6–7;6 (mean age 6;0), 10 adolescents with Williams Syndrome (WS) aged 10;0–16;3 (mean age 12;5), and 12 adult controls in elicited production of RCs (Table 2).

---

2 King and Just (1991) also conducted a reading span test to measure the participants’ working memory and then divided them into a group with high working memory capacity and another group with low working memory capacity. They found that participants with low working memory capacity struggled with TRCs more than the participants with high working memory capacity. The accuracy rate in Table 1 reflects my own reanalysis of King and Just’s data, and is an average of the two groups.
Table 2. Summary of Zukowski (2009).

<table>
<thead>
<tr>
<th>Participants</th>
<th>Typically-developing child speakers of English (age 4;6–7;6, mean 6;0, N = 10)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Child and adolescent speakers of English with Williams Syndrome (age 10;0–16;3, mean 12;5, N = 10)</td>
</tr>
<tr>
<td></td>
<td>Native adult speakers of English (N = 12)</td>
</tr>
<tr>
<td>Sentences</td>
<td>Subject-gap RC (includes ARCs and intransitive subject RCs)</td>
</tr>
<tr>
<td></td>
<td>The boy that is pointing to the cow.</td>
</tr>
<tr>
<td></td>
<td>Object-gap RC (includes TRCs and oblique RCs)</td>
</tr>
<tr>
<td></td>
<td>The cow that the girl is pointing to.</td>
</tr>
<tr>
<td>Tasks</td>
<td>Elicited production task</td>
</tr>
<tr>
<td></td>
<td>Participants looked at a sequence of two pictures (pre-change picture in (a) and post-change picture in (b) and (c)) and answered questions asked by the researchers, such as &quot;Which cow turned blue?&quot; and &quot;Which cow is Max (the small mouse) looking at?&quot;</td>
</tr>
</tbody>
</table>

Results

Target rate: Higher target rate in ARCs compared to TRCs

<table>
<thead>
<tr>
<th></th>
<th>subject-gap</th>
<th>object-gap</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adults</td>
<td>95.4%</td>
<td>53.5%</td>
</tr>
<tr>
<td>TD Children</td>
<td>82.3%</td>
<td>51.0%</td>
</tr>
<tr>
<td>WS Adolescents</td>
<td>76.7%</td>
<td>10.0%</td>
</tr>
</tbody>
</table>

In this study, some items were designed to elicit subject-gap RCs, which include ARCs (e.g., the girl that is chasing the bunny) and intransitive subject RCs (e.g., the boy that is waving). Other items were designed to elicit object-gap RCs, which include TRCs (e.g., the cat that the girl is chasing) and oblique RCs (e.g., the cow that the girl is pointing to). Both adults and TD children produced more target responses for subject-gap RCs (adults 95.4%; TD children 82.3%; WS adolescents 76.7%) than object-gap RCs (adults 53.5%; TD children 51.0%; WS adolescents 10.0%). When the participants produced subject-gap RCs in place of object-gap RCs (adults
15.5%; TD children 22.9%; WS adolescents 46.9%), some were appropriate RCs such as passive RCs (adults 10.7%; children 1.0%; WS adolescents 1.0%), but others were inappropriate (adults 15.5%; TD children 22.9%; WS adolescents 46.9%). Among these, a majority involved “wrong head errors” for TD children (13.1%) and WS adolescents (35.8%), in which the head of the RCs was replaced with the wrong head, as shown in (4).

(4) a. Target: ‘The cow that the boy is pointing at.’

A subject advantage is also reported in studies on languages such as Dutch and German, in which RCs with ambiguous gaps are more likely to be interpreted as ARCs than TRCs (Frazier, 1987). In the Dutch RC in (5), for instance, the gap can be interpreted as corresponding to the subject or the direct object. Because embedded clauses in Dutch have an SOV word order, the verb position does not differentiate ARCs and TRCs. Although the subject and verb usually agree in number, this does not help to distinguish RC types when both subject and object have the same person and number. The form of the relative pronoun also does not disambiguate ARCs and TRCs. As a result, the RC in (5) can in principle be interpreted as either the ARC in (6) or the TRC in (7), in which the subject and the object are both singular.

(5) Ik schreef aan de vriend [ die mijn tante heeft bezocht ].
   I wrote to the friend who my aunt have-SG visited
   (Frazier, 1987, p. 545)

(6) Ik schreef aan de vriend [ die _ mijn tante heeft bezocht ].
   I wrote to the friend who my aunt have-SG visited
   ‘I wrote to the friend who has visited my aunt.’
   (Frazier, 1987, p. 545)

Zukowski (2009) also reported on grammatical errors and resumptive errors (which she refers to as “filled gap errors”). However, there was no separate analysis done on subject-gap RCs and object-gap RCs, and it is not clear whether there was any difference between the two types of RCs in terms of these errors.
(7) Ik schreef aan de vriend [ die mijn tante _ heeft bezocht ].
I wrote to the friend who my aunt have-SG visited
‘I wrote to the friend who my aunt has visited.’ (Frazier, 1987, p. 545)

Frazier (1987) tested native Dutch-speaking adults with ambiguous RCs and found that they were interpreted as ARCs more frequently (74%) than TRCs (26%). Schrieffers, Friederici, and Kühn (1995) reported the same results for ambiguous German RCs.

A subject advantage has also been found for languages such as French (Holmes & O’Regan, 1981), Greek (Stavrakaki, 2001), Hebrew (Friedmann & Novogrodsky, 2004), and Persian (Rahmany, Marefat, & Kidd, 2011), among others. Table 3 summarizes the studies on postnominal RCs.

Different hypotheses have been proposed to explain the subject advantage in these languages: Linear Distance Hypothesis, Structural Distance Hypothesis, Canonical Word Order Hypothesis, Frequency Hypothesis, and Semantic Prominence Hypothesis. In the following sections, I will give a brief overview of each proposal.
Table 3. Summary of studies on languages with postnominal RCs.

<table>
<thead>
<tr>
<th>Language</th>
<th>Task</th>
<th>Population</th>
<th>Results</th>
<th>Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dutch</td>
<td>ambiguity interpretation</td>
<td>adults</td>
<td>A &gt; T</td>
<td>Frazier (1987)</td>
</tr>
<tr>
<td>English</td>
<td>elicited imitation</td>
<td>children (4;3–4;9; mean 4;1)</td>
<td>A &gt; T</td>
<td>Diessel &amp; Tomasello (2005)</td>
</tr>
<tr>
<td></td>
<td>elicited production</td>
<td>children (4;6–7;6; mean 6;0)</td>
<td>A &gt; T</td>
<td>Zukowski (2009)</td>
</tr>
<tr>
<td></td>
<td>elicited production</td>
<td>adolescents with Williams Syndrome (10;0–16;3; mean 12;5)</td>
<td>A &gt; T</td>
<td>Zukowski (2009)</td>
</tr>
<tr>
<td>French</td>
<td>eye tracking</td>
<td>adults</td>
<td>A &gt; T</td>
<td>Holmes &amp; O’Regan (1981)</td>
</tr>
<tr>
<td>German</td>
<td>ambiguity interpretation</td>
<td>adults</td>
<td>A &gt; T</td>
<td>Schriefers et al. (1995)</td>
</tr>
<tr>
<td></td>
<td>elicited imitation</td>
<td>children (4;3–4;9; mean 4;5)</td>
<td>A &gt; T</td>
<td>Diessel &amp; Tomasello (2005)</td>
</tr>
<tr>
<td>Greek</td>
<td>act out</td>
<td>children (3.4–9.3; mean 5.2)a</td>
<td>A &gt; T</td>
<td>Stavrakaki (2001)</td>
</tr>
<tr>
<td></td>
<td>act out</td>
<td>SLI children (5.4–9.4; mean 7.4)</td>
<td>A &gt; T</td>
<td>Stavrakaki (2001)</td>
</tr>
<tr>
<td>Hebrew</td>
<td>sentence-picture matching</td>
<td>children (4;6–6;5; mean 5;4)b</td>
<td>A &gt; T</td>
<td>Friedmann &amp; Novogrodsky (2004)</td>
</tr>
<tr>
<td></td>
<td>sentence-picture matching</td>
<td>SLI children (7;3–11;2; mean 9;0)</td>
<td>A &gt; T</td>
<td>Friedmann &amp; Novogrodsky (2004)</td>
</tr>
<tr>
<td>Persian</td>
<td>sentence-picture matching</td>
<td>children (2;6–7;5; mean 4;10)c</td>
<td>A &gt; T</td>
<td>Rahmany et al. (2011)</td>
</tr>
</tbody>
</table>

*a,b,c The original study provided the mean age for each of the multiple groups of children. The mean age in Table 3 is the overall mean age based on my calculation.

1.1.1 Linear Distance

Wanner and Maratsos (1978) attributed the subject-object asymmetry in RCs to working memory cost. As shown in (8) and (9), the distance between the head and the corresponding gap is larger in the TRC (9) than in the ARC in (8).

```
(8) the boy [ that _ saw the girl ]       ARC
```

```
(9) the boy [ that the girl saw _ ]       TRC
```

Processing a TRC creates a greater burden on working memory than an ARC, because the filler must be retained. Gibson (1998, 2000) refined this idea by proposing in his Dependency Locality Theory that only new discourse referents, such as lexical NPs and verbs, increase the processing cost and thus cause difficulty. This revised theory also predicts greater difficulty for TRCs. In
ARCs, the only element intervening between the head and the gap is the relativizer, as shown in (10). On the other hand, TRCs have more words intervening between the head and gap, as shown in (11).

\[
(10) \quad \text{the boy [ that } \_ \text{ saw the girl ]} \quad ARC = 1 \text{ intervening word}
\]

\[
(11) \quad \text{the boy [ that the girl saw } \_] \quad TRC = 3 \text{ intervening words}
\]

I refer to these theories together as the Linear Distance Hypothesis, following O’Grady, Lee, and Choo (2003, p. 435).

1.1.2 Structural Distance

Collins (1994) and O’Grady (1997) proposed another distance-related view of the subject advantage in RCs. Drawing on the notion of structural distance, they propose that the key factor is the depth of the gap, which is determined by counting the number of XP nodes (e.g., S, VP, etc.) between the head and the gap.\(^4\) As seen in (12), the ARC has only one node between the head and the gap.

\[\text{REL NP V}\]

\(^4\) Collins (1994) counts functional projections including XP nodes as well as X’ nodes, but this difference does not change the predicted preferences for RCs.
However, the TRC in (13) has two nodes between the head and the gap; therefore, the gap is more deeply embedded within the syntactic tree.

Thus, the structural distance between the head and the gap is greater in TRCs compared to ARCs. This is referred to as the Structural Distance Hypothesis (O’Grady et al., 2003, p. 436).

1.1.3 Canonical Word Order

Diessel and Tomasello (2005) offered a different explanation. They conducted an oral imitation task with 21 English-speaking children (4;3–4;9; mean 4;1) as well as 24 German-speaking children (4;3–4;9; mean 4;5), in which the participants were asked to repeat the sentences with RCs as well as non-RC filler sentences (Table 4).
**Table 4. Summary of Diessel & Tomasello (2005).**

| Participants | Native monolingual child speakers of English (age 4;3–4;9, mean 4;7, N = 21)  
|              | Native monolingual child speakers of German (age 4;3–4;9, mean 4;5, N = 24) |
| Sentences   | intransitive subject RC  
|             | *There's the boy who played in the garden yesterday.*  
|             | ARC  
|             | *This's the man who saw Peter on the bus this morning.*  
|             | TRC  
|             | *This's the girl who the boy teased at school this morning.*  
| Tasks       | Imitation task  
|             | Participants were asked to repeat the sentences that the researcher uttered.  
| Results     | Accuracy: intransitive subject RCs > transitive ARCs > TRCs  
|             | TRCs were converted to ARCs more frequently than vice versa  

In addition to ARCs, they also looked at the relativization of the intransitive subject. They found that while TRCs were more difficult for children to imitate than either intransitive subject RCs or ARCs, transitive ARCs were also more difficult than intransitive subject RCs.

Diessel and Tomasello (2005) claimed that the filler-gap distance cannot account for why intransitive RCs and transitive ARCs differ from each other, because the distance between filler and gap in intransitive RCs and transitive ARCs is the same. They offered an alternative explanation. First, intransitive RCs are easier than other types of RCs, because they involve a single referent and are thus conceptually simpler. Second, the difficulty in TRCs arises from its non-canonical word order. As shown in the examples below, the intransitive subject RC in (14) has a similar word order (SV) to the basic intransitive sentence in (15), and the ARC in (16) has a similar word order (SVO) to the basic declarative sentence in (18). On the other hand, the TRC in (17) has a non-canonical, OSV word order.

\[
\begin{align*}
(14) & \quad \text{S} \quad \text{V} \\
& \quad \text{the boy [ that _ ran ]} \\
& \quad \text{Intransitive subject RC} \\
(15) & \quad \text{S} \quad \text{V} \\
& \quad \text{The boy ran.} \\
& \quad \text{Basic intransitive sentence}
\end{align*}
\]
The boy [ that _ saw the girl ]  

(16) S V O  

ARC

The girl [ that the boy saw _ ]  

(17) O S V  

TRC

The boy saw the girl.  

(18) S V O  

Basic transitive sentence

Children are known to start out with a preference for a canonical word order in comprehension as well as in production (Bever, 1970; Slobin & Bever, 1982)—that is, they produce sentences with the canonical word order more often, and comprehend the canonical word order better. Under this approach, the difficulty associated with TRCs is not the filler-gap distance, but its non-canonical word order. I refer to this approach as the Canonical Word Order Hypothesis, following Kim and O’Grady (2015, p. 22).

1.1.4 Frequency

Another proposal is that the difficulty of RCs depends on the frequency of RCs. Some research suggests that what is frequent in the input is typically acquired earlier and easier to comprehend and produce (see Ambridge, Kidd, Rowland, and Theakston (2015) for review).

In adults’ speech, ARCs are reported to be more frequent than TRCs in multiple corpora, including a Switchboard corpus, which contains data from telephone conversations (Roland, Dick, & Elman, 2007). While there were 9,548 ARCs per one million NPs, TRCs were almost half as many—5,616 per one million NPs.

On the other hand, child-directed speech contains more TRCs than ARCs (Diessel, 2004). However, ARCs and TRCs have different distributional patterns in terms of animacy. Fox and Thompson (1990) analyzed a corpus of American English and found that ARCs are more likely to have an animate head, and TRCs are more likely to have an inanimate head. Mak, Vonk, and Schriefers (2002) analyzed Dutch and German corpora and also found that most of the TRCs occur with an inanimate head and RC-internal animate NPs. They further conducted self-paced

---

5 Diessel and Tomasello (2005) did not control the length of the test sentences. For example, in the three examples cited in Table 4, intransitive subject RC is the shortest of all.
reading and eye-tracking experiments with Dutch adults and showed that ARCs were read significantly faster than TRCs when both the subject and the object are animate, but there was no difference between the two RC types when the subject is animate and the object is inanimate—that is, the asymmetry disappeared. Kidd, Brandt, Lieven, and Tomasello (2007) also reported, based on a corpus analysis, that 3- and 4-year-old English-speaking children produce TRCs with an inanimate head more often (75%) than TRCs with an animate head (10.5%). Kidd et al. (2007) further conducted a sentence repetition task with 57 English-speaking children (3;1–4;9) and found that there was no difference between ARCs and TRCs when the head of TRCs was inanimate, much like the adult processing results from Mak et al. (2002). Gennari, Mirković, and Macdonald (2012) and Montag and MacDonald (2009) also found that when the theme head is animate, English- and Japanese-speaking adults produced passive RCs, like (19), more often than the active TRC counterpart as in (20).

(19) The baby (that/who is) being held by the woman. Passive RC
(20) The baby (that/who) the woman is holding. TRC

(Montag & MacDonald, 2009, p. 2594)

Furthermore, Wells, Christiansen, Race, and MacDonald (2009) investigated the effect of reading experience on adults’ processing of ARCs and TRCs. Half of the participants were exposed to 80 ARCs and 80 TRCs along with fillers, and the other half were exposed to 160 items that were also complex but did not contain RCs. When the participants’ reading times between the pretest and the post-test were compared, the reading times on TRCs decreased in the group that was exposed to RCs during the experimental sessions. Although the reading times for ARCs were also shorter in the post-test, the experience session had a greater effect on the TRCs.

These studies all suggest that the difficulty associated with TRCs is influenced by the frequency of different types of RCs in the input we receive. Following Kim and O’Grady (2015, p. 23), I refer to this hypothesis as the Frequency Hypothesis.
1.1.5 Semantic Prominence

There have also been semantic accounts for this subject-object asymmetry. In the previous section, we saw that the animacy of the RC head can influence the processing difficulty of TRCs (Mak et al., 2002). Mak, Vonk, and Schriefers (2006, 2008) claimed that it is the interplay of animacy and topichood, rather than animacy itself, that influences RC processing. For example, in the following Dutch examples taken from Mak et al. (2006, p. 469), both the subject and the object of the RCs are inanimate. Because both the ARC in (21) and the TRC in (22) have inanimate heads, the animacy information itself cannot lead the readers to the correct interpretation of the RC head. The auxiliary has number marking, which disambiguates the semantic role of the head noun.

(21) ARC with an inanimate subject (head) and an inanimate object (RC-internal)
    Volgens de folder moet de gel, [die _ de lekkages verhelpt],
    According-to the brochure must the gel that the leakages remedies
    in één keer werken.
    In one time work
    ‘According to the brochure the gel [that _ remedies the leakages] should work at
    once.’
    (Mak et al., 2006, p. 469)

(22) TRC with an inanimate object (head) and an inanimate subject (RC-internal)
    Volgens de folder moeten de lekkages, [die de gel _ verhelpt],
    According-to the brochure must the leakages, that the gel remedies
    in één keer verdwenen zijn.
    In one time disappeared be
    ‘According to the brochure the leakages [that the gel remedies _ ] should disappear at
    once.
    (Mak et al., 2006, p. 469)

The animacy of the RC head does not differ, and although the previous study by Mak et al. (2002) found that a TRC with an inanimate head is read as fast as an ARC, a self-paced reading task in Mak et al. (2006) found that the ARC in (21) is read faster than the TRC in (22).

In order to explain these results, Mak et al. (2008) proposed the Topichood Hypothesis, which states that the most topicworthy entity is chosen as the syntactic subject. The same idea is put forward by Aissen (1999) and Lambrecht (1994, p. 134) in that the subject of a clause is the
default topic. In the case of RCs, the head of an RC is more “topicworthy” than the RC-internal NP, because RCs are always about their head (Kuno, 1976; Van Valin, 1996). An RC is therefore the easiest to process when the topic—the head—of the RC is also the syntactic subject of the sentence. In the case of (22), the participant first interpreted the head as the subject, but this needed to be re-analyzed as the object later when they encountered the auxiliary, which is why the TRC reading times were longer than ARC reading times.

However, animacy remains one of the factors that contribute to topic-worthiness (cf. Van Valin & Wilkins 1996). In the following examples taken from Mak et al. (2006, p. 473), RCs in (23) have an animate subject and an inanimate object, whereas RCs in (24) have an inanimate subject and an animate object.

(23)  
(a) ARC with an animate subject (head) and an inanimate object (RC-internal)  
In het dorp zijn de wandelaars, [die _ de rots weggerold hebben], het gesprek van de dag.

‘In the town the hikers [that _ have rolled away the rock] are the talk of the day.’
(Mak et al., 2006, p. 473)

(b) TRC with an inanimate object (head) and an animate subject (RC-internal)  
In het dorp is de rots, [die de wandelaars _ weggerold hebben], het gesprek van de dag.

‘In the town the rock [that the hikers have rolled away _] is the talk of the day.’
(Mak et al., 2006, p. 473)

(24)  
(a) ARC with an inanimate subject (head) and an animate object (RC-internal)  
In het dorp is de rots, [die _ de wandelaars verpletterd heeft], het gesprek van de dag.

‘In the town the rock [that _ has crushed the hikers] is the talk of the day.’
(Mak et al., 2006, p. 473)
b. TRC with an animate object (head) and an inanimate subject (RC-internal)

In het dorp zijn de wandelaars, [die de rots _ verpletterd heef], het gesprek van de dag.

Has the talk of the day

‘In the town the hikers [that the rock has crushed _ ] are the talk of the day.’

(Mak et al., 2006, p. 473)

In this study, the self-paced reading and eye-tracking experiments found no difference between the ARC in (23a) and the TRC in (23b), but found that the ARC in (24a) was read significantly faster than the TRC in (24b). In the ARC (23a), both animacy and topicality are in agreement that the head de wandelaars ‘the hikers’ should be interpreted as the subject. In the TRC (23b), the animacy and topicality contradict with each other, as the head de rots ‘the rock’ is inanimate; therefore, the readers do not assign the subject and object functions until they encounter the verb or the auxiliary. In the ARC (24a), much like the TRC (23b), the interpretation of the head de rots ‘the rock’ is postponed because animacy and topicality contradict each other. However, in (24b), both animacy and topicality misguide the readers to interpret the RC head de wandelaars ‘the hikers’ as the subject. When the readers get to the verb, they have to reanalyze their interpretation, which is reflected in the longer reading times.

A parallel proposal is put forward by O’Grady (2011). Building on Schachter’s (1977) idea of foregrounding, Kuno’s (1976) idea of topicality (see also Givón, 1983, 1984), and MacWhinney’s idea of ‘perspective’ (MacWhinney & Pléh, 1988; MacWhinney, 1977, 2005), he formulated the notion of “prominence” summarized in (25).

(25) The prominence factor
The ease with which the processor establishes an aboutness relationship with a nominal is proportional to the prominence of that nominal’s referent within the relative clause. (A referent functioning as subject within the relative clause is most prominent, a referent functioning as direct object is next most prominent, and so on.)

(O’Grady, 2011)
That is, when the head noun of a RC refers to a more prominent entity, the RC is easier to process. Following Kim (2013), I will refer to this approach as the Semantic Prominence Hypothesis.⁶

Semantic prominence can be influenced by multiple factors, including the previous mentioned subjecthood, topicality, and animacy. Another way of thinking about semantic prominence is in terms of thematic roles (Kim & O’Grady, 2015). Some research suggests that some thematic roles are more prominent than the others. In particular, agents are considered to be more prominent than themes (Aissen, 1999; Dik & Hengeveld, 1997; Fillmore, 1967). Therefore, it is possible that ARCs are easier to comprehend and to produce than TRCs because an ARC is about the agent, the more prominent entity, and a TRC is about the theme, the less prominent entity.

1.1.6 Headedness

These five different hypotheses based on linear distance, structural distance, canonical word order, frequency, and semantic prominence all make the same prediction for postnominal RCs as in English—an ARC is less difficult than a TRC. However, this is not the case for languages with prenominal RCs. RCs in languages such as Japanese, Korean, and Mandarin Chinese are all prenominal, and thus each hypothesis makes a different prediction. Among these, Mandarin Chinese has SVO word order, and Japanese and Korean have SOV word order. Consider the Chinese examples in (26) and (27), taken from Hsu, Hermon, and Zukowski (2009, p. 329).

| (26) | [ _ kànjìàn xiáogǒu dè ] nà-ge nánhái⁷ ARC = 3 words |
| ‘the boy [that _ saw the dog]’ |

⁶ Kim and O’Grady (2015) addressed all five hypotheses by testing children’s production of subject RCs vs. indirect object RCs as well as direct object RCs vs. oblique RCs in English and Korean. The Semantic Prominence Hypothesis best explains their findings.

⁷ All the tone marks in the Mandarin Chinese examples hereafter were added by me based on the Standard Chinese pronunciation.
The linear distance between the head and the gap is longer in the ARC (26), compared to the TRC in (27). This means that the Linear Distance Hypothesis predicts TRCs to be easier than ARCs.\(^8\)

The Linear Distance Hypothesis also predicts a TRC advantage for SOV languages like Japanese and Korean. Consider the Japanese examples in (28) and (29).

\[
\begin{array}{c}
\text{dog-ACC} \quad \text{see-PST} \\
\text{child} \quad \text{dog-ACC} \quad \text{see-PST} \quad \text{child}
\end{array}
\]

\[
\begin{array}{c}
\text{dog-ACC} \quad \text{see-PST} \\
\text{child} \quad \text{dog-ACC} \quad \text{see-PST} \quad \text{child}
\end{array}
\]

The Structural Distance Hypothesis, on the other hand, predicts an ARC advantage for these languages much like the languages with postnominal RCs. As seen in (31) and (33), there are more syntactic nodes intervening between the gap and the head in the TRC than ARC in (30) and (32), predicting that, much like English, TRCs should be more difficult in these languages.

\[
\begin{array}{c}
\text{see} \quad \text{dog} \quad \text{REL} \quad \text{that-CL} \quad \text{boy}
\end{array}
\]

\[
\begin{array}{c}
\text{see} \quad \text{dog} \quad \text{REL} \quad \text{that-CL} \quad \text{boy}
\end{array}
\]

\(^8\) There is another view on the linear distance that says Japanese and Korean should have no difference between ARCs and TRCs (Gibson & Wu, 2013). This is because in both types of relative clauses, the information of NPs is integrated at the verb, and the verb is right next to the head noun. However, this view still predicts TRCs to be more difficult in Mandarin Chinese.
The Canonical Word Order Hypothesis makes the same prediction as the Linear Distance Hypothesis for Mandarin Chinese, favoring TRC over ARC, as the word order of the ARC in (34) is non-canonical VOS, while the TRC in (35) follows canonical SVO word order.

This hypothesis, however, offers no clear prediction for Japanese and Korean, SOV languages with prenominal RCs. As demonstrated in the Japanese examples below, neither an ARC (36) nor TRC (37) follow the canonical word order.
The Frequency Hypothesis makes different predictions for Mandarin Chinese and Japanese. In Mandarin Chinese, corpus studies show that ARCs are more frequent than TRCs (e.g. Hsiao & Gibson, 2003). However, in Japanese, different types of RCs appear in caretaker speech at similar frequency (Ozeki & Shirai, 2007). Therefore, while the Frequency Hypothesis predicts an ARC advantage in Mandarin Chinese, it would expect no difference between ARCs and TRCs in Japanese.

The Semantic Prominence Hypothesis predicts an ARC advantage in these languages, as the head of an ARC is an agent, a more prominent thematic role, as shown in (38), than a theme, which is the head of a TRC (39).

```
(38) [ _ kànjiān xiáogōu dè ] nà-ge nánhái ARC
     see dog REL that-CL boy
     ‘the boy [that _ saw the dog]’
     (Hsu et al., 2009, p. 329)

(39) [ nánhái kànjiān _ dè ] nà-zhī xiáogōu TRC
     boy see REL that-CL dog
     ‘the dog [that the boy saw _]’
     (Hsu et al., 2009, p. 329)
```

Multiple studies have reported that the ARC advantage is found in languages with prenominal RCs. Hsu, Hermon, and Zukowski (2009) conducted an elicited production task with 23 children (mean age 4;8) as well as 10 adults, all monolingual native speakers of Mandarin Chinese (Table 5).
Table 5. Summary of Hsu et al. (2009).

| Participants | Native monolingual child speakers of Mandarin Chinese (age 4;3–4;9, mean 4;7, N = 21)  
Native monolingual adults (N = 10) |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Sentences</td>
<td>subject-gap RC</td>
</tr>
</tbody>
</table>
    \[ (_{xǐhuan} \text{xiógòu} \text{de} \text{núhái}) \]  
    ‘the girl [that _ likes the dog]’  
    object-gap RC | 
    \[ (\text{núhái} _{xǐhuan} \text{de} \text{xiáogòu}) \]  
    ‘the dog [that the girl likes _]’  
| Tasks        | Elicited production task | Participants saw a sequence of two pictures and answered the questions asked by the researchers, such as “Which girl turned blue?” and “Which girl is the mouse watching?” |

<table>
<thead>
<tr>
<th>Tasks</th>
<th>Target rate:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Higher target rate in subject-gap RCs compared to object-gap RCs</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Object-gap RCs were converted to subject-gap RCs more frequently than vice versa</td>
<td></td>
</tr>
</tbody>
</table>

| Response | Target gap condition and participant group |  
|----------|-----------------------------------------|---|
|          | Adults | Children |  
|          | subject-gap RC | object-gap RC | subject-gap RC | object-gap RC |  
| Subject-gap RC | 95% | 13.75% | 86.8% | 6.1% |  
| Object-gap RC | 0% | 82.5% | 1.8% | 38.7% |  
| Ungrammatical RC | 0% | 3.75% | 2.4% | 19.6% |  
| Others | 0% | 0% | 6% | 29.5% |  

Like Zukowski (2009), they tested subject-gap RCs, which include ARCs and intransitive subject RCs, as well as object-gap RCs, which include TRCs and oblique RCs. Both children and adults
produced more target responses in the subject-gap RC condition (adults 95%; children 86.8%) than in the object-gap RC condition (adults 82.5%; children 38.7%). Participants were more likely to recast object-gap RCs as subject-gap RCs (adults 13.75%; children 6.1%) than vice versa (adults 0%; children 1.8%). Almost all of the subject-gap RCs produced by adults in place of object-gap RCs were well-formed passive RCs; however, this was not the case for children. Most of these responses from children were “wrong head errors.” Moreover, children were more likely to produce ungrammatical RCs in response to items designed to elicit object-gap RCs (19.6%) than subject-gap RCs (2.4%), and were more likely to avoid producing RCs in the object-gap RC (29.5%) condition than the subject-gap RC condition (6%).

Similar results were reported for adult processing of Mandarin Chinese (Vasishth, Chen, Li, & Guo, 2013), children’s comprehension and production of Japanese (Kawashima, 1980), adult processing of Japanese (Ishizuka, 2005; Miyamoto & Nakamura, 2003), children’s spontaneous production of Korean (Kim, 1987), children’s comprehension and elicited production of Korean (Cho, 1999), processing of Korean by adults (Kwon, Kluender, Kutas, & Polinsky, 2013), and spontaneous production of Turkish (Slobin, 1986). However, other studies report the lack of such an asymmetry in Japanese children’s naturalistic data (Ozeki & Shirai, 2007), and some studies even reported a TRC advantage in Cantonese naturalistic data by Cantonese-English bilingual children (Yip & Matthews, 2007), Cantonese-speaking children’s comprehension (Chan et al. 2011), Japanese-speaking children’s comprehension (Hakuta, 1981) and Mandarin Chinese-speaking adults’ processing data (Gibson & Wu, 2013; Hsiao & Gibson, 2003). Table 6 summarizes the results from Hsiao & Gibson (2003), which show a TRC advantage.

<table>
<thead>
<tr>
<th>Participants</th>
<th>40 adult native speakers of Mandarin Chinese (spoken in Taiwan)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sentences</td>
<td>Doubly-embedded ARC</td>
</tr>
<tr>
<td></td>
<td>[ _  yāoqǐng [ _  gōu̍i̍-je̍ [ fāguān  de]  fū-hāo  de]  guān-yū-ān</td>
</tr>
<tr>
<td></td>
<td>invite  conspire  judge  REL  tycoon  REL  official</td>
</tr>
<tr>
<td></td>
<td>xīn-huáibū-gūi</td>
</tr>
<tr>
<td></td>
<td>have bad intentions</td>
</tr>
<tr>
<td></td>
<td>‘The official [who _ invited the tycoon [who _ conspired with the judge]] has bad intentions.’</td>
</tr>
<tr>
<td></td>
<td>Doubly-embedded TRC</td>
</tr>
<tr>
<td></td>
<td>[  fū-hāo  yāoqǐng  _ de]  fā-guān  gōu̍i̍-je̍ [ _ de]  guān-yū-ān</td>
</tr>
<tr>
<td></td>
<td>tycoon  invite  REL  judge  conspire  REL  official</td>
</tr>
<tr>
<td></td>
<td>xīn-huáibū-gūi</td>
</tr>
<tr>
<td></td>
<td>have bad intentions</td>
</tr>
<tr>
<td></td>
<td>‘The official [who the judge [who the tycoon invited _] conspired with _] has bad intentions.’</td>
</tr>
<tr>
<td>Tasks</td>
<td>Self-paced reading task</td>
</tr>
<tr>
<td>Results</td>
<td>TRCs read faster than ARCs</td>
</tr>
</tbody>
</table>

These conflicting results may be due to the temporary ambiguity associated with comprehension tasks in these languages. Because the head comes after the RC, the comprehenders do not realize they are reading an RC until they get to the disambiguating region, at which point reanalysis is required. Furthermore, these languages allow null arguments, as illustrated in the example of a Mandarin Chinese ARC in (40). As a result, a listener or reader may initially postulate a null subject as in (41), and not realize that a RC is in play until encountering the relativizer de.

(40) Lǎo-shī  rèn-shī  [ _ yāoqǐng  nán-hái  de]  nū-hái.
Teacher  know  invite  boy  REL  girl
‘The teacher knows [who _ invites the boy].’  (ARC as the matrix object)
(Jäger, Chen, Li, Lin, & Vasishth, 2015, p. 100)

(41) Lǎo-shī  rèn-shī  [ pro  yāoqǐng  nán-hái ...  
teacher  know  invite  boy
‘The teacher knows pro invites the boy…’
(Jäger et al., 2015, p. 100)
The situation is no better in the case of TRCs. In (42), where a TRC is the matrix object, the listener or reader may experience a garden path effect, because the NP nánhái ‘boy’ may initially be interpreted as the direct object of the matrix verb renshi ‘know,’ as shown in (43). Upon encountering either the embedded verb yāoqíng ‘invite’ or the relativizer de, the sentence needs to be reanalyzed, which leads to increased processing difficulty.

(42) Lǎoshī rènshi [ nánhái yāoqíng _ de ] nǚhái.
Teacher know boy invite REL girl
‘The teacher knows the girl [who the boy invites _ ].’ (TRC as the matrix object) (Jäger et al., 2015, p. 100)

(43) Lǎoshī rènshi nánhái…
teacher know boy …
‘The teacher knows the boy…’

(Jäger et al., 2015, p. 100)

In either case, there needs to be a significant reanalysis at the head noun, which may be why there have not been straightforward results from these languages, especially in comprehension.

There are two ways to address this issue. Jäger et al. (2015) used types of RCs that are less likely to have such local ambiguity. For example, the RCs in (44) and (45) are introduced with the sequence of a determiner and a nominal classifier nà-ge ‘that-CL’, which helps the readers predict that a noun is coming up.

(44) … nà-ge [ _ shànggēyuè yāoqíng-le nánhái jǐ-cí de ] nǚhái …
det-CL last.month invite-ASP boy several-CL REL girl
‘…the girl [who _ invited the boy] several times last month…’ (ARC)

(45) … nà-ge [ shànggēyuè nánhái yāoqíng-le _ jǐ-cí de ] nǚhái …
det-CL last.month boy invite-ASP several-CL REL girl
‘…the girl [who the boy invited _ ] several times last month…’ (TRC)

With the possibility of local ambiguity eliminated, an ARC advantage emerged in the results of a self-paced reading task and an eye-tracking task, suggesting that the previously reported cases of a TRC advantage is due to the temporary ambiguity in comprehending RCs.
Another solution is to look at production instead of comprehension. Interestingly, studies that used an elicited production task report a subject advantage in Mandarin Chinese (Hsu et al., 2009) as well as Korean (Cho, 1999). To my knowledge, none has been done on Japanese. See the summary of previous studies on languages with prenominal RCs in Table 7.

Table 7. Summary of studies on languages with prenominal RCs.

<table>
<thead>
<tr>
<th>Language</th>
<th>Task</th>
<th>Population</th>
<th>Results</th>
<th>Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cantonese</td>
<td>act out</td>
<td>children (4;0–6;1)</td>
<td>A &gt; T</td>
<td>Lau (2006)</td>
</tr>
<tr>
<td></td>
<td>elicited imitation</td>
<td>children (4;0–6;1)</td>
<td>A &gt; T</td>
<td>Lau (2006)</td>
</tr>
<tr>
<td></td>
<td>elicited imitation</td>
<td>children (4;3–4;9)</td>
<td>A = T</td>
<td>Chan et al. (2007)</td>
</tr>
<tr>
<td></td>
<td>natural speech</td>
<td>Cantonese-dominant bilinguals (1;3–4;6)</td>
<td>A &gt; T</td>
<td>Yip &amp; Matthews (2007)</td>
</tr>
<tr>
<td></td>
<td>referent selection</td>
<td>children (4;3–4;9)</td>
<td>T &gt; A</td>
<td>Chan et al. (2011)</td>
</tr>
<tr>
<td>Japanese</td>
<td>act out</td>
<td>children (5;0–9;0)</td>
<td>A &gt; T</td>
<td>Kawashima (1980)</td>
</tr>
<tr>
<td></td>
<td>imitation</td>
<td>children (5;0–9;0)</td>
<td>A &gt; T</td>
<td>Kawashima (1980)</td>
</tr>
<tr>
<td></td>
<td>act out</td>
<td>children (5;3–6;2)</td>
<td>T &gt; A</td>
<td>Hakuta (1981)</td>
</tr>
<tr>
<td></td>
<td>natural speech</td>
<td>children (0;0–3;11)</td>
<td>A = T</td>
<td>Ozeki &amp; Shirai (2007)</td>
</tr>
<tr>
<td>Korean</td>
<td>natural speech</td>
<td>children (1;6–3;5)</td>
<td>A &gt; T</td>
<td>Kim (1987)</td>
</tr>
<tr>
<td></td>
<td>natural speech</td>
<td>children (1;4–3;9)</td>
<td>A &gt; T</td>
<td>Lee (1991)</td>
</tr>
<tr>
<td></td>
<td>sentence-picture matching</td>
<td>children (3–6; mean 6;0)</td>
<td>A &gt; T</td>
<td>Cho (1999)</td>
</tr>
<tr>
<td></td>
<td>elicited production</td>
<td>children (4–7; mean 6;0)</td>
<td>A &gt; T</td>
<td>Cho (1999)</td>
</tr>
<tr>
<td></td>
<td>self-paced reading</td>
<td>adults</td>
<td>A &gt; T</td>
<td>Kwon et al. (2013)</td>
</tr>
<tr>
<td></td>
<td>elicited production</td>
<td>children (5;0–6;5)</td>
<td>A = T</td>
<td>Su (2004)</td>
</tr>
<tr>
<td></td>
<td>elicited production</td>
<td>children (mean 4;8)</td>
<td>A &gt; T</td>
<td>Hsu et al. (2009)</td>
</tr>
<tr>
<td></td>
<td>referent selection</td>
<td>children</td>
<td>A &gt; T</td>
<td>Chan et al. (2011)</td>
</tr>
<tr>
<td></td>
<td>self-paced reading</td>
<td>adults</td>
<td>A &gt; T</td>
<td>Vasilshth et al. (2013)</td>
</tr>
<tr>
<td></td>
<td>eye tracking</td>
<td>adults</td>
<td>A &gt; T</td>
<td>Jäger et al. (2015)</td>
</tr>
<tr>
<td>Turkish</td>
<td>natural speech</td>
<td>children</td>
<td>A &gt; T</td>
<td>Slobin (1986)</td>
</tr>
</tbody>
</table>

A particularly interesting study involved Chamorro, a VSO language that allows both postnominal and prenominal RCs (Borja, Chung, & Wagers, 2016), as illustrated below.
A key feature of these patterns is that they are all potentially ambiguous: each clause can in principle be interpreted as either an ARC or a TRC because the position of the gap cannot be unequivocally determined. The properties of Chamorro allowed Borja et al. (2016) to investigate whether the interpretation of the RCs are influenced by RC ordering (Table 8). They conducted a sentence-picture matching task, in which participants were presented with a panel of two pictures that depict reversed events and were asked to select the picture (but not the character)\(^9\) that matched the auditory description. They tested 135 adult speakers of Chamorro and found that 94% of the ambiguous postnominal RCs were interpreted as ARCs, with minimal variation among speakers. On the other hand, only 43% of ambiguous prenominal RCs were interpreted as

\(^9\) A sentence-picture matching task helps us determine whether the participants understand what they hear; however, it does not determine whether the participants understand what they hear as the relative clause. This is why I employed a referent-selection task in my study, and in fact, children make a lot of mistakes identifying the referent even when they identify the correct picture, as will be shown in Chapter 4.
ARCs, and the interpretation showed large variation among speaker groups—more specifically, depending on which island the participants were from. One of the speaker groups even preferred the TRC interpretation for prenominal RCs.

Table 8. Summary of Borja et al. (2016).

<table>
<thead>
<tr>
<th>Participants</th>
<th>Native adult speakers of Chamorro (N = 135)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sentences</td>
<td>Ambiguous RCs—postnominal/prenominal</td>
</tr>
<tr>
<td></td>
<td>Postnominal example:</td>
</tr>
<tr>
<td></td>
<td>atyu na biha [i ha papaini i palao’an]</td>
</tr>
<tr>
<td></td>
<td>that L old.lady C AGR comb.PROG the woman</td>
</tr>
<tr>
<td></td>
<td>‘that old woman [who_ is combing the woman] / [who the woman is combing _]’</td>
</tr>
<tr>
<td>Tasks</td>
<td>Sentence-picture matching task</td>
</tr>
<tr>
<td></td>
<td>Participants were asked to select the picture that matches the given auditory description.</td>
</tr>
<tr>
<td>Results</td>
<td>ARC interpretation</td>
</tr>
<tr>
<td></td>
<td>Postnominal  94%</td>
</tr>
<tr>
<td></td>
<td>Prenominal  43%</td>
</tr>
<tr>
<td></td>
<td>Saipan      53%</td>
</tr>
<tr>
<td></td>
<td>Tinian      35%</td>
</tr>
<tr>
<td></td>
<td>Rota        66%</td>
</tr>
</tbody>
</table>

Postnominal RCs: minimal variation: ARC > TRC
Prenominal RCs: large variation: reduced ARC preference or TRC preference
With the exception of Chamorro, the languages that have been mentioned so far have a nominative-accusative alignment. In these languages, intransitive subject (S) and transitive subject (A) are treated the same—as nominatives—and direct object (O) is treated differently—as accusative. See the Japanese examples in (50–51), in which the S in (50) and the A in (51) take the nominative case marker –*ga*, and the O in (51) takes the accusative case marker –*o*.

(50) Kodomo-ga hasit-ta.
    child-NOM run-PST

‘The child ran.’

(51) Kodomo-ga ringo-o tabe-ta.
    child-NOM apple-ACC eat-PST

‘The child ate an apple.’

However, there are ergative-absolutive languages that treat S and O alike, differentiating them in the same way from A. Ergativity can be manifested in different ways, but among different kinds of ergative languages, only a handful have been studied with attention to the acquisition and processing of their RCs. These languages can be classified into either of the following two types: morphologically ergative languages and syntactically ergative languages. Both types give us further insight into the nature of the subject advantage in a way nominative-accusative languages cannot.

1.1.7.1 Morphologically ergative languages

Studies on morphologically ergative languages have demonstrated the role of morphology in the acquisition and processing of RCs. Basque, a morphologically ergative language with SOV word order, group S and O as the unmarked category—absolutive—and treat A as a marked category. See the Basque example in (52).

(52) Zu-k am-a-ri liburu-a-Ø eman d-i-o-zu.
    you-ERG mother-the-DAT book-the-ABS give 3ABS-AUX-3DAT-2ERG

‘You have given mother the book.’

(Gutierrez-Mangado, 2011, p. 179)
Carreiras, Duñabeitia, Vergara, de la Cruz-Pavía, and Laka (2010) conducted a self-paced reading task and also investigated event-related potentials (ERPs) with adult speakers of Basque. They found that ARCs cause more difficulty than TRCs in this language. As you can see below, Basque RCs are prenominal like Mandarin Chinese and Japanese.

\((53)\) ARC
\[
\text{Hau da [ } _{\text{amona-Ø}} \text{ muxukatzen duen } ] \text{ nesa-Ø}.
\]
\(\text{this is grandmother-ABS kiss-IPFV AUX-REL girl-ABS}
\)
\(\text{‘This is the girl [who } _{\text{is kissing the grandmother}.}]
\)
\(\text{(Gutierrez-Mangado, 2011, p. 180)}\)

\((54)\) TRC
\[
\text{Hau da [ amona-k } _{\text{muxukatzen duen } ] \text{ nesa-Ø}.
\]
\(\text{this is grandmother-ERG kiss-IPFV AUX-REL girl-ABS}
\)
\(\text{‘This is the girl [who the grandmother is kissing } _{\text{.}]}
\)
\(\text{(Gutierrez-Mangado, 2011, p. 180)}\)

According to Carreiras et al. (2010), ARCs are more difficult than TRCs in Basque because of the added complexity in case marking—ergative A has a marking but absolutive O is zero-marked. Gutierrez-Mangado (2011) also found that Basque-speaking 4-year-olds (mean age 4;2, \(N = 14\)) and 6-year-olds (mean age 6;1, \(N = 14\)) comprehended TRCs better (4-year-olds 58%; 6-year-olds 79.3%) than ARCs (4-year-olds 75.7%; 6-year-olds 87.85%) in a picture-sentence matching task.

Polinsky, Gallo, Graff, and Kravtchenko (2012) conducted a self-paced reading task with Avar, another morphologically ergative language with SOV word order and prenominal RCs, to test the role of the morphological cues. In Avar, much like Basque, absolutive NPs are zero-marked, while the ergative subject is overtly marked, as shown below.

\((55)\)
\[
\text{was-:as: } \text{šiša-Ø } \text{ b-ek-ana.}
\]
\(\text{boy-ERG bottle-ABS III-break-PST}
\)\(\text{‘The boy broke a/the bottle.’} \)
\(\text{(Polinsky et al., 2012, p. 269)}\)
The suffix-marked ergative subject in (55) signals that there is an absolutive NP in the clause. Furthermore, the verb agrees in noun class with the absolutive NP: the prefix b- in the verb agrees in noun class (glossed as III) with the absolutive NP šiša ‘bottle.’ Therefore, the verb morphology also serves as a cue for the existence and identity of an absolutive NP. However, in terms of grammatical functions, it is the ergative subject that behaves as the pivot in binding, control structures, etc. Conveniently, it is possible to relativize both the ergative NP (transitive subject) and absolutive NP (either intransitive subject or direct object) with a gap, as shown in (57–59).

(56) was-Ø ruq’:O-w-e ‘-an ila
boy-ABS home-I-LAT go-PST
‘The boy went home.’

(57) Ergative subject gap (ARC)
[ _ ʕoloqana-y yas-Ø repetici-yal-de y-ač:-un y-ač’-ara-y ]
unmarried-II girl-ABS rehearsal-OBL-LOC II-bring-GER II-come-PRTCP-II
artistka-Ø bercina-y y-igo
actress-ABS beautiful-II II-AUX
‘The actress [that _ brought the young girl to the rehearsal] is pretty.’

(58) Absolutive object gap (TRC)
[ xalq’iya-y artistka-yal _ repetici-yal-de y-ač:-un
people’s-II actress-ERG rehearsal-OBL-LOC II-bring-GER
y-ač’-ara-y ] yasi-Ø bercina-y y-igo
II-come-PRTCP-II girl-ABS beautiful-II II-AUX
‘The girl [that the distinguished actress brought _ to the rehearsal] is pretty.’

(Polinsky et al., 2012, p. 270)
If there is a universal subject advantage, the RCs in (57) and (59) should be easier than the RC in (58). However, if the morphology serves as a useful cue for identifying the gap, then the pattern in (58) is predicted to be the easiest; in (58) the ergative subject appears early in the sentence, which signals the existence of an absolutive NP later in the sentence, and if this absolutive NP is missing, it means that there is a gap. The expectation of an absolutive NP may facilitate the processing of the RC. The results from Polinsky et al.’s (2012) moving-window self-paced reading task showed no significant difference between the pattern in (57) and the pattern in (58). The researchers interpret these results in an intriguing way: they suggest that Avar in fact has a subject (i.e. A-argument) advantage, which is obscured by the morphological advantage for absolutive (i.e. O-argument), suppressing the subject-object asymmetry.

Under this approach, it is possible to say that a subject advantage was in fact present for Basque as well, but that it was overridden by the morphological cues that help identify a direct object gap. Interestingly, another Basque study (Gutierrez-Mangado & Ezeizabarrena, 2012) that compared children’s comprehension and production found a TRC advantage in the comprehension task and an ARC advantage in the production task. In this study, 4-year-olds (mean age 4.1; n = 13) and 6-year-olds (mean age 6.2; n = 9) comprehended TRCs with more accuracy than ARCs in a sentence-picture matching task, supporting the results of Gutierrez-Mangado (2011); however, the elicited production results from these participants as well as a different group of participants (mean age 5.6; n = 20) showed that children were better at producing ARCs (4-year-olds 82.6%; 5-year-olds 87.05%; 6-year-olds 92.5%) compared to TRCs (4-year-olds 56%; 5-year-olds 54.3%; 6-year-olds 74.4%). Moreover, a processing study of postnominal RCs in Ch’ol, a Mayan language, found advantages in ARCs in terms of accuracy rates as well as response times (Clemens et al., 2015). It was also reported that when
RCs are ambiguous, participants are more likely to interpret them as ARCs. The lack of a subject advantage in Basque and Avar might be due to their prenominal RCs. In Ch’ol, the matrix predicate and the head of the RC appear early in the sentence and facilitates parsing. On the other hand, the head of the RC appears later in both Basque and Avar, and the predicate also does not appear until later in the sentence in Avar. Because of the lack of information from the RC head (and in Avar, the predicate), the comprehender relies more on the information from morphology, which may compete with the subject advantage more strongly in these languages compared to Ch’ol. Research on morphologically ergative languages has uncovered that morphology can be a strong factor in understanding the acquisition and processing of RCs.

1.1.7.2 Syntactically ergative languages
In syntactically ergative languages, unlike morphologically ergative languages, relativization is restricted to absolutive arguments.\textsuperscript{10} Essentially, these languages can only relativize absolutes (S and O), but ergatives (A) cannot be relativized (unless a special construction is used). See the following examples in Q’anjob’al Mayan, a syntactically ergative language with a VSO word order. As seen in (61), the absolutive O can be relativized directly, while the relativization of the ergative A is ungrammatical, as in (62). In order to relativize the A-argument, it is necessary to use a special construction, usually referred to as “Agent Focus” (AF) (Clemens et al., 2015). Although AF makes the verb intransitive, this is treated differently from a true antipassive. In AF, the absolutive O is retained, but while in antipassive, the relativized S is marked absolutive, and the O becomes oblique.

\begin{verbatim}
(60) Transitive clause
Max-Ø y-uk’ ix ix kapey.
PFV-3.ABS 3.ERG-drink DET woman coffee
‘The woman drank coffee.’
\end{verbatim}

\textsuperscript{10} This parallels Tagalog’s constraints on relativization in §2.4. However, Keenan & Comrie (1977) interpreted Tagalog as a case in which only the subject is relativizable, following the NPAH.
In a production task in Q’anjob’al Mayan, Gagliardi, Mateo Pedro, and Polinsky (2013) found no significant difference between ARCs and TRCs in children (age 2;8–6;2) and adults. The lack of a clear difference between the patterns is explained as the result of competition between the grammatical system that disprefer the A-argument extraction\(^\text{11}\) and the processing preference for the A-argument extraction. On the contrary, Clemens et al. (2015) tested adult speakers of Q’anjob’al Mayan using a sentence-picture matching task, and found an ARC advantage over TRCs.

Heaton, O’Grady, and Deen (2016) also found an ARC advantage in elicited production from adult speakers of Kaqchikel, another syntactically ergative Mayan language. The results were used as evidence to claim that this language does not exhibit syntactic ergativity in RCs. However, in the production of \(wh\)-questions, Kaqchikel showed a strong evidence of syntactic ergativity.

Although it is hard to draw conclusions about ergative-absolutive languages, especially because there are only a handful of studies, the research seems to show that there is a subject advantage for ergative-absolutive languages as well. However, this may be weakened or overridden by the position of RCs with respect to the head noun (postnominal or prenominal),

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\(^\text{11}\) Fox (1987) revised Keenan and Comrie’s (1977) hierarchy to claim that it is not the subjects (S and A) that are the most relativizable, but rather the absolutes (S and O).
morphological complexity (a potential advantage for absolutes in morphologically ergative languages) and grammatical factors (disfavoring extraction of ergatives in syntactically ergative languages). Table 9 summarizes previous studies on ergative-absolutive languages with prenominal or post-nominal RCs.

### Table 9. Summary of previous studies on ergative-absolutive languages.

<table>
<thead>
<tr>
<th>Language</th>
<th>Ergativity</th>
<th>Headedness</th>
<th>Task</th>
<th>Population</th>
<th>Results</th>
<th>Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avar</td>
<td>morphological</td>
<td>prenominal</td>
<td>self-paced reading</td>
<td>adults</td>
<td>A = T</td>
<td>Polinsky et al. (2012)</td>
</tr>
<tr>
<td>Basque</td>
<td>morphological</td>
<td>prenominal</td>
<td>self-paced reading</td>
<td>adults</td>
<td>T &gt; A</td>
<td>Carreiras et al. (2010)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>ERPs</td>
<td>adults</td>
<td>T &gt; A</td>
<td>Carreiras et al. (2010)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>sentence-picture matching</td>
<td>children</td>
<td>T &gt; A</td>
<td>Gutierrez-Mangado (2011)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(mean 5.6)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>adults</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>elicited production</td>
<td>children</td>
<td>A &gt; T</td>
<td>Gutierrez-Mangado &amp;</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(mean 4.1;</td>
<td></td>
<td>Ezeizabarrena (2012)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6.2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>sentence-picture matching</td>
<td>adults</td>
<td>A &gt; T</td>
<td>Gutierrez-Mangado &amp;</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>children</td>
<td>T &gt; A</td>
<td>Ezeizabarrena (2012)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(mean 4.1;</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6.2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ch’ol</td>
<td>morphological</td>
<td>postnominal</td>
<td>sentence-picture matching</td>
<td>adults</td>
<td>A &gt; T</td>
<td>Clemens et al. (2015)</td>
</tr>
<tr>
<td>Kaqchikel</td>
<td>syntactic</td>
<td>postnominal</td>
<td>elicited production</td>
<td>adults</td>
<td>A &gt; T</td>
<td>Heaton, O’Grady, Deen (2016)</td>
</tr>
<tr>
<td>Q’anjob’al Mayan</td>
<td>syntactic</td>
<td>postnominal</td>
<td>sentence-picture matching</td>
<td>adults</td>
<td>A &gt; T</td>
<td>Clemens et al. (2015)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>elicited production</td>
<td>adults</td>
<td>A = T</td>
<td>Gagliardi et al. (2013)</td>
</tr>
</tbody>
</table>

### 1.2 Summary

To summarize, there are several competing accounts for the subject-object asymmetry in RCs:

(64) Linear Distance Hypothesis
(65) Structural Distance Hypothesis
(66) Canonical Word Order Hypothesis
(67) Frequency Hypothesis
(68) Semantic Prominence Hypothesis

These hypotheses are all equally successful for languages, like English, with prenominal RCs. However, research on prenominal RCs such in languages like Mandarin Chinese has questioned the validity of the Linear Distance Hypothesis and Canonical Word Order Hypothesis. There are other factors that may influence which type of RC is easier to process, such as morphological complexity. It would be ideal to have a language that can neutralize these additional factors, and yet offer a new data that test these hypotheses. In this dissertation, I use data from Tagalog to address these issues. The next chapter gives an overview of Tagalog morphosyntax and explains how Tagalog can help us further research the subject-object asymmetry.
Chapter 2. Tagalog

Tagalog, one of the 183 languages spoken in the Philippines, has 21.5 million native speakers (Lewis, Simons, & Fennig, 2016). Tagalog belongs to the Malayo-Polynesian subgroup of the Austronesian language family, and is spoken in the Central and Southern Luzon regions as well as on the island of Palawan. The experiments presented in my dissertation were conducted in Quezon City in the National Capital Region and the City of Bacoor in the Province of Cavite. In addition, the majority of the population in the Philippines speaks Tagalog (under the name of Filipino), as it is one of the official languages of the Philippines. Figure 1 shows a map of the Tagalog-speaking regions.

![Language map of Luzon and surrounding islands](Lobel, 2013)

Because of the linguistic diversity in the country as well as the official status of English, it is extremely difficult to find a monolingual native speaker of Tagalog. For this reason, this study included a language background survey (Appendix A) in order to ensure that Tagalog was the
dominant language of each of the participants.\textsuperscript{12} Many of the participants in my study also speak Taglish, a mixed language in which English lexical items are used with Tagalog syntax.

In the following sections, I provide an overview of Tagalog morphosyntax as well as of previous studies on the acquisition of Tagalog.

### 2.1 Focus System

Tagalog utilizes a predicate-initial word order. The ordering of post-predicate NPs is flexible and is sensitive to different morphophonological, syntactic, and discourse factors. The canonical word order is unclear: some claim that the preferred word order has the primary syntactic argument (PSA) in clause-final position (Bloomfield, 1917, p. 153; Bowen, 1965, pp. 151–2), while others claim that the canonical word order is Verb-Agent-Theme (Bautista, 1983; Naylor, 1975). Indeed, it has been suggested that Tagalog has two canonical word orders (Kroeger, 1993). The template for a transitive Tagalog sentence can be summarized as in (69).\textsuperscript{13} Chapter 3 provides additional discussion of Tagalog word order, drawing on data from a production experiment.

\begin{table}[h]
\centering
\begin{tabular}{lcc}
  (69) & Verb & Argument 1 & Argument 2 \\
  & (with focus and aspect morphology) & (non-PSA/Agent) & (PSA/Theme) \\
\end{tabular}
\end{table}

A signature feature of Tagalog grammar is its Philippine-type focus system (also known as a trigger or voice system), also seen in other Philippine languages, in Formosan languages, and in several other Austronesian languages. It is characterized by the presence of a verbal affix that indicates the thematic role of the PSA, which in turn is marked by the case prefix (hereafter, focus marker) \textit{aŋ}\textsuperscript{14}.

Tagalog has five focus patterns:\textsuperscript{15} agent focus (AF), theme focus (TF), locative/goal focus (LF), benefactive focus (BF), and instrumental focus (IF).\textsuperscript{16} Each focus pattern is signaled by

\textsuperscript{12} A more ideal method of establishing language dominance is to use an independent proficiency measure.

\textsuperscript{13} As shown in Chapter 3, children prefer Verb-Agent-Theme word order. For this reason, I will assume this word order when I postulate a gap in the subsequent RC examples.

\textsuperscript{14} For personal names, the nominative marker \textit{si} is used instead of \textit{aŋ}.

\textsuperscript{15} Not all verbs are compatible with all five focus patterns.
different verbal affixes, which in turn indicate the thematic role of the *aŋ*-marked PSA. The PSA is a unique element in a clause—there can be only one *aŋ*-marked NP per clause. Other NPs are marked by the non-focus marker *naŋ* (which marks the agent in TF, and the theme in other focus patterns) or by *sa* (marking location, recipient, goal, source, etc., and optionally a definite theme in AF).

Various analyses have been proposed regarding what *aŋ* marks. Some researchers have argued that *aŋ* marks a subject (Guilfoyle, Hung, & Travis, 1992), while others have proposed that it signals a sentential topic (Schachter & Otanes, 1972), a discourse topic (Cooreman, Fox, & Givón, 1984; Katagiri, 2006), an absolutive (Aldridge, 2004), or a definite NP (Reid & Liao, 2004). However, in accordance with common practice, I employ the theory-neutral term PSA.

### 2.1.1 Agent Focus

Agent focus is typically indicated by the verbal infix *-um*- or the prefix *mag*- and *mang-* , whose use coincides with the appearance of the focus marker *aŋ* on the agent argument. The PSA in an AF pattern is the sole argument of a monadic verb, as well as the agent of a dyadic verb. In (70) the agent subject *lalake ‘man’* of the monadic verb ‘run’ is preceded by the focus marker *aŋ*, and therefore is the PSA.

(70)  
Agent focus  
T<um>akbo *aŋ* lalake.  
<AF.PFV> run FOC man  
‘The man ran.’

The *-um*- infix in the dyadic verb ‘buy’ in (71) indicates that the PSA, marked by *aŋ*, is the agent *lalake ‘man’*.

---

16 The categorization and labeling of each focus pattern also differs among researchers. I refer to each focus pattern based on the thematic role of the PSA.

17 Instead of ‘intransitive’ and ‘transitive,’ I employ the term ‘monadic’ and ‘dyadic’ here, as some claim that agent focus is structurally intransitive, where the agent is realized as the sole argument and the theme is realized as oblique (Aldridge, 2012; Reid & Liao, 2004).

18 I use the Tagalog orthography in presenting examples, with the exception of the focus marker *ang* [aŋ], non-focus marker *ng* [naŋ], and the linker *-ng* [-ŋ].
(71) Agent focus
B<um>|ili  aŋ lalake naŋ mangga.
<AF.PFV> buy  FOC man  NFOC mango
‘The man bought a/the mango.’

The interpretation of the PSA is obligatorily specific/definite, as indicated in the interpretation of the agent lalake ‘man.’ The theme mangga ‘mango’ marked with naŋ can be, but need not be, specific/definite.

2.1.2 Theme Focus
Theme focus is typically indicated by the verbal affix -in-, the suffix -an, or the prefix i-, depending on the verb. In contrast to AF patterns, the PSA in TF is the undergoer and is therefore marked with the focus marker aŋ. The agent in a TF sentence is marked with the non-focus marker naŋ. In the example in (72), the infix -in- indicates that the aŋ-marked PSA is the theme mangga ‘mango.’

(72) Theme focus
B<in>|ili naŋ lalake aŋ mangga.
<TF.PFV> buy  NFOC man  FOC mango
‘A/The man bought the mango.’

2.1.3 Locative Focus
Locative focus is indicated by the verbal suffix -an or the circumfix pag-...-an. The PSA is the location or goal/recipient, marked with the focus marker aŋ. The agent and the theme are marked with the non-focus marker naŋ. In the example in (73), the suffix -an (realized as its allomorph -han) indicates that the PSA is the locative palengke ‘market.’

---

19 The selection of PSA may be influenced by different factors such as definiteness (Foley & Van Valin, 1984; Reid & Liao, 2004), specificity (Macachlan & Nakamura, 1997; Rackowski, 2002), genericity, referentiality, topicality (Carrier-Duncan, 1985), and agentivity (Saclot, 2006).
20 This affix is usually realized as infix -in- in perfective and imperfective, and as suffix -in- in infinitive and contemplated (prospective).
(73) Locative focus
B<in>i-l-han naŋ lalake naŋ mangga aŋ palengke.
<PFV>buy-LF NFOC man NFOC mango FOC market
‘A/The man bought a/the mango at the market.’

Note that in (73) the locative is the only *aŋ*-marked nominal in the sentence, and that both the other two arguments (the agent and the theme) are *naŋ*-marked. In the following example, the PSA in the locative focus sentence is the recipient *babae* ‘woman.’ The agent and the theme are marked with the non-focus marker *naŋ*.

(74) Locative focus
B<in>i-gy-an naŋ lalake naŋ mangga aŋ babae.
<PFV>give-LF NFOC man NFOC mango FOC woman
‘A/The man gave a/the mango to the woman.’

2.1.4 Benefactive Focus

Benefactive focus is indicated by the prefix *i-* and *ipag-*., and the beneficiary *babae* ‘woman’ is marked as the PSA (75). 21

(75) Benefactive focus
I-b<in>i-li naŋ lalake naŋ mangga aŋ babae.
BF-<PFV>buy NFOC man NFOC mango FOC woman
‘A/The man bought a/the mango for the woman.’

2.1.5 Instrumental Focus

Instrumental focus is indicated by the verbal prefix *ipang-*., with the instrument *pera=ko* ‘my money’ marked as the PSA, as shown in (76).

---

21 In colloquial Manilan Tagalog, benefactive focus appears to be merged with locative focus for some speakers. This was also reported in other languages in the Philippines south of Tagalog (Blust, 2015 citing his personal communication with H. Liao).
In this dissertation, I focus on the contrast between AF and TF.

2.2 Analyses of the Tagalog Focus System

Previous studies have analyzed the Tagalog focus system as essentially one marking alignment (nominative-accusative or ergative-absolutive). Some have argued that Tagalog has (a) a nominative-accusative system in which the AF pattern is active and transitive, and the TF pattern is passive (Bloomfield, 1917; Guilfoyle et al., 1992; Rackowski & Richards, 2005), while others have proposed that Tagalog has (b) an ergative-absolutive system, in which the TF pattern is the active transitive and the AF pattern is the antipassive (e.g., Aldridge, 2004; De Guzman, 1988; Liao, 2004). Finally, Foley (1998) argues that Tagalog has (c) a symmetrical voice system in which both the AF and TF patterns are transitive, and neither is derived from the other.

If we were to adopt a nominative-accusative analysis of Tagalog focus, in which the AF is active and the TF is passive, more appropriate glosses for (71) and (72) would be the ones in (77) and (78), respectively.

(77) B<um>ili naŋ mangga aŋ lalake.
<TR.PFV>buy NFOC mango FOC man
‘The man bought a/the mango.’

(78) B<in>ili naŋ lalake aŋ mangga.
<PASS.PFV>buy NFOC man NOM mango
‘The mango was bought by a/the man.’

On the other hand, if we were to adopt an ergative-absolutive analysis of Tagalog focus, in which the TF is an active transitive and the AF is an antipassive, the gloss for (72) should be reformulated as follows.
(79) B<in>ili naŋ lalake aŋ mangga.  
<TR.PFV>buy ERG man ABS mango  
‘A/The man bought the mango.’

Under this approach, AF patterns are considered intransitives/antipassives, in which aŋ marks the absolutive and naŋ marks the oblique, as demonstrated in (80).

(80) B<um>ili aŋ lalake naŋ mangga.  
<INTR.PFV>buy ABS man OBL mango  
‘The man bought a/the mango.’

Because there is not a consensus among linguists on how to formally analyze Tagalog, I do not commit to any of these theoretical views in this dissertation. Instead, I will present my findings in a theory-neutral way that maximizes their relevance to a general understanding of how Tagalog RCs work. This is why I avoid the terms such as “subject RC” and “direct object RC,” and instead use “agent RC” and “theme RC.” I will describe the Tagalog RCs in §2.4, but first, I will provide a review of previous acquisition studies on Tagalog.

2.3 Acquisition of Tagalog Focus System
A few studies have investigated the acquisition of Tagalog focus patterns. Tucker (1971) tested children’s mastery of all focus patterns using two tasks: an imitation task and a sentence completion task. In the imitation task, 48 child native speakers of Tagalog (mean age 10;8, age range not given) were asked to repeat the sentences read by the researchers. In the sentence completion task, they were given a sentence in a certain focus pattern, such as the TF in (81), and were prompted to turn the sentence into another focus pattern, by changing the sentence into one that starts with an NP given by the researcher.

22 Antipassives are seen among ergative languages. The agent is realized as the absolutive—the syntactically prominent argument—and the theme as the oblique (Dixon, 1979). Because antipassive clauses are morphologically intransitive, it is possible to think of the absolutive agent as the intransitive subject (Schachter, 1994) and the theme downgraded to oblique.

23 This requires children to produce a sentence in NP-initial word order, which is possible (as long as the first NP is in focus) but not canonical in Tagalog.
For example, participants might be asked to turn the TF sentence in (81) into the one that starts with the agent, as illustrated in (82).²⁴

(81)  K<in>ain naŋ bata aŋ sagiŋ.
<TF.PFV>eat NFOC child FOC banana
‘A/The child ate the banana.’

(82)  Aŋ bata ay ___ naŋ sagiŋ.
FOC child TOP NFOC banana
‘The child _____ a/the banana.’

In Tagalog, only the PSA can be fronted (the same restriction applies to relativization, as discussed in §2.4). Therefore, in order for participants to produce a grammatical sentence in the completion task, the verb they supplied had to be in correct form based on what NP was given as the sentence-initial element by the researcher. In the case of (82), the correct verb form that follows the fronted agent is the AF form k<um>ain. Tucker (1971) used 12 actual Tagalog verbs and 12 nonce verbs. The results from both tasks showed that TF was easier than AF for the children to produce. The summary of this study is given in Table 10.

²⁴ The marker ay (glossed as the topic marker here) signals the fronting of a PSA, but has received different analyses in the previous literature (e.g. Hirano, 2006; Schachter & Otanes, 1972).
Table 10. Summary of Tucker (1971).

<table>
<thead>
<tr>
<th><strong>Participants</strong></th>
<th>48 child native speakers of Tagalog (mean age 10;8, range not given)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tasks</strong></td>
<td>Imitation task</td>
</tr>
<tr>
<td></td>
<td>Children were asked to repeat the sentences read by the researchers.</td>
</tr>
<tr>
<td></td>
<td>Sentence completion task</td>
</tr>
<tr>
<td></td>
<td>Children were given a sentence in a certain focus pattern, and had to turn the sentence into another focus pattern by providing a correct form of the verb that follows the sentence-initial NP given by the researcher.</td>
</tr>
<tr>
<td><strong>Results</strong></td>
<td>Error rates:</td>
</tr>
<tr>
<td></td>
<td>TF was easier than AF</td>
</tr>
<tr>
<td>Verb types</td>
<td>Tasks</td>
</tr>
<tr>
<td>Real verbs</td>
<td>Imitation</td>
</tr>
<tr>
<td></td>
<td>Completion</td>
</tr>
<tr>
<td>Nonce verbs</td>
<td>Imitation</td>
</tr>
<tr>
<td></td>
<td>Completion</td>
</tr>
</tbody>
</table>

*a Because the actual numbers were not reported, visual estimates were made based on the graph.
*b Tucker (1971) also tested the relative difficulty of locative focus, directional focus, referential focus, and causative focus. Of these, locative focus and directional focus were explained in §2.1.3 as a single category. Referential focus and causative focus are not addressed in this dissertation. The order of difficulty using his original terminology is as follows, with the leftmost being the easiest and the rightmost being the most difficult (object focus is equivalent to TF, and actor focus is equivalent to AF): Object Focus > Referential Focus > Locative Focus > Directional Focus > Actor Focus > Causative Focus.

Segalowitz and Galang (1978) conducted an elicited production task, in which 30 child native speakers of Tagalog (10 children aged 3;1–3;11, mean 3;6; 10 children aged 5;1–5;9, mean 5;6; and 10 children aged 7;1–7;5, mean 7;4) were asked to describe pictures of reversible actions following the prompt given by the researcher. The results showed that children, regardless of age, did equally well in both AF and TF. Segalowitz and Galang also conducted a comprehension task, in which children were asked to select an appropriate picture based on the sentence they had heard. When the sentence was in an NP-initial word order, children did equally well in both AF and TF; however, when the sentence had a canonical verb-initial word order, they performed better with a TF pattern. The summary of this study is given in Table 11.

<table>
<thead>
<tr>
<th>Participants</th>
<th>30 child native speakers of Tagalog</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3-year-olds (ages 3;1–3;11, mean 3;6; n = 10)</td>
</tr>
<tr>
<td></td>
<td>5-year-olds (ages 5;1–5;9, mean 5;6; n = 10)</td>
</tr>
<tr>
<td></td>
<td>7-year-olds (ages 7;1–7;5, mean 7;4; n = 10)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tasks</th>
<th>Comprehension task</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Children were presented two pictures portraying reversible actions (e.g., dog biting duck, duck biting dog) and had to point to the correct picture. The sentences were all given in verb-initial, PSA-final word order. A follow-up experiment was done with a subset of the participants using PSA-initial sentences.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Results</th>
<th>Production task</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Children described each picture following the prompt given by the researcher. Each prompt gave children the beginning of the appropriate PSA-initial sentence, and children had to complement the verb with an appropriate form.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Results</th>
<th>Comprehension task (accuracy):</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Better performance in TF than in AF with verb-initial sentences</td>
</tr>
<tr>
<td></td>
<td>Equally good performance in AF and in TF with PSA-initial sentences</td>
</tr>
<tr>
<td></td>
<td>No significant age effect</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Age group</th>
<th>AF</th>
<th>TF</th>
</tr>
</thead>
<tbody>
<tr>
<td>verb-initial 3-year-olds</td>
<td>38%</td>
<td>63%</td>
</tr>
<tr>
<td>verb-initial 5-year-olds</td>
<td>34%</td>
<td>91%</td>
</tr>
<tr>
<td>verb-initial 7-year-olds</td>
<td>31%</td>
<td>91%</td>
</tr>
<tr>
<td>PSA-initial 5- &amp; 7-year-olds</td>
<td>95%</td>
<td>90%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Production task (accuracy):</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equally good performance in AF and in TF</td>
</tr>
<tr>
<td>Significant difference only between 3-year-olds and 5-year-olds</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Age group</th>
<th>AF</th>
<th>TF</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSA-initial 3-year-olds</td>
<td>71%</td>
<td>73%</td>
</tr>
<tr>
<td>PSA-initial 5-year-olds</td>
<td>90%</td>
<td>97%</td>
</tr>
<tr>
<td>PSA-initial 7-year-olds</td>
<td>93%</td>
<td>95%</td>
</tr>
</tbody>
</table>

---

Segalowitz and Galang (1978) also conducted a comprehension task for aspect, the description of which I omit from this table because it is irrelevant here.

The actual numbers were not reported in the paper and thus retrieved from the graph based on visual estimate.

Based on a picture-based elicited production task, Bautista (1983) reported that TF was the predominant focus pattern in the speech of Tagalog-dominant children aged 2;2 to 4;6. The
dominance of TF is also manifested in Cooreman et al.’s (1984) study of text frequency, as shown in Table 12.

**Table 12.** Text frequency reported by Cooreman et al. (1984).25

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>TF (Verb-initial)</td>
<td>166</td>
<td>59%</td>
</tr>
<tr>
<td>TF (PSA-initial)</td>
<td>47</td>
<td>17%</td>
</tr>
<tr>
<td>AF (Verb-initial)</td>
<td>37</td>
<td>13%</td>
</tr>
<tr>
<td>AF (PSA-initial)</td>
<td>31</td>
<td>11%</td>
</tr>
<tr>
<td>Total</td>
<td>281</td>
<td>100%</td>
</tr>
</tbody>
</table>

More recently, Marzan (2013, p. 129) conducted a far-reaching study of children’s development of Tagalog by collecting longitudinal naturalistic data from five bilingual and trilingual children aged 1;2 to 5;0. Although Marzan did not investigate the emergence of different focus types, she reported the frequency of different verbal affixes in the children’s speech. Overall frequency showed that TF/LF -an was the most frequent verbal affix in child speech,26 followed by the TF affix -in, AF prefix mag-, ma-, and TF/BF prefix i-27. Of these, the TF affix -in was the most frequent focus marker in the earliest stage of the children’s production (24 months).28

Tanaka et al. (2016) conducted a picture-based elicited production task to test focus-pattern preference in declarative clauses. When animacy and definiteness were controlled (i.e., the agent and the theme were both animate and definite), children aged 4;2 to 5;3 (mean 4;6) and adults were more likely to describe transitive events in TF (adults 96.8%; children 84.2%) than AF. While these results are far from conclusive, the preponderance of evidence seems to suggest that young children have better mastery of TF than AF, at least in the canonical verb-initial word order.

A wrinkle is added to this picture by work from Garcia, Sekerina, Dery, Roeser, and Höehle (2015), who investigate the interaction of focus patterns (AF versus TF) and word order. As

25 Cooreman et al. (1984) refers to TF (Verb-initial) as ergative, TF (PSA-initial) as passive, and AF as antipassive.
26 Because -an can mark either TF or LF, it is not clear which focus pattern was used.
27 Because i- can mark either TF or BF, it is not clear which focus pattern was used.
28 Note that the data reported are frequency counts and not accuracy.
noted above, there is no consensus about the canonical word order of Tagalog: Verb-Agent-Theme or PSA-final (Verb-Theme-Agent in AF and Verb-Agent-Theme in TF). Garcia et al. (2015) conducted a sentence-picture matching task, crossing focus (AF vs. TF) and word order (Verb-Agent-Theme vs. Verb-Theme-Agent). They tested 60 Tagalog-speaking children (20 each for three age groups: 3-year-olds, 5-year-olds, and 7-year-olds) and 20 adults. They found that irrespective of focus marking on the verb, the Verb-Agent-Theme word order was easier to understand than Verb-Theme-Agent word order for all age groups except for the 3-year-olds, who showed a numerical (but non-significant) preference for Verb-Theme-Agent order.

On the other hand, Sauppe, Norcliffe, Konopka, Van Valin, and Levinson (2013) conducted an eye-tracking-during-production study with 53 adult speakers of Tagalog and found that the participants produced verb-initial, PSA-final word order more frequently regardless of the focus patterns. However, word order did not have any effect on eye fixation patterns. Instead, the speakers fixated on the agent more than the theme in AF patterns regardless of the word order, but during the production of TF sentences, no difference was found between the fixation patterns on the agent and the theme.

### 2.4 Relative Clauses in Tagalog

RCs in Tagalog typically begin with the head noun, which is immediately followed by the “linker” *na* (*–ŋ* after a word ending in a vowel). Focus marking in Tagalog is relevant to the syntax of RCs as well as various types of extraction. In Tagalog, only the PSA is relativizable—that is, only the agent in the AF clause and the theme in the TF clause can be relativized, as shown in (83) and (84).

\[
\text{(83) } \text{lalake} = \eta [ \text{h＜um＞a～habol } \_ \_ \_ \text{ naŋ babae } ] \quad \text{ARC with AF} \\
\quad \text{man} = \text{LK} <\text{AF}>\text{IPFV～chase} \quad \text{NFOC woman} \\
\quad \text{‘(the) man [that } \_ \text{ is chasing a/the woman]’}
\]

\[
\text{(84) } \text{babae} = \eta [ \text{h＜in＞a～habol} \_ \_ \_ \text{ naŋ lalake } ] \quad \text{TRC with TF} \\
\quad \text{woman} = \text{LK} <\text{TF}>\text{IPFV～chase} \quad \text{NFOC man} \\
\quad \text{‘(the) woman [that a/the man is chasing } \_ \_ \_ \_ \text{]’}
\]
The relativization of the agent of a TF clause as seen in (85) is less preferred than (83) but acceptable to many speakers; however, it is not possible to relativize the theme argument of an AF clause, as shown in (86).

(85) Relativization of the agent of a TF clause
? lalake=ŋ [ h<in>a~habol _ aŋ babae]  
man=LK <TF>IPFV~chase FOC woman  
‘(the) man [that _ is chasing the woman]’

(86) Relativization of the theme of an AF clause
* babae=ŋ [ h<um>a~habol aŋ lalake _]  
woman=LK <AF>IPFV~chase FOC man  
Intended: ‘(the) woman [that the man is chasing _]’

The pattern in (85) was originally reported to be ungrammatical (e.g. Aldridge, 2004); however, recent studies claim that it is in fact acceptable (Ceña & Nolasco, 2011, p. 248), and it is even used in a children’s book as shown in (87):

(87) aŋ dyirap na [ k<in>ain _ aŋ buwan ]  
FOC giraffe LK <TF.PFV>eat FOC moon  
‘the giraffe [that _ ate the moon]’  
(Rangel & Kwong, 2015)

Furthermore, as we will see below, adults (and children) produced this pattern in my elicited production task. A formal acceptability judgment study is necessary in the future, but for now, it suffices to note that while (83) still seems to be the preferred way to relativize an agent argument, the alternative pattern in (85) is also acceptable.

Tanaka et al. (2014) conducted an elicited production study of Tagalog ARCs and TRCs, testing 14 children aged 4;1–5;5 (mean 4;10) and 11 adults (Table 13).
### Table 13. Summary of Tanaka et al. (2014).

<table>
<thead>
<tr>
<th>Participants</th>
<th>14 child speakers of Tagalog (age 4;1–5;5, mean 4;10) 11 adult speakers of Tagalog</th>
</tr>
</thead>
</table>
| **Tasks**          | Elicited production task  
|                    | Participants saw pictures depicting two transitive actions and described the character that an arrow pointed to. |
| **Results**        | Accuracy:  
|                    | Children produced more target ARCs than TRCs  
|                    | Reversal errors turned more TRCs into ARCs than vice versa  
|                    | **|**  
| **|**  
| ARC | TRC |  
| Children | 69.0% | 34.6%  
| Adults | 100% | 97.0%  |

The results showed no difference between ARCs and TRCs in adults’ accuracy; however, children were better at producing ARCs compared to TRCs. Although there was large variation among children, the overall results showed that children were more successful at producing
ARCs than TRCs. Analysis of inappropriate RCs also showed that more TRCs were turned into ARCs than vice versa, pointing to an ARC advantage.

Pizarro-Guevara (2014) conducted a comprehension study of Tagalog RCs, testing adults and three groups of children (ages 4–7, ages 7–9, and ages 10–14) (Table 14). Pizarro-Guevara compared ARCs and what he refers to as “non-agent” RCs, which include TRCs and relativization of the recipient as shown in (88).

(88) aŋ bisita=ŋ [ b<in>igy-an _ ko naŋ regalo ]
    FOC visitor=LK <PFV>give-LF Isg.NFoc NFoc gift
    ‘the visitor [who I gave a gift to ]’

The results of the referent-selection task\(^{29}\) showed that children were generally better with ARCs than non-agent RCs, with respect to the accuracy rate and reaction times. Moreover, while children aged 7–9 years already manifested adult-like performance on ARCs, albeit with slower reaction times than adults, children aged 10–14 years were still not adult-like with non-agent RCs. This study showed a subject advantage; however, his “non-agent” RC condition did not distinguish the relativization of a theme from the relativization of a recipient, and therefore did not provide a direct comparison between ARCs and TRCs.\(^{30}\)

\(^{29}\) Unlike a sentence-picture matching task, a referent-selection task requires the participant to identify the correct character, not just the picture, based on what they hear.

\(^{30}\) Studies of relativization in languages with a Philippine-type focus system are rare. Chamorro is a language with a similar system, but Borja et al.’s (2016) study does not directly test the relative difficulty of ARC and TRC. A study on Jakarta Indonesian (Tjung, 2006) found an ARC advantage. Jakarta Indonesian is a closely-related language, but does not retain a full-fledged focus system.

| Participants | 31 child native speakers of Tagalog (ages 4–14)  
|             | Three groups: 4–6 (mean 5;0), 7–9 (mean 8;27), 10–14 (mean 11;11)  
|             | 10 adult native speakers of Tagalog  
| Tasks       | Referent-selection task  
|             | Children saw pictures depicting two reversed actions and were asked to point at the character that matches the auditory prompt.  

Agent RC Prompt: Where is the visitor who was giving me a present?  
Non-agent RC Prompt: Where is the visitor who I was giving a present to?  

| Results | Accuracy:  
|         | Children aged 7–9 performed adult-like in ARC  
|         | Children aged 10–14 still did not perform adult-like in TRC  
| age group | agent | non-agent  
| 4–6 | 50.00% | 30.30%  
| 7–9 | 80.00% | 61.21%  
| 10–14 | 85.19% | 71.11%  
| adults | 88.00% | 89.33%  
| Response Time:  
|             | Children aged 7–9 and 10–14 responded as quickly as adults  
| age group | agent | non-agent  
| 4–6 | 3306 ms | 4697 ms  
| 7–9 | 1979 ms | 2796 ms  
| 10–14 | 1263 ms | 2075 ms  
| adults | 1201 ms | 1578 ms  

More recently, Pizarro-Guevara and Wagers (2016) used a stop-making-sense task to investigate the role of focus morphology in the processing of *wh*-questions in Tagalog. Although
this was not a study targeting RCs per se, it is relevant to this dissertation, as Tagalog *wh*-questions are typically analyzed as pseudo-clefts involving free RCs.

\[(89) \begin{array}{llll} \text{[PRED} & \text{Aling alak} & \text{[SUBJ} & \text{aŋ } \text{in-inom } \text{naj } \text{babae } ] \\ \text{which wine } & \text{FOC} & \text{TF-drink } & \text{NFOC woman} \\ \text{‘(lit.) The one that the woman drank was which wine?’} & \end{array} \]

The researchers compared two kinds of agent *wh*-questions: those with an overt AF morphology (90) and those involving the ‘iterative’ pattern exemplified in (91). They also compared two kinds of theme *wh*-questions: those with an overt TF morphology (92) and those involving the ‘recent perfective’ (RP) pattern exemplified in (93).

\[(90) \begin{array}{llll} \text{Aling dalaga } & \text{aŋ } & \text{um-inom parati naj tubig} \? \\ \text{which young.girl } & \text{FOC} & \text{AF-drink again NFOC water} \\ \text{‘Which young girl drank water again and again?’} & \end{array} \]

\[(91) \begin{array}{llll} \text{Aling dalaga } & \text{aŋ } & \text{inom-nang-inom naj tubig} \? \\ \text{which young.girl } & \text{FOC} & \text{drink-ADV-drink NFOC water} \\ \text{‘Which young girl drank water again and again?’} & \end{array} \]

\[(92) \begin{array}{llll} \text{Aling alak } & \text{aŋ } & \text{in-inom naj babae} \? \\ \text{which wine } & \text{FOC} & \text{TF-drink NFOC woman} \\ \text{‘Which wine did the woman drink?’} & \end{array} \]

\[(93) \begin{array}{llll} \text{Aling alak } & \text{aŋ } & \text{kaka-inom lang naj babae} \? \\ \text{which wine } & \text{FOC} & \text{RP-drink only NFOC woman} \\ \text{‘Which wine has the woman just drunk?’} & \end{array} \]

After further comparing plausible questions such as those above and implausible questions such as *Aling babae aŋ ininom naj babae? ‘Which girl did the wine drink?’, Pizarro-Guevara and Wagers (2016) found that the focus morphology only had an effect in agent *wh*-questions, showing a possible subject advantage.

In addition to the postnominal RCs that I will primarily investigate in this dissertation, Tagalog also allows prenominal and head-internal RCs, as noted below in Chapter 6.
2.5 Research Questions and Rationale of the Study

In the current study, I investigate whether a subject-object asymmetry arises in the comprehension and production of RCs by adult and child speakers of Tagalog (as their dominant language). I address two research questions in this dissertation:

1. Are ARCs easier to comprehend than TRCs for child and adult speakers of Tagalog? (Experiment 2)
2. Are ARCs easier to produce than TRCs for child and adult speakers of Tagalog? (Experiments 3 & 4)

Tagalog RCs can give novel insight into the nature of subject-object asymmetry in language. As I discussed in §1.1, there are currently five competing accounts for subject-object asymmetry: Linear Distance Hypothesis, Structural Distance Hypothesis, Canonical Word Order Hypothesis, Frequency Hypothesis, and Semantic Prominence Hypothesis. In the following sections, I will discuss the prediction that each hypothesis makes for Tagalog RCs.

2.5.1 Linear Distance Hypothesis

The Linear Distance Hypothesis states that a RC is more difficult when the linear distance between the head and the gap is greater (see the discussion in §1.1.1). However, because the default word order of Tagalog is unclear, we cannot make a specific prediction based on this hypothesis. If we assume the preferred word order in Tagalog is Verb-Agent-Theme (Bautista, 1983; Garcia et al., 2015; Naylor, 1975), then, ARCs (94) should be easier than TRCs (95), much like in English.

\[
\begin{align*}
\text{(94) } & \quad \downarrow \quad \text{lalake}=\eta \quad [ \ h<\text{um}>\text{a~habol} \_ \quad \text{na}\eta \quad \text{babae} ] \quad \text{ARC} \\
\text{man}=\text{L}K & \quad <AF>\text{IPFV~chase} \quad \text{NFOC} \quad \text{woman} \\
\text{‘(the) man [that } & \_ \text{is chasing a/the woman]’}
\end{align*}
\]
However, if we assume that the default word order is verb-initial and PSA-final (Bloomfield, 1917, p. 153; Bowen, 1965, pp. 151–152; Sauppe et al., 2013), the Linear Distance Hypothesis predicts no differences between ARCs (96) and TRCs (97).

Therefore, the Linear Distance Hypothesis predicts that there is either an ARC advantage in Tagalog, or that there is no difference between ARCs and TRCs.

### 2.5.2 Structural Distance Hypothesis

The Structural Distance Hypothesis states that a RC is more difficult when the gap is more deeply embedded in the tree (see §1.1.2).

Regardless of the analysis of the Tagalog grammatical system, the structural depth of gap between ARCs and TRCs should not differ if the depth is based on the surface structure. In all analyses, the PSA is in the highest specifier position for both AF and TF. For example, in the

---

**Note:** There is another way to look at structural distance as AF and TF differ in terms of the preparatory movement of PSA prior to relativization. In Guilfoyle et al.’s (1992) analysis, the PSA moves to Specifier position of IP in both AF and TF, but the structural distance of the movement is greater in the case of TF. In the analyses by Rackowski and Richard (2005) and Aldridge (2004), the PSA agent raises in TF patterns but not in AF patterns. This means that there is an extra operation involved in TF. These sorts of contrasts might be used to explain an increased difficulty in TRC compared to ARC. However, if the operations under consideration add to a sentence’s complexity, we might expect to see an effect in declaratives (where similar movements also take place), yet no such effect has been observed.
nominative-accusative analysis of Tagalog AF and TF proposed by Guilfoyle et al. (1992) and illustrated in (98) and (99), the PSA moves to the [Spec, IP] position, regardless of whether it is agent or theme. In both focus patterns, the PSA is in the highest position in the surface structure prior to relativization, ensuring that the gap associated with this operation has the same structural depth in both ARCs and TRCs.

(98) Tree structure of AF based on Guilfoyle et al.’s (1992) analysis

(99) Tree structure of TF based on Guilfoyle et al.’s (1992) analysis

Rackowski and Richards (2005) propose another nominative-accusative analysis, in which the PSA receives an obligatorily specific interpretation in the highest specifier position of vP (at the
edge of vP). In the case of TF, the PSA theme goes through “object shift” (Chomsky, 2001), in which the theme moves to the [Spec, vP] position to receive a specific reading as shown in (100). In the case of AF, there is no such shift and the agent therefore occupies the highest position within vP as shown in (101).

(100) Tree structure of TF based on Rackowski and Richard’s (2005) analysis

(101) Tree structure of AF based on Rackowski and Richard’s (2005) analysis

---

32 According to Chomsky (2001), object shift is allowed (and required) by an EPP-feature on v, which can be assigned only if it has a semantic outcome. In this case, the EPP position of v is assigned a specific interpretation, and therefore does have a semantic outcome (Rackowski & Richards, 2005).
Because the agent in AF and the theme in TF are both at the edge of vP; therefore, the gap left by relativization in both ARCs and TRCs will be in that same position as well. The Structural Distance Hypothesis again predicts no difference between ARCs and TRCs.

The same prediction can be derived from the ergative-absolutive analysis by Aldridge (2004) and illustrated in (102) and (103).

(102) Tree structure for AF based on Aldridge’s (2004) analysis

(103) Tree structure for TF based on Aldridge’s (2004) analysis

33 Although the original tree diagrams had verb raising (V to v to T movement), the diagrams in (102) and (103) do not depict this operation for the sake of simplicity.
Under this analysis, TF is considered to be the basic transitive sentence, with an ergative agent and an absolutive theme; in contrast, AF is treated as an antipassive, in which the verb is intransitive and the agent is oblique. In both focus patterns, the gap left by relativization of PSA would be in the [Spec, vP] position. Therefore, the ergative-absolutive analysis also does not predict any difference in structural depth.\(^\text{34}\)

In sum, the Structural Distance Hypothesis does not predict any difference between ARC and TRC in Tagalog, regardless of the analysis on its syntactic structure.

### 2.5.3 Canonical Word Order Hypothesis

The Canonical Word Order Hypothesis predicts that non-canonical word order contributes to the difficulty of a RC (see §1.1.3). Although canonical word order may be unclear, it is certain that the order NP V NP, which characterizes both ARCs and TRCs as shown in (104–105), is not the default order for Tagalog, which is uncontroversially predicate-initial (at least on the surface level). The Canonical Word Order Hypothesis therefore predicts no difference between ARCs and TRCs.

\[
\begin{align*}
\text{ARC} & \quad (104) \quad \text{man} = \text{LK} \quad \langle \text{AF}\rangle \text{IP} \quad \text{chase} \quad \text{NFOC} \quad \text{woman} \\
& \quad \text{‘(the) man [that _ is chasing a/the woman]’}
\end{align*}
\]

\[
\begin{align*}
\text{TRC} & \quad (105) \quad \text{man} = \text{LK} \quad \langle \text{TF}\rangle \text{IP} \quad \text{chase} \quad \text{NFOC} \quad \text{woman} \\
& \quad \text{‘(the) man [that a/the woman is chasing _]’}
\end{align*}
\]

A PSA-initial word order is possible in Tagalog in topicalization constructions, although it is not canonical.\(^\text{35}\) However, even if take it into consideration, we would still predict no difference between the two RC types. As shown in Table 12, Cooreman et al. (1984) reported that AF sentences with Agent-Verb-Theme word order (11%) are as frequent as TF sentences with

---

\(^{34}\) If Tagalog is an ergative language, ARCs and TRCs are equally marked in regards to morphology; therefore, neither form should exhibit effects of morphological complexity.

\(^{35}\) This is also subject to the same PSA-only constraint as relativization, in that only the PSA can be fronted.
Theme-Verb-Agent word order (17%). Furthermore, the results from Segalowitz and Galang (1978) suggest that children understand PSA-initial AF sentences and PSA-initial TF sentences equally well. Therefore, the frequency or the comprehension ease of PSA-initial word order does not change the prediction made based on the Canonical Word Order Hypothesis.

2.5.4 Frequency Hypothesis
The frequency hypothesis predicts that the difficulty associated with TRCs is influenced by the frequency of different types of RCs in the input we receive. Unfortunately, I do not have a corpus data to show what types of RCs are frequent in Tagalog. However, previous studies on declarative clauses may help make some predictions.

First, as previous studies report, TF is a far more frequent pattern in Tagalog compared to AF (Bautista, 1983; Cooreman et al., 1984; Tanaka et al., 2016). If the distribution of declarative clauses affects the difficulty of RCs, TRCs are expected to be easier than ARCs.

Cooreman et al. (1984) also showed there was no large frequency difference between AF sentences and TF sentences in the PSA-initial patterns. If the distribution of RCs is similar to topicalized sentences, it is also possible that there is no frequency difference between ARCs and TRCs, predicting no difference between the two.

2.5.5 Semantic Prominence Hypothesis
The Semantic Prominence Hypothesis states that RCs are easier to process when the head refers to a prominent entity. All things being equal (both agent and theme are PSA and animate), this hypothesis predicts that Tagalog ARCs should be easier than TRCs because agents are more prominent than themes (see §1.1.5).

\[
\begin{align*}
\text{agent} & \quad \text{(more prominent)} \\
\downarrow & \\
(106) \quad & \text{man=LK} <\text{AF}> IPFV \sim \text{chase} \quad \text{NFOC} \quad \text{woman} \\
& \text{‘(the) man that is chasing a/the woman’}
\end{align*}
\]
If an ARC advantage is found in Tagalog, the results could be interpreted as a support for the Semantic Prominence Hypothesis. If a TRC advantage is observed, then it may support the Frequency Hypothesis, although this cannot be confirmed until we obtain frequency data on Tagalog RCs. If no difference is found between ARCs and TRCs, then, we are left with two possibilities: the Canonical Word Order Hypothesis or the Structural Distance Hypothesis. Table 15 summarizes the predictions on Tagalog RCs based on the five hypotheses.

**Table 15. Summary of predictions for Tagalog RCs.**

<table>
<thead>
<tr>
<th>Predictions</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Linear distance</td>
<td>No prediction or ARC advantage</td>
</tr>
<tr>
<td>Word order canonicity</td>
<td>No difference</td>
</tr>
<tr>
<td>Structural distance</td>
<td>No difference</td>
</tr>
<tr>
<td>Frequency</td>
<td>TRC advantage or no difference</td>
</tr>
<tr>
<td>Semantic prominence</td>
<td>ARC advantage</td>
</tr>
</tbody>
</table>

Although data from Tagalog alone may not be sufficient to distinguish among these five hypotheses, Tagalog data may complement previous findings from other languages in identifying the source of the subject advantage. I will return to this discussion in Chapter 7.

### 2.5.6 Experimental Designs

In the subsequent chapters, I report the results from a production task on declarative clauses, a comprehension task on RCs, an elicited imitation task on RCs, and an elicited production task on RCs. Although the results will be reported in this order, they were conducted in one of the following two orders to minimize task effects (108–109):

(108) RC production, RC imitation, RC comprehension, and declarative production

(109) RC production, RC comprehension, declarative production, and RC imitation
Of these two, the order in (108) was followed whenever possible. Adults participated in all four experiments in one session, and for children, the experiments were divided into two sessions with an interval ranging from 1–8 days. They participated in the RC production task and the RC imitation task in one session, and the RC comprehension task and the declarative production task in the second session. However, because the RC production task was the longest and the most demanding task, seven of 46 children were not able to continue with the RC imitation task in the first session. For these children, the RC imitation task was conducted at the end of the second session, following the order in (109).

Participants were recruited and tested at two locations in the Philippines: Bacoor City in the Province of Cavite and Quezon City in the National Capital Region. Most of the participants tested in Bacoor City as well as the child participants in Quezon City had grown up locally. However, most of the adult participants in Quezon City were college students from various Tagalog-speaking areas of the Philippines, and therefore represented a less homogeneous demography than the other adult group as well as the children. A total of 38 children and 32 adults participated in the study; however, not all of them participated in all four experiments, which is why the sample size of each experiment varies. I will refer to participants using a participant code that has the testing location information (B for Bacoor City and Q for Quezon City), population information (A for adult and C for child) and a participant number. For example, QA01 means that it is an adult participant from Quezon City who was assigned participant number 01. As stated earlier in this chapter, a language background questionnaire was conducted in order to ensure participants’ dominance in Tagalog.

There were numerous reasons to conduct three separate experiments on Tagalog RCs. First, it is important to establish children’s knowledge of RCs by testing their comprehension. Just because children do not produce a certain structure in natural or elicited context, we cannot conclude that they do not have knowledge of that structure. Nonetheless, comprehension is a relatively passive activity since the words and sentences are selected by the speaker, not the listener. An elicited production task is therefore a more useful way to investigate how children and adults actively construct RCs ‘from scratch’ (Kim & O’Grady, 2015, p. 3). Moreover, since some studies have found different results for comprehension and production tasks (e.g. Gutierrez-Mangado & Ezeizabarrena, 2012), this dissertation makes use of both methodologies.
Additionally, there is also a place for an imitation task, which requires sentence production but, compared to a pure production task, reduces the cognitive burden on children, who nonetheless are known to repeat only what they have already acquired (Lust, Flynn, & Foley, 1998, p. 56).

In the following chapters, I report the methodology, results, and discussion for each of the four experiments. Chapter 3 reports the results from the elicited production task of declarative clauses, which I refer to as Experiment 1. This experiment was used to obtain the baseline of focus and word order preferences, as well as to see if some of the children showed adult-like behavior. In Chapter 4, I report the results from Experiment 2, a referent selection task to test the comprehension of RCs. Chapter 5 reports the results from Experiment 3, the elicited imitation task of RCs, and Chapter 6 reports the results from Experiment 4, the elicited production task of RCs, which was based on Tanaka et al.’s (2014) study. Lastly, Chapter 7 concludes the dissertation with general discussion. Table 16 shows the summary of the experiments.

<table>
<thead>
<tr>
<th>Declarative clauses</th>
<th>Experiment 1: Elicited production</th>
<th>(Chapter 3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relative clauses</td>
<td>Experiment 2: Referent selection</td>
<td>(Chapter 4)</td>
</tr>
<tr>
<td></td>
<td>Experiment 3: Elicited imitation</td>
<td>(Chapter 5)</td>
</tr>
<tr>
<td></td>
<td>Experiment 4: Elicited production</td>
<td>(Chapter 6)</td>
</tr>
</tbody>
</table>
Chapter 3. Experiment 1: Production of Declarative Clauses

This chapter reports the results from an elicited production task that was designed to determine whether child participants know the function of verb morphology as well as the case markers required for ARCs and TRCs in simple declarative sentences. This experiment also tests whether the children have acquired the same focus-pattern preferences as adults.

3.1 Method

3.1.1 Participants

The participants were 19 Tagalog-dominant children (10 female, 9 male) from age 4;11 to 5;9 (mean 5;5). Four of them (2 female, 2 male) were tested in Bacoor City and 15 (8 female, 7 male) were tested in Quezon City. Two of the children tested in Quezon City were exposed to languages other than Tagalog and English (Bisaya and Ilokano) in the family, but had little reported proficiency in those languages. Adult controls ($N = 9$) also participated in this experiment, all of whom were tested in Quezon City.

3.1.2 Materials and Design

Participants were presented with 10 test items, each consisting of two pictures: a context picture and a target picture. The items were divided into 2 conditions: the AF-oriented condition and the TF-oriented condition.

In my previous work (Tanaka, 2015), I found that the speakers are more likely to produce AF sentences when (a) the agent is animate and definite/specific, and (b) the theme is inanimate and indefinite/nonspecific. My earlier work suggested that speakers almost always produce TF sentences when the agent and theme are both animate and definite/specific (Tanaka et al., 2016).

Based on these results, both conditions manipulated animacy and definiteness/specificity in ways that maximized the likelihood of the production of AF sentences in the AF-oriented condition, and TF sentences in the TF-oriented condition. First, the AF condition used semantically non-reversible events—such as cutting, eating, kicking, picking, and reading—with an animate agent and an inanimate theme. The definiteness/specificity of the animate agent was established with the use of a context picture (depicting only the agent) that was presented prior to the presentation of the target picture, but the inanimate theme was not included in the context.
picture. Figure 2 presents a sample context picture and a sample target picture from the AF-oriented condition.

![Context picture](image1.png) ![Target picture](image2.png)

**Figure 2.** Sample context and target picture in the AF-oriented condition.

Second, the TF-oriented condition involved semantically reversible events—such as carrying, chasing, hugging, pushing, and splashing—with an animate agent and an animate theme. The animate agent and animate theme were both included in the context pictures, and therefore were definite and specific. Figure 3 contains a sample context picture and a sample target picture from the TF-oriented condition.

![Context picture](image3.png) ![Target picture](image4.png)

**Figure 3.** Sample context and target picture in the TF-oriented condition.
Each condition was presented in a block. Four lists were created, varying the order of stimuli within each block as well as the order of the blocks. The summary of the experiment’s design is presented in Table 17. The complete list of stimuli can be found in Appendix B.

Table 17. Summary of the research design.

<table>
<thead>
<tr>
<th></th>
<th>AF-oriented</th>
<th>TF-oriented</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Agent</td>
<td>Theme</td>
</tr>
<tr>
<td>Animacy</td>
<td>+animate</td>
<td>-animate</td>
</tr>
<tr>
<td>Definiteness/Specificity</td>
<td>+definite</td>
<td>-definite</td>
</tr>
</tbody>
</table>

3.1.3 Procedure

Participants were each assigned one of the four lists. After seeing a context picture like Figure 3a with a Tagalog auditory prompt such as (110), they were shown a target picture like Figure 3b along with a query such as (111).

(110) May isa=ŋ babae at isa=ŋ lalake. exist one=LK girl CONJ one=LK boyküông
“There are a girl and a boy.”

(111) Ano ang naŋ-ya~yari dito?
what FOC AF-IPFV~happen here
“What is happening here?”

The characters that appear in the target picture had been previously seen in the context picture and were therefore expected to be definite. In this particular case, participants were expected to respond by reporting ‘the girl is splashing the boy’, giving us the opportunity to observe a possible preference for either AF or TF in patterns where both arguments are animate and definite/specific.

[36] In Tagalog, the expressions for ‘boy’ and ‘girl are bata=ŋ babae ‘female child’ and bata=ŋ lalake ‘male child.’ In all the experiments in this dissertation, I simply used the word babae ‘woman’ and lalake ‘man’ to refer to ‘boy’ and ‘girl,’ in order to avoid answers that use bata ‘child’ without specifying the gender of the characters.
3.2 Analysis

Participants’ responses were recorded, transcribed, and coded for verb morphology, case markers, and word order. The adults’ responses were transcribed by a fluent L2 speaker (the researcher), and the children’s responses were transcribed either by a native speaker or by a fluent L2 speaker (the researcher) and checked by a native speaker. If a participant produced two utterances, each with a different focus, only the first utterance was included in the analysis.

3.3 Results

3.3.1 Adults

A total of 90 responses from adults were analyzed. Among these, 30 responses produced by three adults were in RC forms, and therefore were analyzed separately. The results from the remaining six adults confirmed that the manipulation of animacy as well as definiteness/specificity as a strategy for eliciting focus patterns in declarative clauses was successful. As shown in Table 18, adults produced AF sentences 70.00% of the time in the AF-oriented condition and 100.00% of the time in the TF-oriented condition.

<table>
<thead>
<tr>
<th></th>
<th>AF</th>
<th>TF</th>
<th>Others</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>AF-oriented</td>
<td>21 70.00%</td>
<td>8 26.67%</td>
<td>1 3.33%</td>
<td>30 100.00%</td>
</tr>
<tr>
<td>TF-oriented</td>
<td>0 0.00%</td>
<td>30 100.00%</td>
<td>0 0.00%</td>
<td>30 100.00%</td>
</tr>
<tr>
<td>Overall</td>
<td>21 35.00%</td>
<td>38 63.33%</td>
<td>1 1.67%</td>
<td>60 100.00%</td>
</tr>
</tbody>
</table>

Individual results in Table 19 show that the AF preference in the AF-oriented condition was not uniform among the participants. While some participants (QA15 and QA16) showed a strong AF preference in the AF-oriented condition, producing at least four AF sentences, others fluctuated between AF and TF, not manifesting a strong preference for either. However, even in such cases, they were more likely to choose AF in the AF-oriented condition compared to the TF-oriented condition, and none of the participants produced AF in the TF-oriented condition.
Table 19. Adults’ individual results.

<table>
<thead>
<tr>
<th>Condition Responses</th>
<th>AF-oriented</th>
<th>TF-oriented</th>
</tr>
</thead>
<tbody>
<tr>
<td>QA13</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>QA15</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>QA16</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>QA18</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>QA20</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>QA21</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>21</td>
<td>8</td>
</tr>
</tbody>
</table>

As mentioned above, three adult participants produced RCs throughout the experiment, using an existential construction such as (112). This may have been because this experiment was conducted after the RC experiments reported in the subsequent chapters.

(112) May isäŋ bataŋ babae na [ s<um>i~sipa naŋ bola ].

EXIST one=LK child=LK female LK <AF>IPFV~kick NFOC ball
‘There is one girl that is kicking a/the ball.’ (QA19)

However, even in the RCs, the distribution of AF-patterns (ARCs) and TF-patterns (TRCs) followed the prediction, although the proportion of AF-patterns in the TF-oriented condition is much larger here (40.00%) compared to the declarative clauses (0.00%), as shown in Table 20.

Table 20. Percentage and frequency of ARCs (AF) and TRCs (TF) per condition.

<table>
<thead>
<tr>
<th></th>
<th>ARC</th>
<th>TRC</th>
<th>Others</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>AF-oriented</td>
<td>12 80.00%</td>
<td>2 13.33%</td>
<td>1 6.67%</td>
<td>15 100.00%</td>
</tr>
<tr>
<td>TF-oriented</td>
<td>6 40.00%</td>
<td>9 60.00%</td>
<td>0 0.00%</td>
<td>15 100.00%</td>
</tr>
<tr>
<td>Total</td>
<td>18 60.00%</td>
<td>11 36.67%</td>
<td>1 3.33%</td>
<td>30 100.00%</td>
</tr>
</tbody>
</table>

Table 21 shows the frequency of different word order patterns in adults’ responses. The most frequent word order overall was Verb-Agent-Theme (VAT). TF sentences were likely to follow VAT word order, and VAT sentences are most likely to exhibit TF. VTA order occurred in ten tokens out of 60, and most VTA sentences were in AF. While the PSA-final word order (VTA in AF and VAT in TF) was the preferred word order, speakers also seem to prefer placing agents

66
before themes. Additionally, the agent appeared preverbally on seven occasions, while the theme never occurred in this position.

Table 21. Word order distribution (declaratives only).

<table>
<thead>
<tr>
<th></th>
<th>AF</th>
<th>TF</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td>Verb-Agent-Theme</td>
<td>5</td>
<td>34</td>
<td>39</td>
</tr>
<tr>
<td>Verb-Theme-Agent</td>
<td>9</td>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td>Verb-Agent</td>
<td>3</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Agent-Verb-Theme</td>
<td>4</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>Total</td>
<td>21</td>
<td>38</td>
<td>59</td>
</tr>
</tbody>
</table>

The theme argument was omitted in three tokens, all of which contained the verb *basa* ‘read’, which can be used intransitively in Tagalog as in English.

(113) Nag-ba-basa aŋ bata=ŋ lalake.

*AF-IPFV-read FOC child=LK male*

‘The boy is reading.’ (QA16)

3.3.2 Children

A total of 190 utterances were produced by the child participants. Of these, 21 were excluded from analysis for various reasons, such as unintelligibility, the absence of a transitive verb (such as ‘they are running’ instead of ‘chasing’), and so on.

Table 22 shows the relative frequency of AF and TF utterances produced by children. As a group, children behaved much like adults in the TF-oriented condition, showing a larger proportion of TF utterances (74.39%) than AF utterances (19.51%). However, TF utterances were just as frequent as AF utterances in the AF-oriented condition (AF 44.83%; TF 52.87%).

37 Sometimes children produced partial reduplication of the verb without any affixes. This signals AF with progressive aspect in adult speech, as seen in (i). The use of aspect is not quite appropriate; however, in the case of (i), it is clear from the case marking on the NPs that children are using AF. A response was considered erroneous if the theme was marked with the focus marker.

(i) Ka~kain siya naŋ aiskrim.

*AF,FUT~eat 3SG,FOC NFOC icecream*

‘He/She will eat ice cream.’ (BC15)
Children also used other strategies, such as a partial reduplication the verb (which usually signals prospective aspect in isolation, but an imperfective aspect in combination with a focus affix) and bare verbs without any focus affixes.

**Table 22.** Percentage and frequency of children’s AF and TF utterences per condition.

<table>
<thead>
<tr>
<th></th>
<th>AF</th>
<th>TF</th>
<th>Bare</th>
<th>Other affixes</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>AF-oriented</td>
<td>39 44.83%</td>
<td>46 52.87%</td>
<td>2 2.30%</td>
<td>0 0.00%</td>
<td>87 100.00%</td>
</tr>
<tr>
<td>TF-oriented</td>
<td>16 19.51%</td>
<td>61 74.39%</td>
<td>3 3.66%</td>
<td>2 2.44%</td>
<td>82 100.00%</td>
</tr>
<tr>
<td>Overall</td>
<td>55 32.5%</td>
<td>107 63.31%</td>
<td>5 2.96%</td>
<td>2 1.18%</td>
<td>169 100.00%</td>
</tr>
</tbody>
</table>

Individual results in Table 23 show that some children behaved like adults, either showing a strong AF preference in the AF-oriented condition and a strong TF preference in the TF-oriented condition (e.g., BC16), or showing a split preference in the AF-oriented condition and a strong TF preference in the TF-oriented condition (e.g., QC02, QC11, QC20). While most of the children produced both focus patterns, there was one child who produced only AF patterns across conditions (e.g., BC15). It is unclear whether this child had acquired the TF affix—an issue that calls for attention in the following RC experiments.
Table 23. Individual results from children (sorted by age).

<table>
<thead>
<tr>
<th>Participant</th>
<th>Age</th>
<th>AF</th>
<th>TF</th>
<th>AF</th>
<th>TF</th>
</tr>
</thead>
<tbody>
<tr>
<td>QC14</td>
<td>4;11</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>BC15</td>
<td>5;1</td>
<td>5</td>
<td>0</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>QC06</td>
<td>5;1</td>
<td>1</td>
<td>4</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>QC09</td>
<td>5;1</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>QC13</td>
<td>5;2</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>QC02</td>
<td>5;3</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>QC10</td>
<td>5;3</td>
<td>1</td>
<td>4</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>QC03</td>
<td>5;4</td>
<td>1</td>
<td>4</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>QC04</td>
<td>5;5</td>
<td>1</td>
<td>3</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>QC07</td>
<td>5;5</td>
<td>1</td>
<td>4</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>QC19</td>
<td>5;6</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>QC17</td>
<td>5;7</td>
<td>1</td>
<td>4</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>QC05</td>
<td>5;8</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>QC18</td>
<td>5;8</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>QC11</td>
<td>5;9</td>
<td>3</td>
<td>2</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>QC20</td>
<td>5;9</td>
<td>2</td>
<td>3</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>BC16</td>
<td>NA^a</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>BC17</td>
<td>NA^b</td>
<td>1</td>
<td>4</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>BC18</td>
<td>NA^c</td>
<td>1</td>
<td>4</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>Total</td>
<td>39</td>
<td>46</td>
<td>16</td>
<td>61</td>
<td></td>
</tr>
</tbody>
</table>

^a,b,c The parents of these children did not report the children's age in the questionnaire.

Table 24 shows the overall frequency of the various word order patterns in children’s responses. Much like adults, Verb-Agent-Theme is the most frequent word order overall in both AF and TF utterances, although there are some TF responses with Verb-Theme-Agent word order. Unlike adults, children did not make use of Verb-Theme-Agent word order with AF. Moreover, unlike adults, children frequently omitted either or both the agent and the theme.
Table 24. Children’s word order distribution.

<table>
<thead>
<tr>
<th></th>
<th>AF</th>
<th>TF</th>
<th>Bare</th>
<th>Other affixes</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Verb-Agent-Theme</td>
<td>15</td>
<td>47</td>
<td>0</td>
<td>0</td>
<td>62</td>
</tr>
<tr>
<td>Verb-Theme-Agent</td>
<td>0</td>
<td>12</td>
<td>0</td>
<td>0</td>
<td>12</td>
</tr>
<tr>
<td>Verb-Agent</td>
<td>4</td>
<td>7</td>
<td>0</td>
<td>0</td>
<td>11</td>
</tr>
<tr>
<td>Verb-Theme</td>
<td>19</td>
<td>31</td>
<td>2</td>
<td>1</td>
<td>53</td>
</tr>
<tr>
<td>Agent-Verb-Theme</td>
<td>3</td>
<td>7</td>
<td>0</td>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td>Verb (no NPs)</td>
<td>14</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>21</td>
</tr>
<tr>
<td>Total</td>
<td>55</td>
<td>107</td>
<td>5</td>
<td>2</td>
<td>169</td>
</tr>
</tbody>
</table>

Since some children may be in the stage of telegraphic speech, absence of verb morphology or case marking was not taken to be an indication of errors—in contrast to cases where they produced verb morphology and case marking that were not in congruence; that is, AF sentences with a PSA theme, and TF sentences with a PSA agent, as seen below in (114–117).

(114)  

a. Target  
  nag-ha~hag aŋ lalake  
  <AF>IPFV~hug FOC boy  
  ‘The boy is hugging Ø.’

b. AF sentence with VA word order and non-PSA agent  
  nag-ha~hag ni₃₈ lalake  
  <AF>IPFV~hug NFOC boy  
  ‘Ø is hugging ‘the boy.’”

(QC05, 5;8)

(115)  

a. Target  
  p<in>i~pitas aŋ flawər  
  <TF>IPFV~pick FOC flower  
  ‘Ø picking the flower.’

b. TF sentence with VT word order and non-PSA theme  
  p<in>i~pitas naŋ flawər  
  <TF>IPFV~pick NFOC flower  
  ‘A/the flower is picking Ø.’

(BC18, age unknown)

₃₈ This is a non-focus marker that is used for personal names, but it is overgeneralized here for a common noun.
Note that for the 21 utterances that contained only a verb in Table 24, it was not possible to judge whether the children’s speech contained errors.

Among the 213 responses included in the analysis, 19 utterances, produced by 10 children, contained visible errors in case marking and/or agreement, as summarized in Table 25. Many of these errors occurred in the AF-oriented condition that included an animacy contrast between an animate agent and an inanimate theme. It is possible that the children did not feel the necessity of focus marking, as it was clear from animacy what the agent was and what the theme was. Evidently, however, these children can use focus appropriately when both NPs are animate and need focus marking to discern the agent from the theme. Although they made errors on no more than two out of five tokens in the TF-oriented condition, the performance of participants BC18, QC02, QC04, QC05, and QC07 merits attention in the subsequent experiments.

\[\text{39} \quad \text{yuŋ} \text{ is a colloquial form of the focus marker } aŋ, \text{ which is derived from a near-hearer demonstrative + linker } iyo=ŋ. \]

\text{As seen in subsequent chapters, children use this form predominantly instead of } aŋ.
Table 25. Frequency of erroneous utterances per condition per children.

<table>
<thead>
<tr>
<th>Age</th>
<th>AF-oriented condition</th>
<th>TF-oriented condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>QC13 5;2</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>QC02 5;3</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>QC04 5;5</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>QC07 5;5</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>QC17 5;7</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>QC05 5;8</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>QC18 5;8</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>BC15 NA</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>BC18 NA</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>12</td>
<td>7</td>
</tr>
</tbody>
</table>

3.4 Discussion

Experiment 1 used an elicited production task to determine (a) whether child participants know the function of the verbal focus morphology and the case markers required to form and interpret simple declarative AF and TF sentences, and (b) whether they have the same focus-pattern preferences as adults. Adults changed the focus patterns they used depending on animacy and definiteness/specificity. They used AF 70% of the time in the AF-oriented condition (in which the agent was animate and definite/specific and the theme was inanimate and indefinite/nonspecific), and TF 100% of the time in the TF-oriented condition (in which the agent and theme were both animate and definite/specific). Children used TF 74.39% of the time in the TF-oriented condition, but in the AF-oriented condition, the frequency of AF and TF patterns were almost evenly split (AF 44.83%; TF 52.87%). Although children seem to be less sensitive to animacy and definiteness/specificity compared to adults, the production of AF still increased in the AF-oriented condition compared to the TF-oriented condition. Therefore, it is clear that children have some sensitivity to these factors, albeit not as much as adults.

Some children produced sentences in which focus morphology on the verb and case markers do not match, even when there was no animacy contrast between the agent and the theme. The performance of these children may call for special attention in the subsequent experiments. However, there were few such errors, so it is safe to say that most of the children also understand the function of focus marking.
Furthermore, while adults seem to use both Verb-Agent-Theme word order and Verb-Theme-Agent word order with AF but only Verb-Agent-Theme word order with TF, children almost always used Verb-Agent-Theme word order (at least when both NPs are present) in both focus patterns, except for some responses with Verb-Theme-Agent TF responses. These results seem to support Garcia et al.’s (2015) findings that children prefer Verb-Agent-Theme word order.
Chapter 4. Experiment 2: Comprehension of Relative Clauses

This chapter reports on the comprehension experiment of Tagalog RCs, making use of a referent-selection matching task. Section 4.1 describes the experiment in detail, including the methodology, participants, materials, and design. Section 4.2 explains how I went about analyzing the results of the experiment. The results are reported in §4.3, followed by a discussion of their import in §4.4.

4.1 Method

4.1.1 Participants

Thirty-one child speakers of Tagalog (10 male, 21 female), aged 4;8–5;9 (mean 5;5), participated in this experiment. Thirteen (4 male, 9 female; mean age 5;6) were tested in Bacoor City and 18 (6 male, 12 female; mean age 5;2) were tested in Quezon City. All but one child\(^{40}\) were reported to be either less proficient in English than Tagalog, or were equally proficient in both in the language history survey, which was filled out by their parents. Only two children had been exposed to additional languages at home (Bisaya, Ilokano, and Kapampangan), but they had little to no proficiency in them. Twenty-nine adult speakers also participated as the control group. Adult data were also collected in two locations: Quezon City \((n = 23)\) and Bacoor City \((n = 6)\).

4.1.2 Materials and Design

Two pseudo-randomized lists were created,\(^{41}\) each containing four practice items and 10 test items. Each practice item consisted of two pictures depicting animate agents and inanimate themes. For example, one practice item depicted a girl picking a flower in one picture, and the other picture showed a different girl picking a tomato, as illustrated in Figure 4. Although the practice items were themselves RCs, they crucially involved non-reversible events, and so were significantly easier to interpret than the actual test items.

---

\(^{40}\) This child was reported to be more proficient in English; however, this child was also reported to have more exposure to Tagalog than to English.

\(^{41}\) One list was created by reversing the order of presentation of the other list.
Each test item consisted of a panel of two pictures that depict reversible events. Figure 5 shows one of the items that depicted the event of chasing—‘a girl chasing a boy’ and ‘a boy chasing a girl.’ The same five verbs used in Experiment 1 for the TF-oriented condition were used for both RC types: *basa* ‘wet’, *buhat* ‘carry’, *habol* ‘chase’, *tulak* ‘push’, *yakap* ‘hug.’ Together, the task included ten test items in total. The same five verbs were also used in subsequent experiments, allowing for close comparison of results across the various experiments.

The design of the panels allows for testing comprehension of either an ARC or a TRC (see below). The test sentences associated with each panel were varied, as was the configuration of the characters so as to create variation from item to item. Appendix C contains the complete list of stimuli.
4.1.3 Procedure

Participants were tested on one of the two pseudo-randomized lists. With the use of four practice items, participants were first trained to select the character of their choice, and not the whole picture. In each test trial, participants were shown a panel of two pictures, like those in Figure 6, and were asked to select a referent that matches the auditory description, which was given in the form of either an ARC or TRC. For example, Figure 6 contains a picture of ‘a girl chasing a boy’ and another picture of ‘a boy chasing a girl’.

![ARC target and TRC target](image)

**Figure 6.** Target responses for ARC and TRC.

If a participant hears the ARC in (118), the correct response is to select the girl in the picture on the left, as shown by the red box in Figure 6. In contrast, if a participant hears the TRC in (119), he or she should select the girl in the picture on the right, as shown in the blue box in Figure 6.

(118) ARC

```
<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>h</td>
<td>&lt;u</td>
<td>m&gt;</td>
<td>a</td>
<td>h</td>
<td>a</td>
</tr>
<tr>
<td>na</td>
<td>l</td>
<td>a</td>
<td>l</td>
<td>a</td>
<td>k</td>
</tr>
</tbody>
</table>

```

girl=LK <AF>IPFV~chase NFOC boy

‘(the) girl [that _ is chasing a/the boy]’
The experiment was carried out using MouseTracker (Freeman & Ambady, 2010), which records the movements of the computer mouse as participants use it to click on the character of their choice. For children, the software was used merely to record where on the screen the children pointed. Because manipulation of the mouse was difficult for the children, they were instructed to simply point at the character of their choice, at which point a research assistant clicked on the location of the child’s finger. The adult participants manipulated the computer mouse on their own, so that mouse movements as well as the reaction times could be analyzed.

4.2 Analysis

Accuracy (i.e., selection of the correct picture) was measured for adults and children. However, for the reason noted above, reaction time (i.e., how long it takes to move a mouse and how long it takes to click on a character) was measured for adults only.

Participants’ responses were classified with the help of the answer types illustrated in Figure 7 and Figure 8.

---

42 In the previous version of the task, children were instructed to mark the character with a pencil/crayon. However, sometimes they circled the whole picture. The “pointing” procedure was introduced in order to avoid such responses. The ideal strategy would be to use a laptop or tablet with a touch screen, which should be implemented in future research.
For instance, in the ARC ‘the girl that is chasing the boy’, the girl in the left picture in Figure 7 is coded as the target referent—the agent. If the participant chose the girl in the picture on the right (the theme), this was categorized as a reversal error, as the thematic role of the girl is reversed (from agent to theme). Responses that involved pointing to one of the boys were coded as head errors since the head modified by the RC must refer to a girl. Head errors were coded separately for instances in the correct picture (the same picture as the target response) and in the wrong picture (the same picture as the reversal error).

For instance, in the ARC ‘the girl that is chasing the boy’,
For TRC items, the girl on the right in Figure 8 was coded as the target referent—the theme argument. Selection of the other girl, who is the agent of the chasing action, was categorized as a reversal error. Selection of a boy was coded as a head error.

4.3 Results

4.3.1 Adults

Adults by and large showed very high accuracy for both types of RCs. They clicked on the target referent 95.17% of the time for ARCs and 88.97% of the time for TRCs (Figure 9).

The accuracy data were fitted to a mixed-effects logistic regression model that included RC type as a fixed effect and location of testing, participants, items, and presentation order as random effects. There was a significant main effect of RC type ($\beta = -1.65, SE = 0.73, z = -2.14, p < .05$). However, a majority of the errors were made by just six participants, two of which had no target responses in one of the RC types. BA03 answered only two ARCs and no TRCs correct. BA04 answered all the ARCs correctly but none of the TRCs. Removing these two participants from the statistical analysis, there is no significant difference between the two RC type ($p = .47$).
Reaction times were calculated based on target responses only and were measured in two different ways: how long it took for the participants to initiate mouse movement (initial time) and how long it took to click after the presentation of the stimuli (end time). The initial times are at best suggestive, because we cannot be sure whether the mouse movement happened with the intention of clicking somewhere specific. Participants could have easily moved the mouse by mistake or without any purpose. For this reason, the initial times prior to the verb onset (measured for each audio file) were excluded; mouse movements during this period were initiated before any useful information (verb affixes) appeared in the test items. Although I cannot completely exclude the possibility of random mouse movements in the remaining data, I can at least reduce such possibility. As a result, only a subset (43.79%) of data was used for the initial time calculation. Moreover, because the place in the picture where it was appropriate to click the mouse differed across the items, normalized reaction times were calculated in order to average the distance between the initial location of the mouse and the location of the click. The mean values of these three measurements are shown in Figure 10.

![Figure 10. Mean reaction times of adults (ms).]

---

43 Normalized reaction times were calculated by dividing the end time by the distance between the initial location of the mouse (which was the same across items—the bottom center of the screen) and the location of the click.
The reaction time data were fit to a linear mixed-effects model that included RC type as fixed effects and location of testing, participants, items, and presentation order as random effects. No significant main effect of RC type was found in any of these three measurements (initial time $p = .29$; end time $p = .21$; normalized reaction time $p = .08$), and the exclusion of BA03 and BA04 did not change the results.

### 4.3.2 Children

Figure 11 shows the overall results for children. The solid dark bars indicate selection of the target character in the target picture, and is therefore the target (correct) response.

As seen in Figure 11, children exhibit a large advantage for ARCs (49.03%) over TRCs (14.84%), an effect that is significant (effect of RC type: $\beta = -1.77$, $SE = 0.29$, $z = -6.14$, $p < .001$) when the data were fitted to a mixed-effects logistic regression model that included RC type as fixed effects and locations of testing, participants, items, and orders of presentation as random effects. Furthermore, reversals occurred significantly more often in TRCs than ARCs (effect of RC type: $\beta = 1.31$, $SE = 0.35$, $z = 3.70$, $p < .001$). While head errors in correct pictures were equally frequent in ARCs and TRCs ($p = .89$), head errors in wrong pictures were significantly more frequent in TRCs (effect of RC type: $\beta = 0.96$, $SE = 0.47$, $z = 2.02$, $p < .05$).
Examples of each kind of error, first provided in Figure 7 and Figure 8, are given with a different item again in Figure 12.

**Figure 12.** Response types for a TRC ‘the boy that the girl is hugging.’

The individual results showed large variation, but the majority of the children (21 out of 31) selected the target referent more often with ARCs than TRCs (Table 26). Fifteen of these 21 children correctly responded to two or more ARC items than TRC items, and 13 children accurately comprehended at least three more ARC items than TRC items.
Table 26. Individuals with more target responses to ARCs than TRCs (sorted by age).

<table>
<thead>
<tr>
<th>Child</th>
<th>Age</th>
<th>Target</th>
<th>Head</th>
<th>Reversal</th>
<th>Head</th>
<th>Correct picture</th>
<th>Wrong picture</th>
<th>Correct picture</th>
<th>Wrong picture</th>
</tr>
</thead>
<tbody>
<tr>
<td>QC16</td>
<td>4;10</td>
<td>3</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>QC09</td>
<td>5;0</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>QC06</td>
<td>5;1</td>
<td>3</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>BC02</td>
<td>5;2</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>QC12</td>
<td>5;2</td>
<td>3</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>QC13</td>
<td>5;2</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>QC10</td>
<td>5;3</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>QC03</td>
<td>5;4</td>
<td>3</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>BC16</td>
<td>5;5</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>QC07</td>
<td>5;5</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>1</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>QC15</td>
<td>5;6</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>3</td>
<td>0</td>
<td>2</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>QC19</td>
<td>5;6</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>BC07</td>
<td>5;8</td>
<td>1</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>QC05</td>
<td>5;8</td>
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<td>0</td>
<td>0</td>
<td>1</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>QC18</td>
<td>5;8</td>
<td>4</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>QC11</td>
<td>5;9</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>BC01</td>
<td>5;9</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>4</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>BC11</td>
<td>5;9</td>
<td>1</td>
<td>3</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>QC20</td>
<td>5;9</td>
<td>4</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>BC04</td>
<td>N/A</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>BC18</td>
<td>N/A</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

Five children had more target responses with TRCs than ARCs (Table 27), but the difference between ARCs and TRCs was slight—just one item for five children and two for one child (BC13). In fact, while more than half of the children (16 out of 30) had three or more target responses in ARC condition as shown in Table 26, only two children were as successful in the TRC condition as shown in Table 27, and both of these only understood three items correctly. Another five children comprehended the same number of ARCs and TRCs (Table 28), but none of these participants understood more than two items correctly in either condition.
Table 27. Individuals with more target responses with TRCs than ARCs (sorted by age).

<table>
<thead>
<tr>
<th>Children</th>
<th>Age</th>
<th>Target</th>
<th>Head</th>
<th>Reversal</th>
<th>Head</th>
<th>Correct picture</th>
<th>Wrong picture</th>
<th>Correct picture</th>
<th>Wrong picture</th>
</tr>
</thead>
<tbody>
<tr>
<td>BC03</td>
<td>4;8</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>QC11</td>
<td>4;11</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>BC12</td>
<td>5;1</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>BC09</td>
<td>5;8</td>
<td>0</td>
<td>2</td>
<td>3</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>BC13</td>
<td>N/A</td>
<td>1</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 28. Individuals with equal numbers of target responses in ARCs and TRCs (sorted by age).

<table>
<thead>
<tr>
<th>Children</th>
<th>Age</th>
<th>Target</th>
<th>Head</th>
<th>Reversal</th>
<th>Head</th>
<th>Correct picture</th>
<th>Wrong picture</th>
<th>Correct picture</th>
<th>Wrong picture</th>
</tr>
</thead>
<tbody>
<tr>
<td>BC15</td>
<td>5;3</td>
<td>1</td>
<td>3</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>QC02</td>
<td>5;3</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>QC04</td>
<td>5;5</td>
<td>0</td>
<td>2</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>QC17</td>
<td>5;7</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>BC17</td>
<td>5;9</td>
<td>0</td>
<td>3</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>5</td>
</tr>
</tbody>
</table>

4.4 Discussion

Experiment 2 found an asymmetry between ARCs and TRCs in RC comprehension; both adults and children showed better accuracy in the comprehension of ARCs. Children’s most common errors were reversals in which they switched the thematic role of the relativized element. This happened more frequently with TRCs, which means that more TRCs were turned into ARCs than vice versa. Individual results also indicated that more children exhibited superior performance on ARCs than on TRCs.

These findings all point to an ARC advantage; however, there are a few remaining issues to consider. First, when the two problematic adult participants were excluded from the analysis, ARCs and TRCs did not differ in accuracy. This casts doubt on the asymmetry found in adults. Other issues include frequent head errors in children, and another interpretation of the ARC advantage.
4.4.1 Doubts about an Asymmetry in Adults

Although the accuracy data from adults showed an ARC advantage, the errors with TRCs were predominantly made by two adult participants, who produced no target responses with one of the two RC types. When these two adult participants were excluded from the analysis, the remaining results for adults showed a lack of asymmetry. It is also not clear yet whether the results from adults show a genuine symmetry in the comprehension of Tagalog RCs, or whether the task’s dependent variables were not sensitive enough to permit the discovery a difference. In future work, it would be desirable to use potentially more sensitive measurements, such as reading times and eye movements.

4.4.2 Frequent Head Errors in Children

Children frequently selected the wrong head: 38.06% of the ARC responses (26.45% in the correct pictures, 11.61% in the wrong pictures) and 50.97% of the TRC responses (25.81% in the correct pictures, 25.16% in the wrong pictures). It is puzzling why this was the case, and various factors call for attention including an age effect, a task effect, an item effect, and a recency effect.

The first possibility is that head errors are a manifestation of an age effect—that is, errors of this type are made more often by younger children. To address this possibility, I took the median age of children (5;5) and divided the children into a group younger than the age of 5;5 (13 children aged 4;8–5;4) and a group at the age of 5;5 or older (15 children aged 5;5–5;9). Three children whose ages were not recorded were excluded. The results from the younger group are shown in Table 29, and the results from the older group are shown in Table 30.

<table>
<thead>
<tr>
<th>Table 29. Response types of the younger children ($n = 13$, 4;8–5;4).</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td>----------------------</td>
</tr>
<tr>
<td>ARC</td>
</tr>
<tr>
<td>TRC</td>
</tr>
</tbody>
</table>
Table 30. Response types of older children (n = 15, 5;5–5;8).

<table>
<thead>
<tr>
<th></th>
<th>Target</th>
<th>ARC</th>
<th></th>
<th>Reversals</th>
<th></th>
<th>TRC</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Head errors</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Head errors</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(correct picture)</td>
<td></td>
<td></td>
<td>(wrong picture)</td>
<td></td>
<td>(correct picture)</td>
<td></td>
</tr>
<tr>
<td>ARC</td>
<td>38</td>
<td>18</td>
<td>8</td>
<td>11</td>
<td>14.67%</td>
<td>29</td>
<td>11.67%</td>
</tr>
<tr>
<td>TRC</td>
<td>6</td>
<td>19</td>
<td>29</td>
<td>21</td>
<td>28.00%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Both groups show an equally high percentage of head errors in correct pictures. Therefore, it was not the case that the younger children were more likely to make errors of this type.

A second possibility is a task effect—that is, children are more likely to make such errors later in the experiment because of interference from the previous items, fatigue, or a lack of concentration. To address this, I examined the rate of head errors in each trial, shown in Table 31.

Although there is some variation here, we see that children were already making head errors at the earliest stage of the experiment, and it is not the case that the rates of head errors increase in the later trials.

Table 31. Rate of head errors (correct picture) per trial.

<table>
<thead>
<tr>
<th>Trials</th>
<th>Head errors (correct picture)</th>
<th>Head errors (wrong picture)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>19.35%</td>
<td>16.13%</td>
</tr>
<tr>
<td>2</td>
<td>19.35%</td>
<td>12.90%</td>
</tr>
<tr>
<td>3</td>
<td>25.81%</td>
<td>19.35%</td>
</tr>
<tr>
<td>4</td>
<td>25.81%</td>
<td>19.35%</td>
</tr>
<tr>
<td>5</td>
<td>19.35%</td>
<td>22.58%</td>
</tr>
<tr>
<td>6</td>
<td>32.26%</td>
<td>19.35%</td>
</tr>
<tr>
<td>7</td>
<td>25.81%</td>
<td>22.58%</td>
</tr>
<tr>
<td>8</td>
<td>35.48%</td>
<td>16.13%</td>
</tr>
<tr>
<td>9</td>
<td>35.48%</td>
<td>29.03%</td>
</tr>
<tr>
<td>10</td>
<td>22.58%</td>
<td>3.23%</td>
</tr>
</tbody>
</table>

A third possibility is item effect, in which the head errors would be frequent for only some of the items. Although there is some variation in the proportion of head errors per item, head errors were made in all the items (Table 32).
Another possibility to consider at this point is recency interference. Are children influenced by the last thing they hear in the test item, sometimes incorrectly picking it as the head? Or are children influenced not by the last thing they hear but by the last thing they look at? There is no direct way to examine this with the current data, but one way to test this hypothesis in the future would be to use RCs without any NPs inside, such as (120) and (121).

If children’s accuracy improves on these RCs, then we might be able to conclude that the children are influenced by the last thing they either hear or look at. However, even here there is a problem, as the RCs in (120) and (121) do not leave any room for head errors, and therefore are arguably not appropriate to test the nature of the head errors. In order to test whether the head errors are genuine errors or merely a manifestation of recency interference, the use of RCs with a triadic verb like (122) could well be more appropriate.

### Table 32. Response types by item.

<table>
<thead>
<tr>
<th></th>
<th>Target</th>
<th>Head errors (correct picture)</th>
<th>Reversal</th>
<th>Head errors (wrong picture)</th>
</tr>
</thead>
<tbody>
<tr>
<td>carry</td>
<td>45.16%</td>
<td>16.13%</td>
<td>9.68%</td>
<td>29.03%</td>
</tr>
<tr>
<td>chase</td>
<td>41.94%</td>
<td>16.13%</td>
<td>16.13%</td>
<td>25.81%</td>
</tr>
<tr>
<td>ARC</td>
<td>hug</td>
<td>58.06%</td>
<td>12.90%</td>
<td>6.45%</td>
</tr>
<tr>
<td></td>
<td>push</td>
<td>54.84%</td>
<td>12.90%</td>
<td>6.45%</td>
</tr>
<tr>
<td></td>
<td>wet</td>
<td>45.16%</td>
<td>6.45%</td>
<td>19.35%</td>
</tr>
<tr>
<td>carry</td>
<td>19.35%</td>
<td>29.03%</td>
<td>35.48%</td>
<td>16.13%</td>
</tr>
<tr>
<td>chase</td>
<td>12.90%</td>
<td>19.35%</td>
<td>45.16%</td>
<td>22.58%</td>
</tr>
<tr>
<td>TRC</td>
<td>hug</td>
<td>12.90%</td>
<td>16.13%</td>
<td>38.71%</td>
</tr>
<tr>
<td></td>
<td>push</td>
<td>6.45%</td>
<td>29.03%</td>
<td>35.48%</td>
</tr>
<tr>
<td></td>
<td>wet</td>
<td>22.58%</td>
<td>22.58%</td>
<td>25.81%</td>
</tr>
</tbody>
</table>

(120)  babae=ŋ [ h<um>a~habol _ ]
girl=LK <AF>IPFV~chase
‘(the) girl that is chasing’

(121)  babae=ŋ [ h<in>a~habol _ ]
girl=LK <TF>IPFV~chase
‘(the) girl that is being chased’
Because there are two RC-internal NPs here, patterns of this type can help us determine whether the head errors are due to recency interference or not. If the participants select the last NP consistently, it is possible that this is due to recency interference. However, if the participant select the penultimate NP, then it is possible that it is a genuine head error. Lastly, it is also possible to do an eye-tracking experiment to see whether participants who make head errors are more likely to do so when they have just looked at the referent of the final NP in the sentence.

4.4.3 Another Interpretation

Although I have tentatively concluded that comprehension of Tagalog RCs manifest an agent advantage, there may be another way to explain the results. As noted in Chapter 1, many speakers accept the RC pattern in (123), despite claims to the contrary in previous research. That is, it is possible to relativize a non-PSA agent in a theme focus clause (Ceña & Nolasco, 2011, p. 248).

![Image](123)

\[
\text{babae}=\eta \quad [\; \text{nag-bigay} \; \text{naŋ} \; \text{regalo} \; \text{sa} \; \text{lalake} \; ]
\]

\[
girl=\text{LK} \quad \text{AF.PFV-give} \quad \text{NFOC} \; \text{gift} \; \text{OBL} \; \text{boy}
\]

\[\quad \text{‘(the) girl [that _ gave a/the gift to a/the boy]’}\]

Crucially, though, it is not possible to relativize a non-PSA theme in an agent focus clause, as shown in (124).

![Image](124)

\[
\text{lalake}=\eta \quad [\; \text{h<in>a~habol} \; \text{aŋ} \; \text{babae} \; ]
\]

\[
\text{boy}=\text{LK} \quad \text{<TF>IPFV-chase} \quad \text{FOC} \; \text{girl}
\]

\[\quad \text{‘(the) boy [that _ is chasing the girl]’}\]

This means that whereas the agent focus affix is an early and unambiguous cue of the thematic role of the relativized element (the head) of an RC, this is not true for the theme focus affix. RCs of this type could have a relativized agent (as in (125)) or a relativized theme (as in (126)).
order to interpret these patterns, participants would have to wait until they encounter the other argument within the RC before determining (from its case) whether the referent is the agent or the theme: an *aŋ*-marked nominal within the RC would indicate a theme, and hence the relativized nominal must be interpreted as an agent, while a *naŋ*-marked nominal would indicate an agent, and therefore the relativized nominal must therefore be the theme. This means that in order to determine the thematic role of the relativized element, listeners must wait until they encounter the argument within the RC and engage in this process of elimination.

\[(125)\] \[\text{NP [RC V-theme focus } \ldots \text{ } aŋ \text{ NP } \ldots ]\] head theme (the relativized argument must be the agent)

\[(126)\] \[\text{NP [RC V-theme focus } \ldots \text{ } naŋ \text{ NP } \ldots ]\] head agent (the relativized argument must be the theme)

This is obviously a potentially costly processing procedure, and it is tempting to think that it might help explain children’s difficulty with RCs whose verb carries theme focus.

One possible avenue is to investigate what adults and children do in the production of RCs, as I did in this dissertation. When speakers are producing RCs, the status of the head noun is known to the speaker from the outset, so there is no danger of confusion. Therefore, if the production results also show an ARC advantage, it is possible to discount this alternative interpretation of the ARC advantage.\(^{44}\)

I will discuss a production task in Chapter 6, but let us first turn to the imitation task described in the next chapter.

\(^{44}\) The production of an RC like (125) itself could be due to an agent advantage—after all, the extraction of a theme is not possible unless the verb has the appropriate TF morphology, but an agent can be extracted without AF morphology on the verb.
Chapter 5. Experiment 3: Imitation of Relative Clauses

In this chapter, I report on the results from an elicited imitation task. This task was employed in order to measure children’s production without demanding too much from the children. From earlier pilot studies, it was clear that elicited production can be a very challenging and demanding task for children. Imitation tasks have been shown to measure children’s syntactic knowledge, as children only repeat what they know (Lust et al., 1998). Therefore, an elicited imitation task makes it possible for us to measure children’s production performance without putting as much burden on them as in a full-fledged elicited production task. Section 5.1 describes the research design and §5.2 explains how I analyzed the results of the experiment. The results themselves are reported in §5.3, followed by a discussion of their import in §5.4.

5.1 Method

5.1.1 Participants

Participants were 13 Tagalog-speaking children (9 female, 4 male) aged 4;11–5;9 (mean 5;0). Four children (2 female, 2 male) were tested in Bacoor City and nine (7 female, 2 male) were tested in Quezon City. One child tested in Bacoor City and one child tested in Quezon City were exposed to languages other than Tagalog and English (Bisaya and Kapampangan), but had little reported proficiency in those languages.

5.1.2 Materials and Design

Test items contained RCs in isolation. Twenty test items were constructed: five for each of the two RC types in both animacy conditions. Two animacy conditions were made by keeping the animacy of the agent constant and manipulating the animacy of the theme. In the reversible condition, all the agents and themes were animate. Five verbs were used in the reversible condition: hanap ‘look for’, hila ‘pull’, huli ‘catch’, kurot ‘pinch’, and tawag ‘call.’ In the non-reversible condition, all of the agents were animate and all of the themes were inanimate. The verbs inom ‘drink’, linis ‘clean’, luto ‘cook’, sulat ‘write’, tinda ‘sell’ were used in the non-reversible condition. The NPs and verbs used in this experiment differed from the other experiments reported in this dissertation in order to minimize a possible task effect. Table 33 shows sample test items. A complete list of stimuli can be found in Appendix D.
Table 33. Sample test sentences for each condition in Experiment 3.

<table>
<thead>
<tr>
<th>Animacy</th>
<th>RC type</th>
<th>Sample RCs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reversible</td>
<td>ARC</td>
<td>doktor na k&lt;um&gt;kurot naŋ artista</td>
</tr>
<tr>
<td></td>
<td></td>
<td>doctor LK &lt;AF&gt;IPFV–pinch NFOC actor</td>
</tr>
<tr>
<td></td>
<td></td>
<td>’(the) doctor that is pinching an/the actor’</td>
</tr>
<tr>
<td></td>
<td>TRC</td>
<td>titser na k&lt;in&gt;kurot naŋ doktor</td>
</tr>
<tr>
<td></td>
<td></td>
<td>teacher LK &lt;TF&gt;IPFV–pinch NFOC doctor</td>
</tr>
<tr>
<td></td>
<td></td>
<td>’(the) teacher that a/the doctor is pinching’</td>
</tr>
<tr>
<td>Non-reversible</td>
<td>ARC</td>
<td>doktor na &lt;um&gt;i–inom naŋ gatas</td>
</tr>
<tr>
<td></td>
<td></td>
<td>doctor LK &lt;AF&gt;IPFV–drink NFOC milk</td>
</tr>
<tr>
<td></td>
<td></td>
<td>’(the) doctor that is drinking milk’</td>
</tr>
<tr>
<td></td>
<td>TRC</td>
<td>dyus na &lt;in&gt;i–inom naŋ doktor</td>
</tr>
<tr>
<td></td>
<td></td>
<td>juice LK &lt;TF&gt;IPFV–drink NFOC doctor</td>
</tr>
<tr>
<td></td>
<td></td>
<td>’(the) juice that a/the doctor is drinking’</td>
</tr>
</tbody>
</table>

5.1.3 Procedure
Children were asked to help a puppet learn Tagalog. They either heard the RCs through a pair of headphones or an experimenter whispered the RCs into their ears. They were then asked to repeat what they heard to the puppet, who could not hear the sentences. No pictures or other props were used. They first practiced with three items such as (127) and (128), which involved adjectives rather than RCs. Adjectival modification also requires a linker (like RCs), but not verbal focus morphology.

(127) ibo(n)=ŋ malaki
bird=LK big
’the big bird’

(128) kotse=ŋ maliit
car=LK small
’the small car’

The first block after the practice items presented the reversible condition with pseudo-randomized ARCs and TRCs, and the second block presented the non-reversible condition. This was done in order to match the design with the production task that is reported in the following chapter. Participants’ responses were audio-recorded and transcribed for later analysis.
5.2 Analysis

The responses were transcribed by a fluent L2 speaker (the researcher) and checked by a native speaker. The coding of the responses followed the method employed by Diessel and Tomasello (2005). I also classified the responses into different categories in order to make the results comparable to the ones from the elicited production task in the next chapter.

A response was considered a target response if the participants repeated the correct head of the RC, the correct verb forms, the correct RC-internal NP, and the correct case marking on the NP inside the RC. Minor mistakes, such as lexical substitutions (e.g., changing the verb to a semantically and structurally comparable one, such as tinda ‘sell’ to benta ‘sell’), affix substitutions (e.g., changing the AF affix from -um- to mag-) or minor grammatical errors (e.g., missing linker), were noted, but these responses were still considered to be target responses.

A response was treated as a reversal error if the correct head was produced but its thematic role was changed from agent to theme or vice versa. In the example in (129), the RC is restructured in a way that changes the thematic role of titser ‘teacher’ from theme to agent.

Responses which were otherwise ungrammatical or in which the structure or the meaning of the RC was changed were also classified as errors.

(129) a. Target (TRC)
   titser na [ k<in>u~kurot nəŋ doktor ]
   teacher LK <TF>IPFV~pinch NFOC doctor
   ‘(the) teacher [that a/the doctor is pinching ]’

   b. Response (ARC)
      titser na [ k<um>u~kurot nəŋ doktor ]
      teacher LK <AF>IPFV~pinch NFOC doctor
      ‘(the) teacher [that _ is pinching a/the doctor ]’

5.3 Results

A total of 260 responses were obtained from the children. The results from one child (BC15) were excluded from analysis as his response consistently lacked case marking and focus affixes. The remaining 240 responses were classified into response types, as summarized in Table 34.
Table 34. Types of responses from all the children.

<table>
<thead>
<tr>
<th></th>
<th>Reversible</th>
<th></th>
<th>Non-reversible</th>
<th></th>
<th>Overall</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ARC</td>
<td>TRC</td>
<td>ARC</td>
<td>TRC</td>
<td>ARC</td>
<td>TRC</td>
</tr>
<tr>
<td>Target</td>
<td>48</td>
<td>80.00%</td>
<td>43</td>
<td>71.67%</td>
<td>103</td>
<td>85.83%</td>
</tr>
<tr>
<td>Reversal</td>
<td>4</td>
<td>6.67%</td>
<td>14</td>
<td>23.33%</td>
<td>8</td>
<td>6.67%</td>
</tr>
<tr>
<td>Other errors</td>
<td>4</td>
<td>6.67%</td>
<td>2</td>
<td>3.33%</td>
<td>5</td>
<td>4.17%</td>
</tr>
<tr>
<td>Unintelligible answers</td>
<td>4</td>
<td>6.67%</td>
<td>1</td>
<td>1.67%</td>
<td>4</td>
<td>3.33%</td>
</tr>
<tr>
<td>Total</td>
<td>60</td>
<td>100.00%</td>
<td>60</td>
<td>100.00%</td>
<td>120</td>
<td>100.00%</td>
</tr>
</tbody>
</table>

Children successfully imitated 85.85% of ARCs (80.00% in the reversible condition; 91.67% in the non-reversible condition) and 74.17% of TRCs (71.67% in the reversible condition; 76.67% in the non-reversible condition).

The data were fitted to a mixed-effects logistic regression model that included RC type and animacy as fixed effects and location of testing, participants, and items as random effects. There was a significant main effect of RC type ($\beta = -0.82$, $SE = 0.35$, $z = -2.35$, $p < .05$), but no main effect of animacy ($p = .11$). When the two animacy conditions were analyzed separately, there was no significant main effect of RC type in the reversible condition ($p = 0.28$), but there was a significant main effect of RC type in the non-reversible condition ($\beta = -1.21$, $SE = 0.56$, $z = -2.17$, $p < .05$). This means that children were significantly more successful at imitating ARCs than TRCs in the non-reversible condition, but that there was no difference in the reversible condition.

5.3.1 Error Analysis

The most common errors in children’s responses involved reversals, as signaled by the AF vs. TF morphology. In (130), the thematic role of the head titser ‘teacher’ is changed from agent to theme, and in (131), the thematic role of the head artista ‘actor’ is changed from theme to agent.

(130) a. Target (ARC)
    titser na [ nag-su-sulat _ naŋ libro ]
    teacher LK <AF>IPFV~write NFOC book
    ‘(the) teacher [that _ is writing a/the book]’
b. Response (TRC)
  titser na [ s<in>u-sulat naŋ libro _ ]
  teacher LK <TF>IPFV~write NFOC book
  ‘(the) teacher [that a/the book is writing _ ]’ (BC17, 5:9)

(131) a. Target (TRC)
  artista=ŋ [ h<in>a-hanap naŋ titser _ ]
  actor=LK <TF>IPFV~search NFOC teacher
  ‘(the) actor [that a/the teacher is looking for _ ]’

b. Response (ARC)
  artista=ŋ [ nag-ha-hanap naŋ titser _ ]
  actor=LK AF-IPFV~search NFOC teacher
  ‘(the) actor [that _ is looking for a/the teacher ]’ (QC19, 5:6)

Reversal errors were more frequent with TRCs (20.83%) than with ARCs (6.67%) and this difference was significant ($\beta = 1.30, SE = 0.43, z = 3.04, p < .01$). As a result, more TRCs were turned into ARCs than vice versa.

5.4 Discussion

The results from the elicited imitation task point toward an ARC advantage. Children were more successful in repeating ARCs than TRCs in the non-reversible condition, and they were equally successful in repeating ARCs and TRCs in the reversible condition. They were also more likely to make errors in the repetition of TRCs than ARCs in both animacy conditions. Particularly, reversal errors were more frequent for TRCs than for ARCs. This means that more TRCs were turned into ARCs than vice versa.
Chapter 6. Experiment 4: Production of Relative Clauses

This chapter reports on a production experiment of Tagalog RCs, which made use of a picture-based elicited production task. It is important to employ an elicited production task, because (a) it shows how speakers actively build RCs from scratch and what kind of mistakes they make (Kim & O’Grady, 2015), and because (b) it is necessary to confirm the ARC advantage found in the comprehension task and the elicited imitation task, as some studies have shown different results for comprehension and production tasks (e.g. Gutierrez-Mangado & Ezeizabarrena, 2012).

Section 6.1 describes the methodology, participants, materials, and design. Section 6.2 describes how I analyzed the results of the experiment. The results are reported in §6.3, followed by a discussion of their import in §6.4.

6.1 Method

6.1.1 Participants
The participants were 20 Tagalog-speaking children (14 female, 6 male) aged 4;11–5;9 (mean 5;1). Eight children (6 female, 2 male) were tested in Bacoor City and 12 (8 female, 4 male) were tested in Quezon City. Two of the children tested in Quezon City were exposed to languages other than Tagalog and English (Bisaya, Kapampangan, and Ilokano), but had little reported proficiency in those languages.

Twenty-seven adults also participated in this experiment as a control group, six of whom were tested in Bacoor City and the rest in Quezon City. All six of the participants tested in Bacoor City had grown up locally, but the adult participants in Quezon City were college students from various Tagalog-speaking areas of the Philippines, and therefore represented a less homogenous demographic than the other adult group and both of the child groups.

6.1.2 Materials and Design
Following the methodology used in previous studies (Hsu et al., 2009; Kim & O’Grady, 2015; Kim, 2013; Zukowski, 2009), pictures and a brief prompt were used to elicit RCs. Participants were presented sequentially with 23 pairs of pictures, each of which was accompanied by a
Tagalog auditory prompt. There were three practice items as well as 20 test items depicting transitive events.

The test items included five reversible events with an animate agent and an animate theme (basa ‘splash/wet,’ buhat ‘carry,’ habol ‘chase,’ tulak ‘push,’ and yakap ‘hug’), and additional five non-reversible events with an animate agent and an inanimate theme (basa45 ‘read,’ kain ‘eat,’ pitas ‘pick,’ putol ‘cut,’ sipa ‘kick’). Each animacy condition was crossed with two RC conditions: an ARC condition and a TRC condition. Figure 13 and Figure 14 present sample test items for ARCs and TRCs with an animate agent and an animate theme.

Figure 13. Sample item used to elicit an ARC (reversible).

Figure 14. Sample item used to elicit a TRC (reversible).

45 Although the spelling looks identical, basa ‘wet’ has the stress on the final syllable and there is a glottal stop after the final vowel ([basáʔ]), while basa ‘read’ has the stress on the penultimate syllable and there is no glottal stop ([bása]).
As these figures illustrate, participants saw a two-panel picture in which each panel depicted two characters engaged in a transitive event (in this case, chasing). The participants were asked to describe the character above which the arrow appears for the benefit of an experimenter who could not see the pictures. Because two characters of the same kind appear in the pictures (two girls in Figure 13, and two boys in Figure 14), it would be uninformative to respond with, for example, ‘the girl’ in Figure 13 or ‘the boy’ in Figure 14. Moreover, because the action ‘chasing’ is the same in both pictures, it would likewise be uninformative to respond with ‘the chaser.’ Only an RC pattern such as *any babaeŋ humahabol nay babae* ‘the girl that is chasing the boy’ would be an appropriate and informative answer. Appendix E contains the complete list of stimuli.

6.1.3 Procedure

Participants first practiced with three items involving adjectives rather than RCs, using pictures like in Figure 15, which was designed to elicit *pusa=ŋ maliit* ‘cat=LK small.’ After participants learned to describe the character above whom the arrow appears (e.g, *pusa=ŋ maliit* ‘small cat’), they proceeded to the test items.

![Figure 15](image)

**Figure 15.** Sample practice item that is designed to elicit *pusa=ŋ maliit* ‘small cat.’

The first block after the practice items presented the reversible condition with pseudo-randomized ARCs and TRCs, and the second block presented the non-reversible condition.

Each item was accompanied by an auditory contextual prompt in Tagalog describing the event in the picture. For example, in the case of the ARC item in Figure 13, participants heard (in
Tagalog), ‘A girl is chasing a monkey. Another girl is chasing a boy. Who has the arrow?’ After the prompt, an arrow appeared, accompanied by a beep sound, pointing to one of the characters or entities in the pictures. Participants had to describe to whom or what the arrow was pointing to an experimenter who had the same panel of pictures but could not see the arrow. In Figure 13, for example, the target answer would be *ay babaeŋ humahabol naŋ lalake* ‘the girl that is chasing the boy.’ Similarly, the presentation of the TRC item in Figure 14 was accompanied by the auditory prompt, ‘A monkey is chasing a boy. A girl is chasing another boy. Who has the arrow?’ The target response in this case is *ay lalakeŋ hinahabol naŋ babae* ‘the boy that the girl is chasing.’ Participants’ responses were audio-recorded and transcribed for later analysis.

Because the choice of RCs could, in principle, be influenced by the type of focus marking used in the contextual prompts that precedes the actual test item, I divided the participants into two groups: one that was given AF prompts (*n* = 8), and the other one with TF prompts (*n* = 16).

6.2 Analysis

The adults’ responses were transcribed by a fluent L2 speaker (the researcher), and the children’s responses were either transcribed by a native speaker or transcribed by a fluent L2 speaker (the researcher) and checked by a native speaker.

A response was considered a target response if the participants produce the correct head of the RC, the correct verb form, and the correct case marking on any NP that appeared inside the RC. The absence of the linker *=ŋ* was not considered an error, as many of the children—and sometimes adults—did not produce it.

In addition to postnominal RCs such as (132), on which I concentrate in this dissertation, prenominal RCs such as (133), head-internal RCs such as (134), as well as free RCs such as (135) were all considered to be target responses. In the head-internal RC in (134), the head lalake ‘boy’ appears inside of the RC, along with the allomorph of the linker *na*.

(132) Postnominal RC

```plaintext
aŋ lalake=ŋ [ y<um>a-yakap _ naŋ/sa babae ]
FOC boy=LK <AF>IPFV-hug NFOC/OBL girl
'the boy [that _ is hugging the girl]
```
I also considered ARCs with TF on the verb, as in (136), as target responses, in accordance with the discussion in §2.4.

(136) ARC with TF

\[
\begin{align*}
\text{a} & \quad \text{Naka-yakap aŋ lalake sa babae.} \\
& \quad \text{STAT-hug FOC boy OBL girl} \\
& \quad \text{‘The boy is hugging the girl.’}
\end{align*}
\]

In addition to patterns with verbs carrying an AF affix (\textit{mag-}, \textit{maŋ-}, and \textit{-um-}) and a TF affix (-\textit{in-} and -\textit{an-}), the following RC patterns were also considered acceptable, as they are allowed by native speakers. In the following examples, the (137–140a) sentences show the basic declarative sentences, and (137–140b) sentences show their relativized counterpart.

(137) a. Stative with the use of \textit{naka-} prefix (functions as AF)

\[
\begin{align*}
\text{Naka-yakap aŋ lalake sa babae.} \\
& \quad \text{STAT-hug FOC boy OBL girl} \\
& \quad \text{‘The boy is hugging the girl.’}
\end{align*}
\]

b. aŋ lalake=ŋ [ naka-yakap _ sa babae ]

\[
\begin{align*}
& \quad \text{FOC boy=LK STAT-hug OBL girl} \\
& \quad \text{‘the boy [that _ is hugging the girl]’}
\end{align*}
\]
(138) a. Stative with the use of an existential and a bare verb (functions as AF)
May buhat aŋ lalake sa babae
EXIST carry FOC boy OBL girl
‘The boy is carrying the girl.’

b. aŋ lalake=ŋ [ may buhat _ sa babae ]
FOC boy=LK EXIST carry OBL girl
‘the boy [that _ is carrying the girl]’

(139) a. Stative with the use of a bare verb (instead of TF)46
Yakap naŋ babae aŋ lalake.
hug NFOC girl FOC boy
‘The girl is hugging the boy.’

b. aŋ lalake=ŋ [ yakap naŋ babae _ ]
FOC boy=LK hug NFOC girl
‘the boy [that the girl is hugging _ ]’

(140) a. Stative with the use of a full reduplication (instead of TF)
Yakap-yakap naŋ babae aŋ lalake.
hug-hug NFOC girl FOC boy
‘The girl is hugging the boy.’

b. aŋ lalake=ŋ [ yakap-yakap naŋ babae _ ]
FOC boy=LK hug-hug NFOC girl
‘the boy [that the girl is hugging _ ]’

Other grammatically and semantically appropriate responses that did not include a verb, such as an NP with a genitive (e.g., ‘the book of the boy’), an NP with an adjective (e.g., ‘the girl with long hair’), an NP with a locative (e.g., ‘the boy at the tree’), were assigned to a separate category called “other NP modifications.”

A response was treated as a reversal error if the correct head is produced, but its thematic role is changed from agent to theme or vice versa. In the following example, the RC is reformatted in a way that changes the thematic role of lalake ‘boy’ from theme to agent, as shown in (141).

46 However, it is unclear whether a root can be considered a verb without the verbal affixes. See Kaufman (2009, p. 210) and Foley (1998) for discussion on the category of the root.
(141) a. Target (TRC)
   aŋ lalake=ŋ [ h<in>a~habol naŋ babae _ ]
   FOC boy=LK <TF>IPFV~chase NFOC girl
   ‘the boy [that the girl is chasing _ ]’

   b. Response (ARC)
   aŋ lalake=ŋ [ h<um>a~habol _ naŋ babae ]
   FOC boy=LK <AF>IPFV~chase NFOC girl
   ‘the boy [that _ is chasing the girl]’

A response was classified as a head error if the referent of the head was changed. In the following example, the target head is lalake ‘boy’ in (142a), but the response selects babae ‘girl’ as the head in (142b).

(142) a. Target (TRC)
   aŋ lalake=ŋ [ h<in>a~habol naŋ babae _ ]
   FOC boy=LK <TF>IPFV~chase NFOC girl
   ‘the boy [that the girl is chasing _ ]’

   b. Response (TRC)
   aŋ babae=ŋ [ h<in>a~habol naŋ lalake _ ]
   FOC girl=LK <TF>IPFV~chase NFOC boy
   ‘the girl [that the boy is chasing _ ]’

A response was classified as a head error with reversal (henceforth head + reversal error) if the referent of the head was changed, along with its thematic role.\(^{47}\) In the following example, the target head is lalake ‘boy’ (the theme) in (143a), but the response selects babae ‘girl’ (the agent) as head in (143b), and additionally the verb bears the AF infix -um- instead of the TF infix -in-. These changes are different from reversal errors or head errors in that they preserve the event because in both the target and the response, a girl is chasing a boy.

\(^{47}\) This type of error was referred to as “wrong head errors” in Hsu et al. (2009) and Zukowski (2009).
(143)  a. Target (TRC)
\[
an\ ng\ lalake=ŋ \ [ \ h<in>a~habol\ naŋ\ babae\ ]
\]
FOC boy=LK <TF>IPFV~chase NFOC boy
‘the boy [that the girl is chasing _ ]’

b. Response (ARC)
\[
an\ babae=ŋ \ [ \ h<um>a~habol\ naŋ\ lalake]\]
FOC girl=LK <AF>IPFV~chase NFOC boy
‘the girl [that the girl is chasing _ ]’

A response was classified as a resumptive error if a resumptive pronoun was used instead of a gap. In Tagalog, a use of a resumptive pronoun, as seen in (143b), is ungrammatical.

(144)  a. Target (TRC)
\[
an\ ng\ lalake=ŋ \ [ \ h<in>a~habol\ naŋ\ babae\ ]
\]
FOC boy=LK <TF>IPFV~chase NFOC boy
‘the boy [that the girl is chasing _ ]’

b. Response (TRC)
\[
*a\ ng\ lalake=ŋ \ [ \ h<in>a~habol\ siya\ naŋ\ babae]\]
FOC boy=LK <TF>IPFV~chase 3SG.FOC NFOC boy
‘the boy [that the girl is chasing him/her]’

A response of the type illustrated in (145) was classified as a case marking error if the target response was an ARC. Such responses reflect an attempt to produce an ARC, but mistakingly mark the case marker of the RC-internal NP with the focus marker an instead of a non-focus marker naŋ. If the target response was a TRC, it could be an error of relativizing the theme of an AF clause, which is not grammatical (as discussed in §2.4). However, neither adults nor children produced the latter pattern.

(145)  * an\ babae=ŋ \ [ \ h<um>a~habol\ _\ an\ ng\ lalake]\]
FOC girl=LK <AF>IPFV~chase FOC boy
Intended: ‘the girl [that _ is chasing the boy]’ (ARC with wrong case marking)
‘the girl [that the boy is chasing _ ]’ (ungrammatical TRC)

A response without the RC-internal NP, such as (146), was also classified as an error. This RC is a well-formed RC, and it indicates that speakers know how to form an RC. However, such
a response is not appropriate in the context of this experiment, as ‘the girl that is chasing’ does not specify which girl the arrow is pointing at.

(146) \textit{aŋ babae=} [ h<\textit{um}>a-habol _ ]
\textit{FOC girl=}L\textit{K <AF>IPFV-chase}

‘the girl [that _ is chasing]’

A response was categorized as a non-RC response if it includes a pseudo-cleft such as (147) and declarative clauses. Even in cases where these sentences are grammatical, they are not appropriate responses to a question “Who has the arrow?”, and thus were not considered to be target responses.

(147) a. Target
\textit{aŋ babae=} [ t<\textit{in}>u-tulak naŋ lalake ]
\textit{FOC girl=}L\textit{K <TF>IPFV-push NFOC boy}

‘the girl [that the boy is pushing _ ]’

b. Response
\textit{yuŋ} [ t<\textit{in}>u-tulak naŋ lalake aŋ isa=}\textit{ŋ babae }
\textit{FOC <TF>IPFV-push NFOC boy FOC one=}L\textit{K girl}

‘the girl is the one [that the boy is pushing _ ]’

In addition to accuracy, reaction times were also measured for adult participants. Because the presentation of the arrow was signaled by the beep, I measure the duration between the beep sound and the onset of the speech in the recordings to examine how long it takes for participants to respond to each item.

6.3 Results
A total of 540 responses from adults and 400 responses from children were obtained in the experiment. Results from adults were analyzed in terms of accuracy and reaction times, and results from children were analyzed for accuracy. I will first report on the findings from adults in §6.3.1, looking at accuracy, types of errors, and reaction times. In §6.3.2, I will report on the results from children.
6.3.1 Adults

6.3.1.1 Accuracy

A total of 540 responses from adults were analyzed. Table 35 shows the frequency and percentage of different response types from all the adult participants.

<table>
<thead>
<tr>
<th>Table 35. Types of responses from all adults (N = 27).</th>
</tr>
</thead>
<tbody>
<tr>
<td>Target responses</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Other acceptable RCs</td>
</tr>
<tr>
<td>Other NP modifications</td>
</tr>
<tr>
<td>Errors Reversal</td>
</tr>
<tr>
<td>Head</td>
</tr>
<tr>
<td>Head + reversal</td>
</tr>
<tr>
<td>Resumptive</td>
</tr>
<tr>
<td>Case marking</td>
</tr>
<tr>
<td>No RC-internal NP</td>
</tr>
<tr>
<td>Others</td>
</tr>
<tr>
<td>Non-RCs</td>
</tr>
<tr>
<td>Other</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

Three participants (QA08, QA13, and QA17) produced non-RC responses (e.g., pseudo-clefts, declarative sentences) for more than half of the 20 transitive RC items, suggesting that they did not understand the protocol of the experiment. Table 36 summarizes the responses of adults other than these three participants.
Table 36. Types of responses from adults that were included in the analysis ($n = 24$).

<table>
<thead>
<tr>
<th></th>
<th>ARC</th>
<th>TRC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Target responses</td>
<td>212</td>
<td>202</td>
</tr>
<tr>
<td>Other acceptable RCs</td>
<td>8</td>
<td>4</td>
</tr>
<tr>
<td>Other NP modifications</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Errors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reversal</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>Head</td>
<td>0</td>
<td>0.00%</td>
</tr>
<tr>
<td>Head + reversal</td>
<td>3</td>
<td>24</td>
</tr>
<tr>
<td>Resumptive</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Case marking</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>No RC-internal NP</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Others</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Non-RCs</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Others</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Total</td>
<td>240</td>
<td>240</td>
</tr>
</tbody>
</table>

The adult participants’ overall accuracy rate was 88.33% for ARC and 84.17% for TRC. Table 37 shows the same results by animacy condition.

Table 37. Types of responses from adults per RC type and animacy condition.

<table>
<thead>
<tr>
<th></th>
<th>Reversible</th>
<th>Non-reversible</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ARC</td>
<td>TRC</td>
</tr>
<tr>
<td>Target responses</td>
<td>95</td>
<td>102</td>
</tr>
<tr>
<td>Other acceptable RCs</td>
<td>8</td>
<td>4</td>
</tr>
<tr>
<td>Other NP modifications</td>
<td>0</td>
<td>0.00%</td>
</tr>
<tr>
<td>Errors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reversal</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Head</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Head + reversal</td>
<td>2</td>
<td>9</td>
</tr>
<tr>
<td>Resumptive</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Case marking</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>No RC-internal NP</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Others</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Non-RCs</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Others</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>120</td>
<td>120</td>
</tr>
</tbody>
</table>

In the reversible condition, 79.17% of the ARC responses and 85.00% of the TRC responses were target patterns. In the non-reversible condition, the accuracy rate was 97.50% for ARCs and 83.33% for TRCs. Table 38 shows different types of target responses.
### Table 38. Types of target responses.

<table>
<thead>
<tr>
<th></th>
<th>Reversible</th>
<th></th>
<th></th>
<th>Non-reversible</th>
<th></th>
<th></th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ARC</td>
<td>TRC</td>
<td>ARC</td>
<td>TRC</td>
<td>ARC</td>
<td>TRC</td>
<td></td>
</tr>
<tr>
<td>Postnominal</td>
<td>75</td>
<td>78.95%</td>
<td>97</td>
<td>95.10%</td>
<td>108</td>
<td>92.31%</td>
<td>100</td>
</tr>
<tr>
<td>ARC with TF</td>
<td>16</td>
<td>16.84%</td>
<td>-</td>
<td>-</td>
<td>8</td>
<td>6.84%</td>
<td>-</td>
</tr>
<tr>
<td>Internal</td>
<td>2</td>
<td>2.11%</td>
<td>0</td>
<td>0.00%</td>
<td>0</td>
<td>0.00%</td>
<td>2</td>
</tr>
<tr>
<td>Free</td>
<td>2</td>
<td>2.11%</td>
<td>5</td>
<td>4.90%</td>
<td>1</td>
<td>0.85%</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>95</strong></td>
<td><strong>100%</strong></td>
<td><strong>102</strong></td>
<td><strong>100%</strong></td>
<td><strong>109</strong></td>
<td><strong>100%</strong></td>
<td><strong>212</strong></td>
</tr>
</tbody>
</table>

The majority of the RC responses were postnominal RCs. Among the 212 target responses for ARC, 24 were ARCs with TF (16 in the reversible condition and eight in the non-reversible condition) as shown in (148).

\[(148)\] ARC with TF

\[
yuŋ \text{ babae=ŋ } [b<in>a-basa _ an] \text{ lalake ]}
\]

FOC girl=LK <AF>IPFV~hug FOC boy

‘the girl [that _ is splashing the boy]’ \(\text{(QA15)}\)

Two responses involved head-internal RCs (both in the reversible condition) and three responses were free RCs (two in the reversible condition and one in the non-reversible condition) as illustrated with the help of the actual examples in (149) and (150). Among the 202 target responses for TRC, only five were free RCs (all in the reversible condition); there were no head-internal RCs.

\[(149)\] Head-internal RC

\[
yuŋ [t<um>u-tulak na lalake sa unggoy ]
\]

FOC <AF>IPFV~push LK boy OBL monkey

‘the boy [that _ is pushing the monkey]’ \(\text{(BA07)}\)

\[(150)\] Free RC

\[
yuŋ [t<um>u-tulak _ sa unggoy ]
\]

FOC <AF>IPFV~push OBL monkey

‘the one [that _ is pushing the monkey]’ \(\text{(QA05)}\)

The accuracy data were fitted to a mixed-effects logistic regression model that included RC type and animacy as fixed effects and participants, items, and types of prompts as random effects.
There was no significant main effect of RC type \((p = .19)\); however, there was a main effect of animacy \((\beta = 2.85, SE = 0.75, z = 3.80, p < .001)\) as well as an interaction effect between RC type and animacy \((\beta = -3.05, SE = 0.80, z = -3.79, p < .001)\). When the two animacy conditions were analyzed separately, there was no significant main effect of RC type in the reversible condition \((p = .17)\), but there was a significant main effect of RC type in the non-reversible condition \((\beta = -2.93, SE = 0.80, z = -3.65, p < .001)\). This means that adults produced significantly more target ARCs than TRCs in the non-reversible condition, but there was no difference in the reversible condition.

### 6.3.1.2 Error Analysis

The category of “other acceptable RCs” includes the following actual responses.

(151)  Stative with the use of *naka-* prefix (instead of AF)
\[
\text{aŋ lalake=ŋ [ naka-yakap _ sa unggoy ]}
\]
\[
\text{FOC boy=LK STAT-hug OBL monkey}
\]
\text{‘the boy [that _ is hugging the monkey]’}  \hspace{1cm} \text{(QA03)}

(152)  Stative with the use of an existential and a bare verb (instead of AF)
\[
\text{yuŋ lalake=ŋ [ may buhat _ sa unggoy ]}
\]
\[
\text{FOC boy=LK EXIST carry OBL monkey}
\]
\text{‘the boy [that _ is carrying the monkey]’}  \hspace{1cm} \text{(BA07)}

(153)  Stative with the use of a bare verb (instead of TF)
\[
\text{aŋ babae=ŋ [ buhat naŋ unggoy _ ]}
\]
\[
\text{FOC girl=LK carry NFOC monkey}
\]
\text{‘the girl [that the monkey is carrying _]’}  \hspace{1cm} \text{(BA07)}

(154)  Stative with the use of a full reduplication (instead of TF)
\[
\text{aŋ babae=ŋ [ buhat-buhat naŋ unggoy _ ]}
\]
\[
\text{FOC girl=LK carry-carry NFOC monkey}
\]
\text{‘the girl [that the monkey is carrying _]’}  \hspace{1cm} \text{(QA09)}
All of these were acceptable RCs; however, they were not considered to be target responses because of the lack of focus affix.\textsuperscript{48}

As Table 37 shows, there were only 13 errors for ARCs, compared to 26 errors for TRCs—nearly twice the amount. This also points toward an ARC advantage.

The most common errors made by adults were head + reversal errors. Seven errors of this kind were made for ARCs, and 24 errors were made for TRCs. This means that more TRCs were turned into ARCs (reversal and head + reversal) than vice versa. The following examples (155–158) demonstrate the kinds of errors that were produced by adults.

(155) a. Target (ARC)
\begin{verbatim}
lalake=ŋ [ b<um>u~buhat naŋ babae ]
boy=LK  <AF>IPFV~carry NFOC  girl
‘(the) boy [that _ is carrying the girl]’
\end{verbatim}

b. Reversal error (TRC)
\begin{verbatim}
lalake=ŋ [ b<in>u~buhat naŋ babae ]
boy=LK  <TF>IPFV~carry NFOC  girl
‘(the) boy [that the girl is carrying _ ]’
\end{verbatim}  (BA01)

(156) a. Target (TRC)
\begin{verbatim}
baba=ŋ [ b<in>u~buhat naŋ unggoy ]
girl=LK  <TF>IPFV~carry NFOC  monkey
‘(the) girl [that the monkey is carrying _ ]’
\end{verbatim}

b. Head error (TRC)
\begin{verbatim}
unggoy na [ b<in>u~buhat naŋ babae ]
monkey LK  <TF>IPFV~carry NFOC  girl
‘(the) monkey [that the girl is carrying _ ]’
\end{verbatim}  (BA01)

(157) a. Target (TRC)
\begin{verbatim}
 añ babae=ŋ [ ni-ya~yakap naŋ unggoy ]
FOC  girl=LK  TF-IPFV~hug NFOC  monkey
‘the girl [that the monkey is hugging _ ]’
\end{verbatim}

\textsuperscript{48} If I count these RCs as target responses, adults’ success rate raises to 85.83\% for ARCs and to 88.33\% for TRCs in the reversible condition.
b. Head + reversal error (ARC)
\[
\text{aŋ } \text{unggoy na [ y<um>a-yakap sa babae ]}
\]
FOC monkey LK <AF>IPFV~hug OBL girl
‘the monkey [that _ is hugging the girl]’

(QA16)

(158)  a. Target (ARC with TF)
\[
\text{aŋ } \text{lalake=}\eta [ b<in>u~buhat aŋ babae ]
\]
FOC man=LK <TF>IPFV~carry FOC girl
‘the boy [that _ is carrying the girl]’

b. Resumptive error (ARC with TF)
\[
\text{aŋ } \text{laláke=}\eta [ b<in>u-búhat niya yuŋ babae]
\]
FOC man=LK <TF>IPFV~carry 3SG.NFOC FOC girl
‘the boy [that he/she is carrying the girl]’

(BA06)

6.3.1.3 Reaction Times

As discussed in §6.2, reaction time data for adults were obtained by measuring the duration between the beep, which signaled the presentation of the arrow, and the onset of speech. Figure 16 shows the mean reaction times, which was performed only on target responses.

![Figure 16. Adult reaction time per RC type and animacy condition.](image-url)
On average, the adult participants took 1192 ms to respond to ARCs and 1265 ms to respond to TRCs in the reversible condition. In the non-reversible condition, adults took 1014 ms to respond to ARCs and 1163 ms to respond to TRCs.

The reaction time data were fit into a linear mixed-effects model that included RC type as fixed effects and participants, items, and types of prompts as random effects. There was a significant main effect of RC type ($\beta = 78.12, \text{se} = 30.07, t = 2.60, p < .01$). This means that adults produced ARCs significantly faster than TRCs regardless of the animacy of the theme argument.

6.3.2 Children

6.3.2.1 Accuracy

A total of 400 responses were obtained from children. Table 39 summarizes the various response types. Children’s overall accuracy was 38.50% in the ARC condition and 25.00% in the TRC condition.

<table>
<thead>
<tr>
<th></th>
<th>ARC</th>
<th>TRC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Target responses</td>
<td>77</td>
<td>50</td>
</tr>
<tr>
<td>Other acceptable RCs</td>
<td>8</td>
<td>3</td>
</tr>
<tr>
<td>Other NP modifications</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>Errors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reversal</td>
<td>19</td>
<td>12</td>
</tr>
<tr>
<td>Head</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>Head + reversal</td>
<td>0</td>
<td>42</td>
</tr>
<tr>
<td>Resumptive</td>
<td>13</td>
<td>6</td>
</tr>
<tr>
<td>No RC-internal NP</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>Combination of errors</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Others</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>NP + transitive clause</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Non-RCs</td>
<td>16</td>
<td>10</td>
</tr>
<tr>
<td>Others</td>
<td>52</td>
<td>54</td>
</tr>
<tr>
<td>Total</td>
<td>200</td>
<td>200</td>
</tr>
</tbody>
</table>

Table 39. Types of responses from all children.

Table 40 shows the same results by animacy condition. In the reversible condition, 25.00% of the ARC responses and 31.00% of the TRC responses were target responses. If I include other acceptable RCs, children produced 33.00% grammatical ARCs and 34.00% grammatical TRCs.
in the reversible condition. In the non-reversible condition, the accuracy rate was 52.00% for ARCs and 19.00% for TRCs.

**Table 40.** Types of responses from children per RC type and animacy condition.

<table>
<thead>
<tr>
<th></th>
<th>Reversible</th>
<th></th>
<th>Non-reversible</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ARC</td>
<td>TRC</td>
<td>ARC</td>
<td>TRC</td>
</tr>
<tr>
<td>Target responses</td>
<td>25 25.00%</td>
<td>31 31.00%</td>
<td>52 52.00%</td>
<td>19 19.00%</td>
</tr>
<tr>
<td>Other acceptable RCs</td>
<td>8  8.00%</td>
<td>3  3.00%</td>
<td>0   0.00%</td>
<td>0   0.00%</td>
</tr>
<tr>
<td>Other NP modifications</td>
<td>4  4.00%</td>
<td>2  2.00%</td>
<td>1   1.00%</td>
<td>6   6.00%</td>
</tr>
<tr>
<td>Errors</td>
<td>Reversal</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Head</td>
<td>8  8.00%</td>
<td></td>
<td>8   8.00%</td>
<td>11 11.00%</td>
</tr>
<tr>
<td>Head + reversal</td>
<td>0  0.00%</td>
<td>2  2.00%</td>
<td>1   1.00%</td>
<td>4   4.00%</td>
</tr>
<tr>
<td>Resetptive</td>
<td>8  8.00%</td>
<td>4  4.00%</td>
<td>5   5.00%</td>
<td>2   2.00%</td>
</tr>
<tr>
<td>No RC-internal NP</td>
<td>3  3.00%</td>
<td>3  3.00%</td>
<td>2   2.00%</td>
<td>1   1.00%</td>
</tr>
<tr>
<td>Combination of errors</td>
<td>0  0.00%</td>
<td>2  2.00%</td>
<td>0   0.00%</td>
<td>0   0.00%</td>
</tr>
<tr>
<td>Others</td>
<td>1  1.00%</td>
<td>0  0.00%</td>
<td>0   0.00%</td>
<td>1   1.00%</td>
</tr>
<tr>
<td>NP + transitive clause</td>
<td>1  1.00%</td>
<td>2  2.00%</td>
<td>2   2.00%</td>
<td>1   1.00%</td>
</tr>
<tr>
<td>Non-RCs</td>
<td>2  2.00%</td>
<td>7  7.00%</td>
<td>14  14.00%</td>
<td>3   3.00%</td>
</tr>
<tr>
<td>Others</td>
<td>40 40.00%</td>
<td>31 31.00%</td>
<td>12 12.00%</td>
<td>23 23.00%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>100 100.00%</td>
<td>100 100.00%</td>
<td>100 100.00%</td>
<td>100 100.00%</td>
</tr>
</tbody>
</table>

Table 41 reports on the different types of target responses. Much like the results from adults, the majority of the RC responses were postnominal RCs.

**Table 41.** Types of target responses.

<table>
<thead>
<tr>
<th></th>
<th>Reversible</th>
<th></th>
<th>Non-reversible</th>
<th></th>
<th>Overall</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ARC</td>
<td>TRC</td>
<td>ARC</td>
<td>TRC</td>
<td>ARC</td>
<td>TRC</td>
</tr>
<tr>
<td>Postnominal RC</td>
<td>6  24.00%</td>
<td>24 77.42%</td>
<td>28 53.85%</td>
<td>13 68.42%</td>
<td>34 44.16%</td>
<td>37 74.00%</td>
</tr>
<tr>
<td>ARC with TF</td>
<td>18 72.00%</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>35 45.45%</td>
<td>-</td>
</tr>
<tr>
<td>Head-internal RC</td>
<td>0  0.00%</td>
<td>1 3.23%</td>
<td>1   1.92%</td>
<td>0  0.00%</td>
<td>1  1.30%</td>
<td>1  2.00%</td>
</tr>
<tr>
<td>Prenominal RC</td>
<td>0  0.00%</td>
<td>0  0.00%</td>
<td>1   1.92%</td>
<td>2 10.53%</td>
<td>1  1.30%</td>
<td>2  4.00%</td>
</tr>
<tr>
<td>Free RC</td>
<td>1  4.00%</td>
<td>6 19.35%</td>
<td>5   9.62%</td>
<td>4 21.05%</td>
<td>6   7.79%</td>
<td>10 20.00%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>25 100.00%</td>
<td>31 100.00%</td>
<td>52 100.00%</td>
<td>19 100.00%</td>
<td>77 100.00%</td>
<td>50 100.00%</td>
</tr>
</tbody>
</table>

Among the 77 target responses for ARC, 35 responses were ARCs with TF (18 in the reversible condition and 17 in the non-reversible condition) as shown in (159).
Six responses were free RCs (one in the reversible condition and five in the non-reversible condition), one response was a head-internal RC (in the non-reversible condition), and one was a prenominal RC (in the non-reversible condition) as illustrated with the help of the actual examples in (160–162). Among the 50 target responses for TRC, one response was a head-internal RC (in the non-reversible condition), two were prenominal RCs (both in the non-reversible condition), and 10 were free RCs (six in the reversible condition and four in the non-reversible condition).

Children’s accuracy data were fitted to a mixed-effects logistic regression model that included RC type and animacy as fixed effects and location of testing, participants, items, and types of prompts as random effects. There was no significant main effect of RC type ($p = .31$), but there was a main effect of animacy ($\beta = 1.39$, $SE = 0.39$, $z = 3.60$, $p < .001$) as well as an interaction between RC type and animacy ($\beta = -2.13$, $SE = 0.49$, $z = -4.33$, $p < .001$). When the two animacy conditions were analyzed separately, there was no difference between ARC and TRC in the reversible condition, but participants produced significantly more target ARCs than
TRCs in the non-reversible condition ($\beta = -1.76$, $SE = 0.36$, $z = -4.87$, $p < .001$). This means that children produced more target ARCs than TRCs in the non-reversible condition, but that there was no difference in the reversible condition.

### 6.3.2.2 Error Analysis

Similar to adults, children made twice as many errors on TRCs (72 errors) than on ARCs (39 errors). The most common errors made by children, like adults, were head + reversal errors, which involve a change of the referent of the head along with its thematic role. In example (163), the target head is bola ‘ball’ (the theme) in (163a), but the response selected babae ‘girl’ (the agent) as the head in (163b), and the verb bears the AF infix -um- instead of the TF infix -in-. There were a total of 42 head + reversal errors, 37 of which occurred in the non-reversible TRC condition.

(163) a. Target (TRC)
\[
\begin{align*}
\text{aŋ bola}=\eta & [ \text{s}\langle \text{i-sipa} \rangle \text{ naŋ babae } ] \\
\text{FOC ball}=\text{LK} & <\text{TF}>\text{IPFV}\sim\text{kick} \text{ NFOC girl} \\
\text{‘the ball [that the girl is kicking ]’}
\end{align*}
\]

b. Head + reversal error (ARC)
\[
\begin{align*}
\text{yuŋ babae}=\eta & [ \text{s}<\text{um}>\text{i-sipa } \text{ naŋ bola} ] \\
\text{FOC girl}=\text{LK} & <\text{AF}>\text{IPFV}\sim\text{kick} \text{ NFOC ball} \\
\text{‘the girl [that is kicking the ball]’}
\end{align*}
\]

(QC20, 5;9)

The children also made 31 reversal errors in total, 19 on ARCs and 12 on TRCs. In example (164), the RC is restructured in a way that changes the thematic role of lalake ‘boy’ from agent to theme while maintaining the correct head noun.

(164) a. Target (TRC)
\[
\begin{align*}
aŋ lalake=\eta & [ \text{ni-ya-yakap} \text{ naŋ unggoy } ] \\
\text{FOC boy}=\text{LK} & \text{TF-IPFV}\sim\text{hug} \text{ NFOC monkey} \\
\text{‘the boy [that the monkey is hugging ]’}
\end{align*}
\]
b. Reversal error (ARC)

\[
\text{aŋ lalake}=ŋ \quad [ y<um>a-\text{yakap} \_ \text{naŋ unggoy} ]
\]

FOC boy=LK <AF>IPFV~hug NFOC monkey

‘the boy [that _ is hugging the monkey]’

(QC19, 5;6)

Overall, with a high number of head + reversal errors and reversal errors, more TRCs were turned into ARCs than vice versa.

Children also frequently produced a resumptive pronoun or a resumptive NP in place of a gap (13 in ARCs and 6 in TRCs), as demonstrated in the following example (165).

(165) Target (ARC with TF)

a. \[
yuŋ lalake na [ t<in>u-tulak yuŋ unggoy ]
\]

FOC boy LK <TF>IPFV~push FOC monkey

‘the boy [that _ is hugging the monkey]’

b. Resumptive pronoun (ARC with TF)

\[
yuŋ lalake na [ t<in>u-tulak niya yuŋ unggoy ]
\]

FOC boy LK <TF>IPFV~push 3SG.NFOC FOC monkey

‘the boy [that he/she is hugging the monkey]’

(QC05, 5;8)

Other kinds of errors made by children include a head error, in which the referent of the head was changed. In the example (166), the target head is babae ‘girl’ in (166a), but the response selects bulaklak ‘flower’ as the head in (166b).

(166) a. Target (ARC)

\[
\text{aŋ babae}=ŋ \quad [ p<um>i-pitas \_ \text{naŋ bulaklak} ]
\]

FOC girl=LK <AF>IPFV~pick NFOC flower

‘the girl [that _ is picking the flower]’

b. Head error (ARC)

\[
\text{aŋ bulaklak} \quad [ p<um>i-pitas \_ \text{naŋ babae} ]
\]

FOC flower <AF>IPFV~pick NFOC girl

‘the flower [that _ is picking the girl]’

(BC18, age unknown)

Children sometimes used other NP modification patterns as shown in (167) in place of RCs, as well as NP + transitive clause patterns as illustrated in (168).
(167) a. Target (TRC)
\[ \text{aŋ} \text{ bola=} \eta \quad [ \text{s<in}>i~\text{sipa} \quad \eta \text{ babae} _{\eta} ] \]
FOC ball=LK <TF>IPFV~kick NFOC girl
‘the ball [that the girl is kicking _]’

b. Response with genitive
\[ \text{yuŋ} \text{ bola} \quad \eta \text{ babae} \]
FOC ball GEN girl
‘the ball of the girl’

(168) a. Target (ARC)
\[ \text{aŋ} \text{ lalake=} \eta \quad [ \text{s<um}>i~\text{sipa} \quad \eta \text{ lata} ] \]
FOC boy=LK <AF>IPFV~kick NFOC can
‘the boy [that _ is kicking the can]’

b. Response with a NP + transitive clause pattern
\[ \text{yuŋ} \text{ boy} \quad \text{kasi} \quad \text{nag-si~sipa} \quad \eta \text{ siya} \quad \eta \text{ trash can} \]
FOC because AF-IPFV~kick 3SG.FOC NFOC
‘the boy because he/she is kicking the trash can’

6.3.2.3 Others
A hundred and six responses were placed in the “others” category (52 for ARCs, 54 for TRCs).
Responses of these types include unintelligible utterances and single NP responses. Sixty-nine of
these responses have an RC-type structure but were not considered to be target responses, as
children produced them bit by bit in response to the researcher’s prompting. An example of such
an interaction is shown in (169).

(169) a. Target
\[ \text{aŋ} \text{ babae=} \eta \quad [ \text{ni-ya~yakap} \quad \eta \text{ unggoy} _{\eta} ] \]
FOC girl=LK <TF>IPFV~carry FOC monkey
‘the girl [that the monkey is hugging _]’

b. BC02: \[ \text{yuŋ} \text{ babae} \]
FOC girl
‘the girl’
Researcher:  Mm. Pero may dalawaŋ babae, no? but EXIST two=LK girl Q
‘Mm. But there are two girls, right?’

Sino aŋ may arrow diyan?
who FOC EXIST arrow there
‘Who has the arrow there?’

BC02:  ni-ya-yakap naŋ unggoy TF-IPFV-hug NFOC monkey
‘the monkey is hugging’ (BC02, 5;2)

In (169), BC02 supplies a transitive clause in response to the researcher’s question, but the clause is missing the theme, which corresponds to the single NP produced by the child in the initial response. Therefore, it is possible that the child was completing his or her own sentence, ultimately ending up with a RC. However, this is speculative, as we saw in §3.3.2 that NP ellipsis is frequent in children’s speech. Still, as shown in Table 42, a large portion of the “others” utterances follow the RC pattern—that is, the NP produced at the outset corresponds to the gap in the transitive clause that is subsequently produced. It is therefore possible that the children could not produce a whole RC on their own, even though they were aware of how to go about doing so.

<table>
<thead>
<tr>
<th>Reversible</th>
<th>Non-reversible</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARC</td>
<td>TRC</td>
</tr>
<tr>
<td>target</td>
<td>18</td>
</tr>
<tr>
<td>reversal</td>
<td>7</td>
</tr>
<tr>
<td>head + reversal</td>
<td>0</td>
</tr>
<tr>
<td>resumptive</td>
<td>1</td>
</tr>
<tr>
<td>case marking</td>
<td>1</td>
</tr>
<tr>
<td>others</td>
<td>4</td>
</tr>
<tr>
<td>Total</td>
<td>31</td>
</tr>
</tbody>
</table>

Table 42. Reanalysis of the 69 responses in “others.”

6.3.2.4 Individual Results

As was the case in the comprehension task, the individual results showed large variation; however, 14 out of 20 children produced more target ARCs than TRCs (Table 43).
Table 43. Individuals with more target ARCs response than target TRC responses (sorted by age).

<table>
<thead>
<tr>
<th></th>
<th>Animate</th>
<th></th>
<th>Inanimate</th>
<th></th>
<th>Overall</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ARC</td>
<td>TRC</td>
<td>ARC</td>
<td>TRC</td>
<td>ARC</td>
<td>TRC</td>
</tr>
<tr>
<td>QC20</td>
<td>5;9</td>
<td>1</td>
<td>1</td>
<td>5</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>QC11</td>
<td>5;9</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td>BC01</td>
<td>5;9</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>BC07</td>
<td>5;8</td>
<td>0</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>QC05</td>
<td>5;8</td>
<td>2</td>
<td>2</td>
<td>4</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>QC19</td>
<td>5;6</td>
<td>0</td>
<td>1</td>
<td>5</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>QC07</td>
<td>5;6</td>
<td>3</td>
<td>3</td>
<td>5</td>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>QC10</td>
<td>5;3</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>QC02</td>
<td>5;3</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>BC02</td>
<td>5;2</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>BC12</td>
<td>5;1</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>QC14</td>
<td>4;11</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>BC13</td>
<td>N/A</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>BC18</td>
<td>N/A</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>3</td>
</tr>
</tbody>
</table>

Three children produced more target responses with TRCs than ARCs (Table 44) and three children produced the same number of ARCs and TRCs (Table 45).

Table 44. Individuals with more target TRC responses than target ARC responses (sorted by age).

<table>
<thead>
<tr>
<th></th>
<th>Animate</th>
<th></th>
<th>Inanimate</th>
<th></th>
<th>Overall</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Age</td>
<td>ARC</td>
<td>TRC</td>
<td>ARC</td>
<td>TRC</td>
<td>ARC</td>
</tr>
<tr>
<td>BC03</td>
<td>4;8</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>QC04</td>
<td>5;5</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>QC17</td>
<td>5;7</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

Table 45. Individuals with equal numbers of target ARC and TRC responses (sorted by age).

<table>
<thead>
<tr>
<th></th>
<th>Animate</th>
<th></th>
<th>Inanimate</th>
<th></th>
<th>Overall</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Age</td>
<td>ARC</td>
<td>TRC</td>
<td>ARC</td>
<td>TRC</td>
<td>ARC</td>
</tr>
<tr>
<td>QC09</td>
<td>5;1</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>QC13</td>
<td>5;2</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>BC17</td>
<td>5;9</td>
<td>0</td>
<td>4</td>
<td>4</td>
<td>0</td>
<td>4</td>
</tr>
</tbody>
</table>

However, as the overall results show, there seems to be an animacy effect: 15 children produced more target ARCs in the non-reversible condition than in the reversible condition.
6.4 Discussion

Table 46 summarizes findings from the elicited production task. As illustrated here, the reaction time results for adults showed that they produced ARCs faster than TRCs. Moreover, in the non-reversible condition, both adults and children produced more target responses in ARCs than TRCs. Children and adults also made twice as many errors in TRCs than in ARCs.

<table>
<thead>
<tr>
<th>Table 46. Summary of the findings.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td>Adults</td>
</tr>
<tr>
<td>Accuracy</td>
</tr>
<tr>
<td>Reaction times</td>
</tr>
<tr>
<td>Children</td>
</tr>
</tbody>
</table>

There are at least three possible explanations for why ARCs were easier to produce in the non-reversible condition than the reversible condition. One possibility, discussed in Chapter 2, is that the use of AF increases when the agent is animate and the theme is inanimate. This may be why we saw a clear advantage for ARCs in the non-reversible conditions from both groups. However, this does not explain why adults showed an ARC advantage in reaction times across the two animacy conditions.

The second possible explanation is that it is not the case that non-reversible condition made ARCs easier, but that it made TRCs more difficult. In the latter condition, the head of the TRC is an inanimate theme, which might have increased the difficulty because the RC head is low in prominence in terms of two semantic prominence factors. This difficulty also manifests in the high percentage of head + reversal errors like in (170b).49

---

49 The high frequency of the head + reversal errors in the non-reversible condition might be due to the pictures I used. In the reversible condition, I used two different human characters for themes—humans tend to be individualized, as no two humans are alike. However, in the non-reversible condition, the inanimate entities used for themes were identical, such as two balls that look exactly the same. There are important practical challenges here. If we make two themes too different, it might give participants more opportunity to avoid RCs by producing responses such as ‘the red ball’ instead of an RC such as ‘the ball that the girl is kicking’.
Participants were still describing the same event, but instead of making the RC about the inanimate theme, they produce RCs about the animate agent. Although reversals and head errors also happened in this condition, that would make the event implausible, as shown in (171)—it is not possible for the ball to kick the girl. Therefore, head + reversal errors were the only way for them to produce an easier RC without describing an implausible event.

The third possible explanation is that, the ARC advantage is present in both conditions, but it is somehow masked in the reversible condition. As demonstrated in Experiment 1 (Chapter 2), when both the agent and the theme are animate, speakers are more likely to produce TF sentences. On this view, the lack of ARC advantage in the reversible condition reflects an interaction between semantic prominence, which favors ARC, and a language-specific focus preference, which favors TF (as shown in the results from Experiment 1 in Chapter 3). This may also explain the participants’ frequent production of ARCs with a TF verb (11.32% of adults’ target responses; 45.24% of children’s target responses).
Children had an overall low accuracy in the production of RCs, which may have also contributed to the lack of an asymmetry in the reversible condition. Table 47 compares the results from the elicited imitation task and the elicited production task for the 11 children who participated in both experiments.

Table 47. Comparison between the results from the elicited imitation task and the elicited production task.

<table>
<thead>
<tr>
<th></th>
<th>Imitation</th>
<th>Production</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>ARC</td>
<td>TRC</td>
</tr>
<tr>
<td>QC14</td>
<td>4;11</td>
<td>9</td>
</tr>
<tr>
<td>QC09</td>
<td>5;1</td>
<td>9</td>
</tr>
<tr>
<td>QC10</td>
<td>5;3</td>
<td>8</td>
</tr>
<tr>
<td>QC02</td>
<td>5;3</td>
<td>9</td>
</tr>
<tr>
<td>QC07</td>
<td>5;5</td>
<td>10</td>
</tr>
<tr>
<td>QC19</td>
<td>5;6</td>
<td>8</td>
</tr>
<tr>
<td>QC17</td>
<td>5;7</td>
<td>8</td>
</tr>
<tr>
<td>BC17</td>
<td>5;9</td>
<td>10</td>
</tr>
<tr>
<td>QC11</td>
<td>5;9</td>
<td>10</td>
</tr>
<tr>
<td>BC18</td>
<td>NA</td>
<td>5</td>
</tr>
</tbody>
</table>

While most of the children did fairly well on the imitation task (except for QC17 who produced only two target responses for TRCs), they did poorly on the elicited production task. In earlier work (Tanaka et al., 2014) that found an ARC advantage, the panel of pictures contained an arrow from the beginning, so children were able to see the arrow while they heard the prompt explaining the pictures. In contrast, in the current version of the experiment, the arrow did not appear until after the prompt. It is possible that in the previous version of the experiment, children benefited from the extra time with the arrow to prepare their speech.
Chapter 7. General Discussion and Conclusion

This dissertation investigates how adult and child speakers of Tagalog comprehend and produce two types of RCs: agent RCs (ARCs) and theme RCs (TRCs). My investigation focused on whether there is an ARC advantage in Tagalog parallel to what has been found in other languages. In this final chapter, I will first summarize the findings reported in the previous chapters and then use those findings to evaluate different hypotheses that have been proposed to explain the ARC advantage in various languages. Section 6.2 discusses the larger implications of my findings and the last section concludes this dissertation by outlining remaining issues and suggestions for future research.

7.1 Children’s Performance across All the Experiments

The results for all 38 children in the tasks in which they participated are reported in Appendix F. Just eleven children (7 female, 4 male, age 4;11–5;9, mean 4;11) participated in all four experiments. See Table 48 for the list of these children.

<table>
<thead>
<tr>
<th>Participant</th>
<th>Age</th>
<th>Sex</th>
<th>Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>QC14</td>
<td>4;11</td>
<td>F</td>
<td>4;11</td>
</tr>
<tr>
<td>QC09</td>
<td>5;1</td>
<td>M</td>
<td>5;1</td>
</tr>
<tr>
<td>QC13</td>
<td>5;2</td>
<td>M</td>
<td>5;2</td>
</tr>
<tr>
<td>QC02</td>
<td>5;3</td>
<td>F</td>
<td>5;3</td>
</tr>
<tr>
<td>QC10</td>
<td>5;3</td>
<td>F</td>
<td>5;3</td>
</tr>
<tr>
<td>QC07</td>
<td>5;5</td>
<td>M</td>
<td>5;5</td>
</tr>
<tr>
<td>QC19</td>
<td>5;6</td>
<td>F</td>
<td>5;6</td>
</tr>
<tr>
<td>QC17</td>
<td>5;7</td>
<td>F</td>
<td>5;7</td>
</tr>
<tr>
<td>BC17</td>
<td>5;9</td>
<td>F</td>
<td>5;9</td>
</tr>
<tr>
<td>QC11</td>
<td>5;9</td>
<td>F</td>
<td>5;9</td>
</tr>
<tr>
<td>BC18</td>
<td>NA</td>
<td>M</td>
<td>NA</td>
</tr>
</tbody>
</table>

These children’s performance with declarative clauses in Experiment 1 is shown in Table 49. Among these, BC18, QC02, QC07, QC10, and QC17 seem to have a TF-bias—in both conditions, they produce a high frequency of TF. On the other hand, QC19 seems to be AF-biased.
Table 49. The results of Experiment 1 from the 11 children.

<table>
<thead>
<tr>
<th>Age</th>
<th>AF-oriented</th>
<th></th>
<th>TF-oriented</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>QC14 4;11</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>QC09 5;1</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>QC13 5;2</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>QC02 5;3</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>QC10 5;3</td>
<td>1</td>
<td>4</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>QC07 5;5</td>
<td>1</td>
<td>4</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>QC19 5;6</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>QC17 5;7</td>
<td>1</td>
<td>4</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>BC17 5;9</td>
<td>1</td>
<td>4</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>QC11 5;9</td>
<td>3</td>
<td>2</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>BC18 NA</td>
<td>1</td>
<td>4</td>
<td>0</td>
<td>5</td>
</tr>
</tbody>
</table>

Furthermore, five of these children produced erroneous responses in Experiment 1, in which the focus morphology on the verb and case marking were not in coordination (Table 50). However, these errors do not seem to be frequent, except for QC13, who produced these errors 4 out of 5 possible tokens in AF-oriented condition.

Table 50. Children who produced erroneous responses in Experiment 1.

<table>
<thead>
<tr>
<th>age</th>
<th>AF-oriented condition</th>
<th>TF-oriented condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>BC18 NA</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>QC13 5;2</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>QC02 5;3</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>QC07 5;5</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>QC17 5;7</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

We can make a few observations comparing the results from Experiment 1 and the results from RC Experiments 2, 3, and 4 in Table 51 and Table 52. First, the children who did not produce many AF patterns in declarative clauses can comprehend and produce ARCs. On the other hand, QC19, who produced a lot of AF patterns in declarative clauses, is good at comprehending and imitation ARCs, but not TRCs. This participant did poorly with RC production as well. Since there is only one of such participants, it is hard to draw any conclusion, but it is possible that children learn AF/ARC patterns first.
Table 51. Children’s performance across three RC tasks (reversible).

<table>
<thead>
<tr>
<th>Participant</th>
<th>Experiment 2 RC Comprehension</th>
<th>Experiment 3 RC Imitation</th>
<th>Experiment 4 RC Production</th>
</tr>
</thead>
<tbody>
<tr>
<td>QC14</td>
<td>4;11 1 2 4 2 1 0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>QC09</td>
<td>5;1 5 0 5 4 0 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>QC13</td>
<td>5;2 1 0 3 2 2 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>QC02</td>
<td>5;3 2 2 4 2 3 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>QC10</td>
<td>5;3 3 0 3 5 0 0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>QC07</td>
<td>5;5 3 0 5 5 3 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>QC19</td>
<td>5;6 5 0 5 1 0 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>QC17</td>
<td>5;7 2 2 4 3 1 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BC17</td>
<td>5;9 0 0 4 4 0 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>QC11</td>
<td>5;9 5 0 5 5 3 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BC18</td>
<td>NA 2 1 2 5 1 2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 52. Children’s performance across three RC tasks (non-reversible).

<table>
<thead>
<tr>
<th>Participant</th>
<th>Experiment 3 RC Imitation</th>
<th>Experiment 4 RC Production</th>
</tr>
</thead>
<tbody>
<tr>
<td>QC14</td>
<td>4;11 5 3 1 0</td>
<td></td>
</tr>
<tr>
<td>QC09</td>
<td>5;1 4 3 1 0</td>
<td></td>
</tr>
<tr>
<td>QC13</td>
<td>5;2 4 3 3 2</td>
<td></td>
</tr>
<tr>
<td>QC02</td>
<td>5;3 5 3 2 1</td>
<td></td>
</tr>
<tr>
<td>QC10</td>
<td>5;3 5 4 1 0</td>
<td></td>
</tr>
<tr>
<td>QC07</td>
<td>5;5 5 5 5 3</td>
<td></td>
</tr>
<tr>
<td>QC19</td>
<td>5;6 5 2 5 1</td>
<td></td>
</tr>
<tr>
<td>QC17</td>
<td>5;7 4 5 2 3</td>
<td></td>
</tr>
<tr>
<td>BC17</td>
<td>5;9 5 4 4 0</td>
<td></td>
</tr>
<tr>
<td>QC11</td>
<td>5;9 5 5 5 0</td>
<td></td>
</tr>
<tr>
<td>BC18</td>
<td>NA 3 4 2 0</td>
<td></td>
</tr>
</tbody>
</table>

Second, although not all the children who produced erroneous declarative sentences performed poorly on RC tasks, QC13, the child who made the most errors in the production of declarative clauses, performed the most poorly on RC comprehension.

Third, good performance in RC comprehension and imitation does not guarantee good performance in production. However, children who performed well in RC production (e.g., QC07, QC11) seemed to do well in comprehension and imitation as well. However, overall, the comprehension performance and the production performance is not a straightforward correlation. This emphasizes the importance of testing both comprehension and production when testing children’s grammatical knowledge.


## 7.2 Summary of Findings

The primary issue this dissertation addresses is the question of whether ARCs like (172) and TRCs like (173) are comprehended and produced with the same degree of success by child and adult speakers of Tagalog (as their dominant language).

(172) - ARC with AF

\[
\text{lalake}=\eta \ [ \text{h<um>a~habol}_n a\eta \ \text{babae}] \\
\text{boy}=\text{LK} \ <\text{AF}>\text{IPFV~chase} \ \text{NFOC} \ \text{girl} \\
\text{‘(the) boy [that } _\text{ is chasing a/the girl]’}
\]

(173) - TRC with TF

\[
\text{lalake}=\eta \ [ \text{h<in>a~habol} \ n a\eta \ \text{babae} \ _] \\
\text{boy}=\text{LK} \ <\text{TF}>\text{IPFV~chase} \ \text{NFOC} \ \text{girl} \\
\text{‘(the) boy [that a/the girl is chasing ]’}
\]

For the purpose of this chapter, I assume that these patterns are parallel to the English subject and direct object RC patterns exemplified in (174) and (175).

(174) - English ARC

the boy [that ] _ is chasing the girl

(175) - English TRC

the boy [that the boy ] _ is chasing

In English (and many other languages), ARCs like (174) are read faster, produced with higher accuracy, and acquired earlier than TRCs like (175). This phenomenon is referred to as a subject advantage.

Different hypotheses have been proposed to explain why this is the case, five of which have been considered here: the Linear Distance Hypothesis, the Canonical Word Order Hypothesis,

---

50 While this was not the original intention of the researcher, this assumption is only valid when the symmetrical voice system is assumed for Tagalog grammatical system. That is because studies of the contrast between subject and direct object RCs in English and most other languages use transitive clauses for both RC types. It is only on the symmetrical voice analysis of Tagalog that both ARCs and TRC are treated as transitive. On the ergative analysis, AF patterns are antipassives (a type of intransitive) and on the passive analysis TF patterns are passive (also intransitive).
the Structural Distance Hypothesis, the Frequency Hypothesis, and the Semantic Prominence Hypothesis. I will briefly review the claim of each hypothesis.

The Linear Distance Hypothesis predicts that the TRCs are more difficult than ARCs because of the greater distance between the head and the gap (Gibson, 1998, 2000; Wanner & Maratsos, 1978), as demonstrated in (176) and (177) below.

\[ \downarrow \quad | \quad (176) \text{ the boy [ that is } \_	ext{ chasing the girl ] } \quad ARC \]

\[ \downarrow \quad | \quad (177) \text{ the girl [ that the boy is chasing } \_	ext{ ] } \quad TRC \]

The Canonical Word Order Hypothesis attributes the difficulty in TRCs to its non-canonical word order. As shown below, while the ARC in (178) has the same SVO word order to the basic declarative sentence in (180), the TRC in (179) has a non-canonical, OSV word order. To the extent that children are better with canonical word order (Bever, 1970; Slobin & Bever, 1982), this factor could contribute to the difficulty in TRCs.

\[ (178) \text{ the boy [ that } \_	ext{ is chasing the girl ] } \quad ARC \]

\[ (179) \text{ the girl [ that the boy is chasing } \_	ext{ ] } \quad TRC \]

\[ (180) \text{ The boy is chasing the girl. } \quad \text{Declarative sentence} \]

The Structural Distance Hypothesis proposes that the key factor is the depth of the gap (Collins, 1994; O’Grady, 1997). As seen in the tree diagrams below, the gap is more deeply embedded in the TRC (182) than the ARC in (181), yielding greater structural distance in the former pattern.
The Frequency Hypothesis predicts that frequent forms are easier. On the one hand, ARCs are more frequent than TRCs in the input and therefore easier (Roland et al., 2007). On the other hand, with the use of a more frequent type of TRCs (i.e. TRCs with an inanimate head), it is possible to make TRCs as easy as ARCs (Fox & Thompson, 1990; Kidd et al., 2007; Mak et al., 2002).

Finally, the Semantic Prominence Hypothesis predicts that the ARCs are easier than TRCs because the head of the RC refers to a more prominent entity (O’Grady, 2011). A number of factors can contribute to semantic prominence, including animacy and thematic roles. Generally, animate entities are more prominent than inanimate entities, and agents are more prominent than
other thematic roles. All things being equal, a subject (an agent) is more prominent than a direct object (a theme) (Kim & O’Grady, 2015; O’Grady, 2011). ARCs are easier to process than TRCs because the head of an ARC is an agent (183), which is more prominent than the theme, which is the head of a TRC (184).

\[
\begin{align*}
\text{agent} & \quad \text{(more prominent)} \\
\downarrow & \\
(183) & \quad \text{the boy [that \_ is chasing the girl]} & \text{ARC}
\end{align*}
\]

\[
\begin{align*}
\text{theme} & \quad \text{(less prominent)} \\
\downarrow & \\
(184) & \quad \text{the boy [that the girl is chasing \_ ]} & \text{TRC}
\end{align*}
\]

All five hypotheses make the same predictions about English: ARCs should be easier than TRCs. Data from English therefore cannot tease apart these different hypotheses. For that reason, it is necessary to look beyond English and find languages for which these hypotheses make different predictions.

Languages like Japanese, Korean, and Chinese have prenominal RCs, unlike English, in which RCs are postnominal. In these languages, the Linear Distance Hypothesis therefore makes an opposite prediction from English. As illustrated in the Japanese examples below, the distance between the head and the gap is actually shorter in the TRC in (186) compared to the ARC in (185).

\[
\begin{align*}
(185) & \quad [\_ \text{ onnanoko-o oikake-tei-ru } ] \text{ otokonoko} & \text{ARC} \\
& \quad \text{girl-ACC chase-PROG-NPST boy} \\
& \quad \text{‘the boy [that \_ is chasing the girl]’}
\end{align*}
\]

\[
\begin{align*}
(186) & \quad [\text{ onnanoko-ga } \_ \text{ oikake-tei-ru } ] \text{ otokonoko} & \text{TRC} \\
& \quad \text{girl-NOM chase-PROG-NPST boy} \\
& \quad \text{‘the boy [that the boy is chasing \_ ]’}
\end{align*}
\]
The Structural Distance Hypothesis makes the same prediction for Japanese as it does for English. As illustrated in (187) and (188), the gap is more deeply embedded in the TRC compared to the ARC, predicting that TRCs should be more difficult in these languages.

(187)

(188)

The Canonical Word Order Hypothesis makes different predictions for Mandarin Chinese, whose canonical word order is SVO, and Japanese, whose canonical word order is SOV. In Japanese, neither ARCs nor TRCs follow canonical SOV word order. Consider the example of ARC in (189), which has OVS word order, and the TRC in (190), which has SVO word order. Because neither word order is canonical, this hypothesis makes no specific prediction for Japanese.

(189)  [ _ onnanoko-o oikake-tei-ru ] otokonoko  ARC
girl-ACC chase-PROG-NPST boy

‘the boy [that _ is chasing the girl]’
The Frequency Hypothesis claims frequent forms are easier to acquire. However, Ozeki and Shirai (2007) showed that different types of RCs appear in Japanese caretaker speech from early on, and at similar frequency. Therefore, this hypothesis does not predict any difference between ARCs and TRCs in Japanese.

The Semantic Prominence Hypothesis also predicts an ARC advantage in these languages because the head noun modified by an ARC is an agent (191), which is more prominent than the theme head noun modified by a TRC (192).

Table 53 summarizes the predictions made by each hypothesis for English and Japanese RCs.

<table>
<thead>
<tr>
<th>Hypotheses</th>
<th>English</th>
<th>Japanese</th>
</tr>
</thead>
<tbody>
<tr>
<td>Linear Distance</td>
<td>ARC advantage</td>
<td>TRC advantage</td>
</tr>
<tr>
<td>Structural Distance</td>
<td>ARC advantage</td>
<td>ARC advantage</td>
</tr>
<tr>
<td>Canonical Word Order</td>
<td>ARC advantage</td>
<td>No difference</td>
</tr>
<tr>
<td>Frequency</td>
<td>ARC advantage</td>
<td>No difference</td>
</tr>
<tr>
<td>Semantic Prominence</td>
<td>ARC advantage</td>
<td>ARC advantage</td>
</tr>
</tbody>
</table>
While many studies report an ARC advantage in English (e.g. Diessel & Tomasello, 2000; King & Just, 1991; Zukowski, 2009), the picture is less clear in Japanese. Some studies have found an ARC advantage (Ishizuka, 2005; Kawashima, 1980; Miyamoto & Nakamura, 2003), but others report the lack of any asymmetry (Ozeki & Shirai, 2007) or even a TRC advantage (Hakuta, 1981). However, even if we assume an ARC advantage for Japanese (and other languages with prenominal RCs), it is still not sufficient information to choose between the Structural Distance Hypothesis and the Semantic Prominence Hypothesis.

In order to investigate this matter further, this dissertation made use of data from Tagalog. For this purpose, I conducted one experiment on the production of declarative clauses and three experiments on the comprehension and production of RCs. All three RC experiments showed an ARC advantage for at least one condition. Table 54 summarizes the results from all three RC experiments.

<table>
<thead>
<tr>
<th>Table 54. Summary of results of all three RC experiments.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Comprehension (Experiment 2)</strong></td>
</tr>
<tr>
<td>---------------------------------</td>
</tr>
<tr>
<td>Reversible</td>
</tr>
<tr>
<td>Child accuracy: ARC advantage</td>
</tr>
<tr>
<td>Adult accuracy: No difference</td>
</tr>
<tr>
<td>Adult RT: No difference</td>
</tr>
</tbody>
</table>

In the comprehension task (Experiment 2), which tested RCs denoting reversible events in which the agent and theme are both animate, children showed an ARC advantage for accuracy. In the imitation task (Experiment 3), children showed an ARC advantage in the non-reversible condition. In the production task (Experiment 4), reaction times from adults showed an ARC advantage in both animacy conditions. In addition, both adults and children manifested an ARC advantage in accuracy in the non-reversible condition. With these results in mind, let us turn to the five hypotheses about the RC asymmetry.

Let us start with the Linear Distance Hypothesis. The canonical word order in Tagalog is either Verb-Agent-Theme or Verb … PSA-final (i.e., Verb-Theme-Agent for AF and Verb-
Agent-Theme for TF). While researchers agree that Verb-Agent-Theme is the canonical word order for TF, there is no consensus about the canonical word order for AF. It is also possible that there are two canonical word orders for AF, as Kroeger (1993) suggested. Some previous experimental studies found that Verb-Agent-Theme word order is the preferred word order for children (Bautista, 1983; Garcia et al., 2015), and this was confirmed by Experiment 1 in this dissertation. However, this preference does not necessarily translate directly to a default word order for the language. As long as the two word order patterns are interchangeable, it is hard to determine what Tagalog canonical word order is and thus hard to generate predictions for hypotheses about the development of RCs that are based on word order. If we assume Tagalog word order is Verb-Agent-Theme, then, the Linear Distance Hypothesis predicts that ARCs (193) should be easier than TRCs (194), which is compatible with the results from the three RC experiments.

\[
\begin{align*}
\text{(193)} & \quad \text{man}=\text{LK} & \text{<AF}>\text{IPFV~chase} & \text{NFOC} & \text{woman} \\
& \quad \text{‘(the) man [that }_\text{is chasing a/the woman]’}
\end{align*}
\]

\[
\begin{align*}
\text{(194)} & \quad \text{man}=\text{LK} & \text{<TF}>\text{IPFV~chase} & \text{NFOC} & \text{woman} \\
& \quad \text{‘(the) man [that a/the woman is chasing }_\text{]’}
\end{align*}
\]

On other hand, if we assume the default word order is predicate-initial and PSA-final (Bowen, 1965), the Linear Distance Hypothesis predicts no differences between ARCs (195) and TRCs (196).

\[
\begin{align*}
\text{(195)} & \quad \text{man}=\text{LK} & \text{<AF}>\text{IPFV~chase} & \text{NFOC} & \text{woman} \\
& \quad \text{‘(the) man [that }_\text{is chasing a/the woman]’}
\end{align*}
\]

\[
\begin{align*}
\text{(196)} & \quad \text{man}=\text{LK} & \text{<TF}>\text{IPFV~chase} & \text{NFOC} & \text{woman} \\
& \quad \text{‘(the) man [that a/the woman is chasing }_\text{]’}
\end{align*}
\]
The Canonical Word Order Hypothesis predicts that non-canonical word order contributes to the difficulty of a RC. Although it may be unclear what the canonical word order is, the default order for the language is uncontroversially predicate-initial. This is significantly different from the order NP V NP, which characterizes both ARCs (197) and TRCs (198) in Tagalog.

\[
\begin{array}{ccc}
A & V & T \\
\text{(197)} & \text{lalake}=\eta & [ h<\text{um}>a\text{-habol} \ _ \ na\j \ babae ] & \text{ARC} \\
& \text{man}=\text{LK} & <\text{AF}>IPFV\sim\text{chase \ NFOC \ girl} & \\
& \text{‘(the) man [that _ is chasing a/the woman]’} & \\
\end{array}
\]

\[
\begin{array}{ccc}
T & V & A \\
\text{(198)} & \text{lalake}=\eta & [ h<\text{in}>a\text{-habol} \ _ \ lalake \ _ ] & \text{TRC} \\
& \text{man}=\text{LK} & <\text{TF}>IPFV\sim\text{chase \ NFOC \ boy} & \\
& \text{‘(the) man [that a/the woman is chasing _]’} & \\
\end{array}
\]

Although non-canonical, PSA-initial word order is possible in Tagalog, Cooreman et al. (1984) reported that AF sentences with Agent-Verb-Theme word order (11%) are about as frequent as TF sentences with Theme-Verb-Agent word order (17%). The results from Segalowitz and Galang (1978) also suggest that children understand PSA-initial AF sentences and PSA-initial TF sentences equally well. The Canonical Word Order Hypothesis therefore predicts no difference between ARCs and TRCs in Tagalog.

The Structural Distance Hypothesis also predicts no difference between ARCs and TRCs in Tagalog. The following trees in (199–200) illustrate Tagalog RCs based on Richards and Rackowski’s (2005) analysis.
In this analysis, both agent and theme are at the vP edge. When the RCs are formed, the position of the gap is wherever the PSA is, so the depth of the gap is essentially the same for ARCs and TRCs. Although there are different syntactic analyses of Tagalog, the position of PSA is commonly taken to be in the same position for both AF and TF—usually the highest specifier.
position. Therefore, the Structural Distance Hypothesis predicts that there is no difference between ARCs and TRCs in Tagalog.

The Frequency Hypothesis predicts either a TRC advantage or no difference between ARCs and TRCs in Tagalog. If the frequency of declarative clauses matters, TRCs should be easier than ARCs in Tagalog, because TF is more frequent than AF (Cooreman et al., 1984). It has also been reported by Cooreman et al. (1984) that in the PSA-initial sentences, AF and TF occur at a similar frequency. If the distribution of RCs is similar to PSA-initial sentences, then we expect no frequency-related difference between ARCs and TRCs in Tagalog. A word of caution is in order here, however, as none of the corpus data collected so far includes maternal speech to children.

The Semantic Prominence Hypothesis states that RCs are easier to process when the head refers to a prominent entity. Assuming that agents are more prominent than themes, this hypothesis predicts that Tagalog ARCs (201) are easier than TRCs (202).

\[ agent \text{ (more prominent)} \]
\[ \downarrow \]
\[ (201) \ lalake=\eta \ [ h<um>a~habol \ _ na\j\babae ] \ ARC \]
\[ \text{man}=LK \ <AF>\text{IPFV}\sim\text{chase} \ NFOC \ \text{woman} \]
\[ \text{‘(the) man [that } _\text{ is chasing a/the woman]’} \]

\[ theme \text{ (less prominent)} \]
\[ \downarrow \]
\[ (202) \ lalake=\eta \ [ h<in>a~habol \ na\j\babae \ _ ] \ TRC \]
\[ \text{man}=LK \ <TF>\text{IPFV}\sim\text{chase} \ NFOC \ \text{woman} \]
\[ \text{‘(the) man [that a/the woman is chasing } _\text{]’} \]

The different behavior of participants on reversible and non-reversible RCs also gives us an insight into the prominence effect. In the elicited imitation task and the elicited production task, participants’ accuracy showed an ARC advantage only in the non-reversible condition. Moreover, in the elicited production task, both adults and children produced head + reversal errors quite frequently in the non-reversible condition. In the non-reversible condition, the heads of ARCs received a boost from both animacy and thematic roles (203). However, TRCs were the exact opposite—the head was less prominent both in terms of animacy and thematic roles (204).
agent (more prominent) 
animate (more prominent) 
↓

(203) lalake=ŋ [ s<um>i~sipa _ naŋ bola ] ARC  
man=LK <AF>IPFV~kick NFOC ball  
‘(the) man [that _ is kicking a/the ball]’

theme (less prominent)  
inanimate (less prominent)  
↓

(204) bola=ŋ [ s<in>i~sipa naŋ lalake _ ] TRC  
bola=LK <TF>IPFV~kick NFOC man  
‘(the) ball [that a/the man is kicking _ ]’

This is particularly interesting as previous studies suggested that the TRC disadvantage disappears when the head is inanimate (Kidd et al., 2007; Mak et al., 2002). Thus, (205a) is no easier than (205b) for children learning English, as well as for adults.

(205)  
a. the man [that _ read the book]  
b. the book [that the man read _ ]

Why does an inanimate head reduce the TRC difficulty in English, but have the opposite effect in Tagalog? Are RCs with inanimate heads infrequent in Tagalog? It is possible that language-specific factors are involved. This matter clearly needs further attention.

Table 55 presents the predictions of all five hypotheses for English, Japanese, and Tagalog. Although looking at each language is not sufficient to select from these hypotheses, a cross-linguistic comparison enables us to see which hypothesis is the most compatible with the findings from the different languages.
Table 55. Summary of predictions on English, Japanese, and Tagalog RCs.

<table>
<thead>
<tr>
<th>Hypotheses</th>
<th>English</th>
<th>Japanese</th>
<th>Tagalog</th>
</tr>
</thead>
<tbody>
<tr>
<td>Linear Distance</td>
<td>ARC advantage</td>
<td>TRC advantage</td>
<td>No prediction or ARC advantage</td>
</tr>
<tr>
<td>Structural Distance</td>
<td>ARC advantage</td>
<td>ARC advantage</td>
<td>No difference</td>
</tr>
<tr>
<td>Canonical Word Order</td>
<td>ARC advantage</td>
<td>No difference</td>
<td>No difference</td>
</tr>
<tr>
<td>Frequency</td>
<td>ARC advantage</td>
<td>No difference</td>
<td>TRC advantage or no difference</td>
</tr>
<tr>
<td>Semantic Prominence</td>
<td>ARC advantage</td>
<td>ARC advantage</td>
<td>ARC advantage</td>
</tr>
</tbody>
</table>

The Semantic Prominence Hypothesis is the only hypothesis of the five that predicts an ARC advantage in all three languages, and thus the most compatible with what has been found so far in languages of the world.

7.3 Implication of the Findings

This dissertation is the first-ever study of the comprehension, imitation, and production of ARCs and TRCs by Tagalog-speaking children and adults. The overall results point to an ARC advantage as predicted by the Semantic Prominence Hypothesis.

7.3.1 Experimental Work in a Fieldwork Setting

I would like to address some of the problems specific to this type of research, mainly in regards to (a) the experimental setting and (b) the participants’ language experience. First, although the ideal setting for experimental work is a carefully controlled environment—a quiet room with necessary equipment where participants can work alone without distraction—this creates a challenge for field-based experimental work. Although I tried to look for a place that is relatively quiet, it was impossible to avoid noise and other kinds of distractions, unlike in a laboratory designed for linguistic experiments. Second, because English is one of the official languages of the Philippines and is used commonly throughout society, all the participants had some exposure to English at home, school, and elsewhere, and some of them were quite proficient bilinguals. Although a language history survey confirmed the participants’ reported dominance in Tagalog, the possibility of influence from English remains strong, and it is nearly impossible to find monolingual speakers of Tagalog in the Philippines. Although monolingual participants are
usually thought as the ideal population for this type of research, this is not realistic in some cases and flexibility is necessary.

However, these problems should not discourage researchers from doing experimental work in field research settings. On the contrary, such research should be encouraged so that we can develop new methodologies, as Clemens et al. (2015) suggested. Because research in psycholinguistics and acquisition generally lacks variety in languages and populations (Anand, Chung, & Wagers, 2011), an increase in field-based experimental work will contribute to the diversity of acquisition studies. However, as Clemens et al. (2015) note, we should always be aware of the problem of irregularities and inconsistencies in the data, and, for this reason, collect data from as large a pool as possible. This suggestion applies to the current study as well. Although I was able to conduct some statistical tests on a relatively small sample, it would be more desirable to have a larger sample size for the reasons noted.

7.4 Concluding Remarks
This dissertation investigated whether an ARC advantage can be found in comprehension and production of Tagalog RCs by adults and children. The purpose of the dissertation was to study a language that has not been previously investigated in the literature on the acquisition and processing of RCs, and to use some of its unique properties to provide potential insights into why an ARC advantage is so widely observed. The findings from this dissertation point toward an ARC advantage in Tagalog for comprehension, imitation, and production. These results, combined with what has been found previously for other languages, suggest that semantic prominence is a key and universal determinant of processing difficulty in RCs, and that it can explain the ARC advantage manifested in different languages, including Tagalog.

7.5 Future Directions
One of the issues identified in this study was the lack of asymmetry in adults’ RC comprehension. While the production data from adults showed differences between ARCs and TRCs in the non-reversible condition, the comprehension task showed no difference in accuracy or in reaction times. It is possible that this was a ceiling effect, and the tasks were not sensitive enough to uncover a difference. In future research, it will be necessary to explore other experimental
techniques, such as self-paced reading and eye-tracking, to measure the comprehension and production of Tagalog RCs by adults. Studies on English that have used these methods have also reported a subject advantage.

Another issue calling for further study is the low accuracy in children’s RC production (ARC 38.50%; TRC 25.00%). One way to address this matter would be to include older children in future research. It would also be beneficial to have a wider age range in the participant population in general, as it makes it easier to see the developmental trajectory of RCs.\footnote{I also plan to further investigate the status of ARCs with a TF verb. I considered these patterns to be acceptable for the reasons outlined in §2.4, but it would be worthwhile to confirm this with the help of independent evidence. This could be achieved by means of an acceptability judgment task designed specifically for children (see Ambridge and Rowland (2013) for review). Alternatively, it would be possible to design an imitation task that includes various types of RCs, including those that are uncontroversially acceptable (e.g., ARCs with an AF verb), those that are uncontroversially unacceptable (e.g., TRCs with an AF verb), and the potentially controversial ARCs with a TF verb. Given that children tend to correct patterns that they find unacceptable in imitation tasks (Kenney & Wolfe, 1972; Over & Gattis, 2010), I therefore predict that children will faithfully imitate both ARCs with AF verbs and ARCs with TF verbs, but not TRCs with AF verbs.}

Lastly, RC patterns other than ARCs and TRCs should be investigated in future research. As discussed in §2.1, Tagalog has multiple focus patterns that encode thematic roles in a significantly different way from languages without a focus system. It would be extremely interesting to investigate how these focus patterns are utilized in different types or RCs, such as goal, instrumental and locative RCs. This is especially important as previous studies have reported an animacy-related confound in the ARC-TRC comparison, in that TRCs with inanimate heads are far more frequent. Although we do not know whether this is true in Tagalog, it could well be worthwhile to compare RCs built around thematic roles that are prototypically animate (e.g., agent vs. recipient, experiencer vs. stimulus). Moreover, because agents are usually external arguments and therefore syntactically privileged on many accounts, there is still a possibility that something structural—rather than semantic or pragmatic—underlies the ARC advantage in Tagalog. For this reason, it is also necessary to find a way to compare RCs that are built around different types of internal arguments—such as themes and locations. These designs have already been implemented for English and Korean in Kim and O’Grady’s (2015) study, and therefore constitute promising steps to consider in future work.
Appendix A. Language Background Questionnaire

Language History Survey

Please fill out the following information about your child.

Name: ___________________________  Sex: ___________________________

Date of Birth: ____________________  Age: __________________________

City of Origin: ____________________  Current City: ____________________

Length of residence in Current City (if different from city of Origin): ____________________

<table>
<thead>
<tr>
<th>Language</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tagalog</td>
<td></td>
</tr>
<tr>
<td>Speaking</td>
<td>1</td>
</tr>
<tr>
<td>Listening</td>
<td>1</td>
</tr>
<tr>
<td>English</td>
<td></td>
</tr>
<tr>
<td>Speaking</td>
<td>1</td>
</tr>
<tr>
<td>Listening</td>
<td>1</td>
</tr>
</tbody>
</table>

Language(s) other than Tagalog and English (please specify; these include Cebuano, Ilokano, etc.):

(                  ) 1 2 3 4 5

2. What language(s) does your child use with each of the following?

<table>
<thead>
<tr>
<th>Language</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mother</td>
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</tr>
<tr>
<td>Tagalog</td>
<td></td>
</tr>
<tr>
<td>English</td>
<td></td>
</tr>
<tr>
<td>(            )</td>
<td>%</td>
</tr>
<tr>
<td>Father</td>
<td></td>
</tr>
<tr>
<td>Tagalog</td>
<td></td>
</tr>
<tr>
<td>English</td>
<td></td>
</tr>
<tr>
<td>(            )</td>
<td>%</td>
</tr>
<tr>
<td>Siblings</td>
<td></td>
</tr>
<tr>
<td>Tagalog</td>
<td></td>
</tr>
<tr>
<td>English</td>
<td></td>
</tr>
<tr>
<td>(            )</td>
<td>%</td>
</tr>
</tbody>
</table>
3. Please indicate how often your child uses the following media:

<table>
<thead>
<tr>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tagalog TV         %</td>
</tr>
<tr>
<td>English TV         %</td>
</tr>
<tr>
<td>Tagalog books      %</td>
</tr>
<tr>
<td>English books      %</td>
</tr>
</tbody>
</table>

4. Do you have any other comments on your child’s language background that you think are important which you were not asked about in this questionnaire?

Thank you for your cooperation.

Nozomi Tanaka
nozomi@hawaii.edu
Appendix B. List of Stimuli for Experiment 1

<table>
<thead>
<tr>
<th>Context picture</th>
<th>Target picture</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Context 1" /></td>
<td><img src="image2" alt="Target 1" /></td>
</tr>
<tr>
<td><img src="image3" alt="Context 2" /></td>
<td><img src="image4" alt="Target 2" /></td>
</tr>
<tr>
<td><img src="image5" alt="Context 3" /></td>
<td><img src="image6" alt="Target 3" /></td>
</tr>
</tbody>
</table>
Appendix C. List of Stimuli for Experiment 2

Practice Items

<table>
<thead>
<tr>
<th>Practice Items</th>
<th>Prompts</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="Picture 1" /></td>
<td>babae=ŋ p&lt;um&gt;i~pitas naŋ kamatis</td>
</tr>
<tr>
<td><img src="image2.png" alt="Picture 2" /></td>
<td>girl=ŁK &lt;AF&gt;IPFV~pick NFOC tomato</td>
</tr>
<tr>
<td><img src="image3.png" alt="Picture 3" /></td>
<td>‘(the) girl that is picking the tomato’</td>
</tr>
<tr>
<td><img src="image4.png" alt="Picture 4" /></td>
<td>bulaklak na p&lt;in&gt;i~pitas naŋ lalake</td>
</tr>
<tr>
<td><img src="image5.png" alt="Picture 5" /></td>
<td>flower ŁK &lt;TF&gt;IPFV~pick NFOC boy</td>
</tr>
<tr>
<td><img src="image6.png" alt="Picture 6" /></td>
<td>‘(the) flower that the boy is picking’</td>
</tr>
<tr>
<td><img src="image7.png" alt="Picture 7" /></td>
<td>babae=ŋ s&lt;um&gt;i~sipa naŋ bola</td>
</tr>
<tr>
<td><img src="image8.png" alt="Picture 8" /></td>
<td>girl=ŁK &lt;AF&gt;IPFV~kick NFOC ball</td>
</tr>
<tr>
<td><img src="image9.png" alt="Picture 9" /></td>
<td>‘(the) girl that is kicking the ball’</td>
</tr>
</tbody>
</table>
bola=ŋ s<in>i~sipa naŋ babae
ball=LK <TF>IPFV~kick NFOC girl
'(the) ball that the girl is kicking'

Test items (ARC)

lalake=ŋ b<um>u~buha naŋ babae
boy=LK <AF>IPFV~carry NFOC girl
'(the) boy that is carrying a/the girl'

babae=ŋ h<um>a~habol naŋ lalake
girl=LK <AF>IPFV~chase NFOC boy
'(the) girl that is chasing a/the boy'

lalake=ŋ y<um>a~yakap naŋ babae
boy=LK <AF>IPFV~hug NFOC girl
'(the) boy that is hugging a/the girl'
4
lalake=ŋ t<um>u~tulak naŋ babae
boy=LK <AF>IPFV~push NFOC girl
‘(the) boy that is pushing a/the girl’

5
babae=ŋ nag-ba~basa naŋ lalake
girl=LK <AF>IPFV~wet NFOC boy
‘(the) girl that is splashing a/the boy’

Test items (TRC)

1
lalake=ŋ b<in>u~buha naŋ babae
boy=LK <TF>IPFV~carry NFOC girl
‘(the) boy that the girl is carrying’

2
babae=ŋ h<in>a~habol naŋ lalake
girl=LK <TF>IPFV~chase NFOC boy
‘(the) girl that the boy is chasing’
lalake=ŋ ni-ya-yakap naŋ babae
boy=LK TF-IPFV~hug NFOC girl
‘(the) boy that the girl is hugging’

babae=ŋ t<in>u-tulak naŋ lalake
girl=LK <TF>IPFV~push NFOC boy
‘(the) girl that the boy is pushing’

babae=ŋ b<in>a-basa naŋ lalake
girl=LK <TF>IPFV~wet NFOC boy
‘(the) girl that the boy is splashing’
Appendix D. List of Stimuli for Experiment 3

Practice items

1. bata=ŋ maliit
   child=LK small
   ‘small child’

2. ibo=ŋ malaki
   bird=LK big
   ‘big bird’

3. kotse=ŋ malaki
   car=LK big
   ‘big car’

Test items (Reversible, ARC)

1. doktor na nag-ha~hanap naŋ titser
   doctor LK AF-IPFV~search NFOC teacher
   ‘(the) doctor that is looking for the teacher’

2. artista=ŋ t<um>a~tawag naŋ doktor
   actor=LK <AF>IPFV~call NFOC teacher
   ‘(the) doctor that is calling the teacher’

3. doktor na k<um>u~kurot naŋ artista
   doctor LK <AF>IPFV~pinch NFOC actor
   ‘(the) doctor that is pinching the actor’

4. doktor na nang-hu~huli naŋ titser
   doctor LK AF-IPFV~catch NFOC teacher
   ‘(the) doctor that is catching the teacher’

5. titser na nang-hi~hila naŋ artista
   teacher LK AF-IPFV~pull NFOC actor
   ‘(the) teacher that is pulling the actor’

Test items (Reversible, TRC)

6. artista=ŋ h<in>a~hanap naŋ titser
   artist=LK <TF>IPFV~search NFOC teacher
   ‘(the) actor that the teacher is looking for’
7. doktor na t<in>a-tawag naŋ artista
doctor LK <TF>IPFV~call NFOC actor
‘(the) doctor that the actor is calling’

8. titser na k<in>u-kurot naŋ doktor
teacher LK <TF>IPFV~pinch NFOC doctor
‘(the) teacher that the doctor is pinching’

9. artista=ŋ h<in>u-huli naŋ doktor
actor=LK <TF>IPFV~catch NFOC doctor
‘(the) actor that is catching the doctor’

10. titser na h<in>i-hila naŋ artista
teacher LK <TF>IPFV~pull NFOC actor
‘(the) teacher that the actor is pulling’

Test items (Non-reversible, ARC)

11. doktor na um-i-inom naŋ gata]
doctor LK <AF>IPFV~drink NFOC milk
‘(the) doctor that is drinking the milk’

12. titser na nag-su-sulat naŋ libro
teacher LK AF-IPFV~write NFOC book
‘(the) teacher that is writing the book’

13. titser na nag-ti-tinda naŋ kotse
teacher LK AF-IPFV~sell NFOC car
‘(the) teacher that is selling the car’

14. doktor na nag-lu-luto naŋ adobo
doctor LK AF-IPFV~cook NFOC adobo
‘(the) doctor that is cooking the adobo’

15. titser na nag-li-linis naŋ sahig
teacher LK AF-IPFV~clean NFOC floor
‘(the) teacher that is cleaning the floor’

Test items (Non-reversible, TRC)

16. dyus na in-i-inom naŋ doktor
juice LK <TF>IPFV~drink NFOC doctor
‘(the) juice that the doctor is drinking’
17. libro=ŋ s<in>u-sulat naŋ artista
    (the) book that the actor is writing

18. kendi=ŋ t<in>i~tinda naŋ doktor
    (the) candy that the doctor is selling

19. lugaw na ni-lu~luto naŋ titser
    (the) porridge that the teacher is cooking

20. mesa=ŋ ni-li~linis naŋ doktor
    (the) desk that the doctor is cleaning
Appendix E. List of Stimuli for Experiment 4

Practice items

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
</table>
| 1 | Maliit ang isang pusa. Malaki ang isa pang pusa. Sino ang may arrow?  
   | ‘One cat is small. Another cat is big. Who is the arrow pointing at?’ |
| 2 | Maliit ang isang lalake. Malaki ang isa pang lalake. Sino ang may arrow?  
   | ‘One man is small. Another man is big. Who is the arrow pointing at?’ |
| 3 | Malaki ang isang bahay. Maliit ang isa pang bahay. Sino ang may arrow?  
   | ‘One house is big. Another house is small. Which is the arrow pointing at?’ |

Test items (Reversible, ARC)

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
</table>
| 1 | AF: Bumubuhat ang isang lalake ng unggoy. Bumubuhat ang isa pang lalake ng babae. Sino ang may arrow?  
   | TF: Binubuhat ng isang lalake ang unggoy. Binubuhat ng isa pang lalake ang babae. Sino ang may arrow?  
   | ‘A boy is carrying a monkey. Another boy is carrying a girl. Who is the arrow pointing at?’ |
| 2 | AF: Humahabol ang isang babae ng unggoy. Humahabol ang isa pang babae ang lalake. Sino ang may arrow?  
   | TF: Hinahabol ng isang babae ang unggoy. Hinahabol ng isa pang babae ang lalake. Sino ang may arrow?  
   | ‘A girl is chasing a monkey. Another girl is chasing a boy. Who is the arrow pointing at?’ |
AF: Yumayakap ang isang lalake ng unggoy. Yumayakap ang isa pang lalake ng babae. Sino ang may arrow?
TF: Niyayakap ng isang lalake ang unggoy. Niyayakap ng isa pang lalake ang babae. Sino ang may arrow?
‘A boy is hugging a monkey. Another boy is hugging a girl. Who is the arrow pointing at?’

AF: Nanunulak ang isang lalake ng babae. Nanunulak ang isa pang lalake ng unggoy. Sino ang may arrow?
TF: Tinutulak ng isang lalake ang babae. Tinutulak ng isa pang lalake ang unggoy. Sino ang may arrow?
‘A boy is pushing a girl. Another boy is pushing a monkey. Who is the arrow pointing at?’

AF: Nagbabasa ang isang babae ng lalake. Nagbabasa ang isa pang lalake ng unggoy. Sino ang may arrow?
TF: Binabasa ng isang babae ang lalake. Binabasa ng isa pang babae ang unggoy. Sino ang may arrow?
‘A girl is splashing a boy. Another girl is splashing a monkey. Who is the arrow pointing at?’

Test items (Reversible, TRC)

AF: Bumubuhat ang lalake ng isang babae. Bumubuhat ang unggoy ng isa pang babae. Sino ang may arrow?
TF: Binubuhat ng lalake ang isang babae. Binubuhat ng unggoy ang isa pang babae. Sino ang may arrow?
‘A boy is carrying a girl. A monkey is carrying another girl. Who is the arrow pointing at?’

AF: Humahabol ang unggoy ng isang lalake. Humahabol ang babae ng isa pang lalake. Sino ang may arrow?
TF: Hinahabol ng unggoy ang isang lalake. Hinahabol ng babae ang isa pang lalake. Sino ang may arrow?
‘A monkey is chasing a boy. A girl is chasing another boy. Who is the arrow pointing at?’
AF: Yumayakap ang lalake ng isang babae. Yumayakap ang unggoy ng isa pang babae. Sino ang may arrow?
TF: Niyayakap ng lalake ang isang babae. Niyayakap ng unggoy ng isa pang babae. Sino ang may arrow?
‘A boy is hugging a girl. A monkey is carrying another girl. Who is the arrow pointing at?’

AF: Nanunulak ang unggoy ng isang babae. Nanunulak ang lalake ng isa pang babae. Sino ang may arrow?
TF: Tinutulak ng unggoy ang isang babae. Tinutulak ng lalake ang isa pang babae. Sino ang may arrow?
‘A monkey is pushing a girl. A boy is pushing another girl. Who is the arrow pointing at?’

AF: Nagbabasa ang babae ng isang lalake. Nagbabasa ang unggoy ng isa pang lalake. Sino ang may arrow?
TF: Binabasa ng babae ang isang lalake. Binabasa ng unggoy ang isa pang lalake. Sino ang may arrow?
‘A girl is splashing a boy. A monkey is splashing another boy. Who is the arrow pointing at?’

Test items (Non-reversible, ARC)

AF: Pumuputol ang isang lalake ng puno ng saging. Pumuputol ang isa pang lalake ng puno ng niyog. Sino ang may arrow?
TF: Pinuputol ng isang lalake ang puno ng saging. Pinuputol ng isa pang lalake ang puno ng niyog. Sino ang may arrow?
‘A boy is cutting a banana tree. Another boy is cutting a coconut tree. Who is the arrow pointing at?’

AF: Kumakain ang isang lalake ng pitsa. Kumakain ang isa pang lalake ng aiskrim. Sino ang may arrow?
TF: Kinakain ng isang lalake ang pitsa. Kinakain ng isa pang lalake ang aiskrim. Sino ang may arrow?
‘A boy is eating a pizza. Another boy is eating an ice cream. Who is the arrow pointing at?’
154

Test items (Non-reversible, TRC)

AF: Sumisipa ang isang lalake ng bola. Sumisipa ang isa pang lalake ng lata. Sino ang may arrow?
TF: Sinisipa ng isang lalake ang bola. Sinisipa ng isa pang lalake ang lata. Sino ang may arrow?
‘A boy is kicking a ball. Another boy is kicking a can. Who is the arrow pointing at?’

AF: Nagbabasa ang isang babae ng libro. Nagbabasa ang isa pang babae ng papel. Sino ang may arrow?
TF: Binabasa ng isang babae ang libro. Binabasa ng isa pang babae ang papel. Sino ang may arrow?
‘A girl is reading a book. Another girl is reading a paper. Who is the arrow pointing at?’

AF: Pumipitas ang isang babae ng bulaklak. Pumipitas ang isa pang babae ng kamatis. Sino ang may arrow?
TF: Pinipitas ng isang babae ang bulaklak. Pinipitas ng isa pang babae ang kamatis. Sino ang may arrow?
‘A girl is picking a flower. Another girl is picking a tomato. Who is the arrow pointing at?’

AF: Pumuputol ang babae ng isang puno ng niyog. Pumuputol ang lalake ng isa pang puno ng niyog. Sino ang may arrow?
TF: Pinuputol ng babae ang isang puno ng niyog. Pinuputol ng lalake ang isa pang puno ng niyog. Sino ang may arrow?
‘A girl is cutting a coconut tree. A boy is kicking another coconut tree. Which is the arrow pointing at?’

AF: Kumakain ang lalake ng isang aiskrim. Kumakain ang babae ng isa pang aiskrim. Sino ang may arrow?
TF: Kinakain ng lalake ang isang aiskrim. Kinakain ng babae ang isa pang aiskrim. Sino ang may arrow?
‘A boy is eating an ice cream. A girl is eating another ice cream. Which is the arrow pointing at?’
3. AF: Sumisipa ang babae ng isang bola. Sumisipa ang lalake ng isa pang bola. Sino ang may arrow?
   TF: Sinisipa ng babae ang isang bola. Sinisipa ng lalake ang isa pang bola. Sino ang may arrow?
   ‘A girl is kicking a ball. A boy is kicking another ball. Which is the arrow pointing at?’

4. AF: Pumipitas ang lalake ng isang bulaklak. Pumipitas ang babae ng isa pang bulaklak. Sino ang may arrow?
   TF: Pinipitas ng lalake ang isang bulaklak. Pinipitas ng babae ang isa pang bulaklak. Sino ang may arrow?
   ‘A boy is picking a flower. A girl is picking another flower. Which is the arrow pointing at?’

5. AF: Nagbabasa ang lalake ng isang libro. Nagbabasa ang babae ng isa pang libro. Sino ang may arrow?
   TF: Binabasa ng lalake ang isang libro. Binabasa ng babae ang isa pang libro. Sino ang may arrow?
   ‘A boy is reading a book. A girl is reading another book. Which is the arrow pointing at?’
# Appendix F. Children’s Results

<table>
<thead>
<tr>
<th>PNT</th>
<th>Age</th>
<th>Sex</th>
<th>Declarative Production</th>
<th>Comprehension</th>
<th>Imitation</th>
<th>Production</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>AF-biased</td>
<td>TF-biased</td>
<td>ARC</td>
<td>TRC</td>
</tr>
<tr>
<td>BC01</td>
<td>5;9</td>
<td>F</td>
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