Bridging methodologies: experimental syntax in the Pacific[*]

Sandra Chung[1], Manuel F. Borja[2], & Matthew Wagers[1]
[1] Department of Linguistics, University of California, Santa Cruz
[2]Inetnon Åmot yan Kutturan Natibu (Center for Native Medicine and Culture), Commonwealth of the Northern Mariana Islands
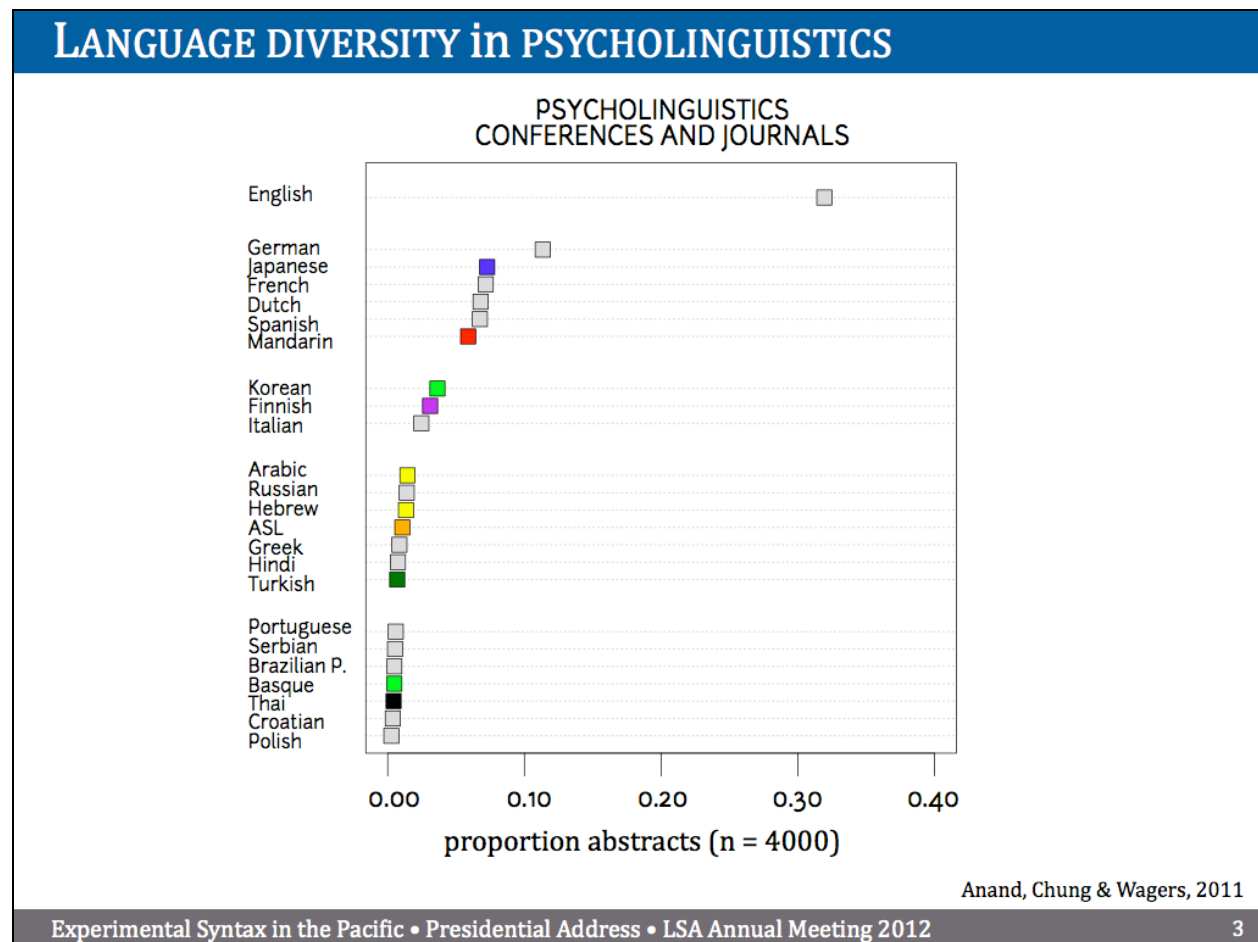
In the best world, theories of language would routinely be tested against scientific data from the full diversity of the world's languages. The richness of grammar is distributed across *all* languages, so it makes sense to draw on evidence from the full spectrum as we construct and evaluate our theories. What must be done for this goal to be achieved? While the answer seems self-evident—linguistic research must encompass many more of the world's languages,—the circumstances of the vast majority of the world's languages pose a challenge. These languages are understudied, spoken by small communities, and threatened by language endangerment. For such languages to have an impact on theory construction, our understanding of them must go far beyond basic documentation. Language endangerment could well impose a time limit on the research that is needed. Many linguists believe that at least half of the world's current languages will become extinct in this century. Given that the declining use of a language can lead to a

reduction in its linguistic complexity, it is imperative to investigate as many understudied languages as possible while they are still vibrant.

The urgency of the situation may call for changes in traditional modes of collecting linguistic data.

For instance, consider the experimental methodology that underlies psycholinguistic research on the dynamic aspects of the human language capacity. These data-gathering methods involve controlled studies that measure the behavioral or physiological responses of participants as they complete language-related tasks. Because the aim is to arrive at statistically significant generalizations, psycholinguistic studies typically involve large numbers of participants. In addition, they sometimes require sophisticated, expensive instrumentation. Thus, in a purely material sense, they are often resource-intensive. But there is a more serious challenge that is not often recognized: the experimental methodology is highly culturally circumscribed. It presupposes that participants are familiar with tests, accept the norms of test-taking, and are willing to maintain exclusive focus on tasks that are often solitary and unnatural. These conditions are typically satisfied in university settings, so it is no surprise that the data collected by this methodology are heavily skewed to the cognitive make-up of 18-21 year old university students in highly industrialized societies. In their study of over 4,000 psycholinguistics abstracts from leading conferences and journals, Anand, Chung, and Wagers (2011)[i] found that just 10 languages accounted for 85% of the research—precisely those languages that support university populations. And fully 3/4 of the research comes from Indo-European languages.

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proportion abstracts (n = 4000)

Anand, Chung & Wagers, 2011

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Clearly, aspects of this methodology might not generalize well to the smaller, poorer, culturally diverse communities in which understudied languages are typically spoken.

Consider next linguistic fieldwork, which is—and doubtless will continue to be—the core methodology for investigating understudied languages. This methodology involves working one-on-one with speakers of a language (or signers of a sign language) to record their words, sentences, narratives, and linguistic intuitions. Fieldwork can uncover language data of great sophistication and subtlety—data that could not be gathered as effectively by other means. But in human terms it is resource-intensive, relying on one-on-one interaction between the linguist and the native speaker. The number of speakers who one linguist can consult is limited by issues of time, access, and personal relations. So it is no surprise that in many fieldwork-based studies of under-documented languages, a small number of speakers have contributed most of the data. For

instance, my electronic corpus of elicited Chamorro data includes over 23,000 sentences, contributed by a total of 43 speakers. But just 10 of these speakers contributed over 80% of the data.
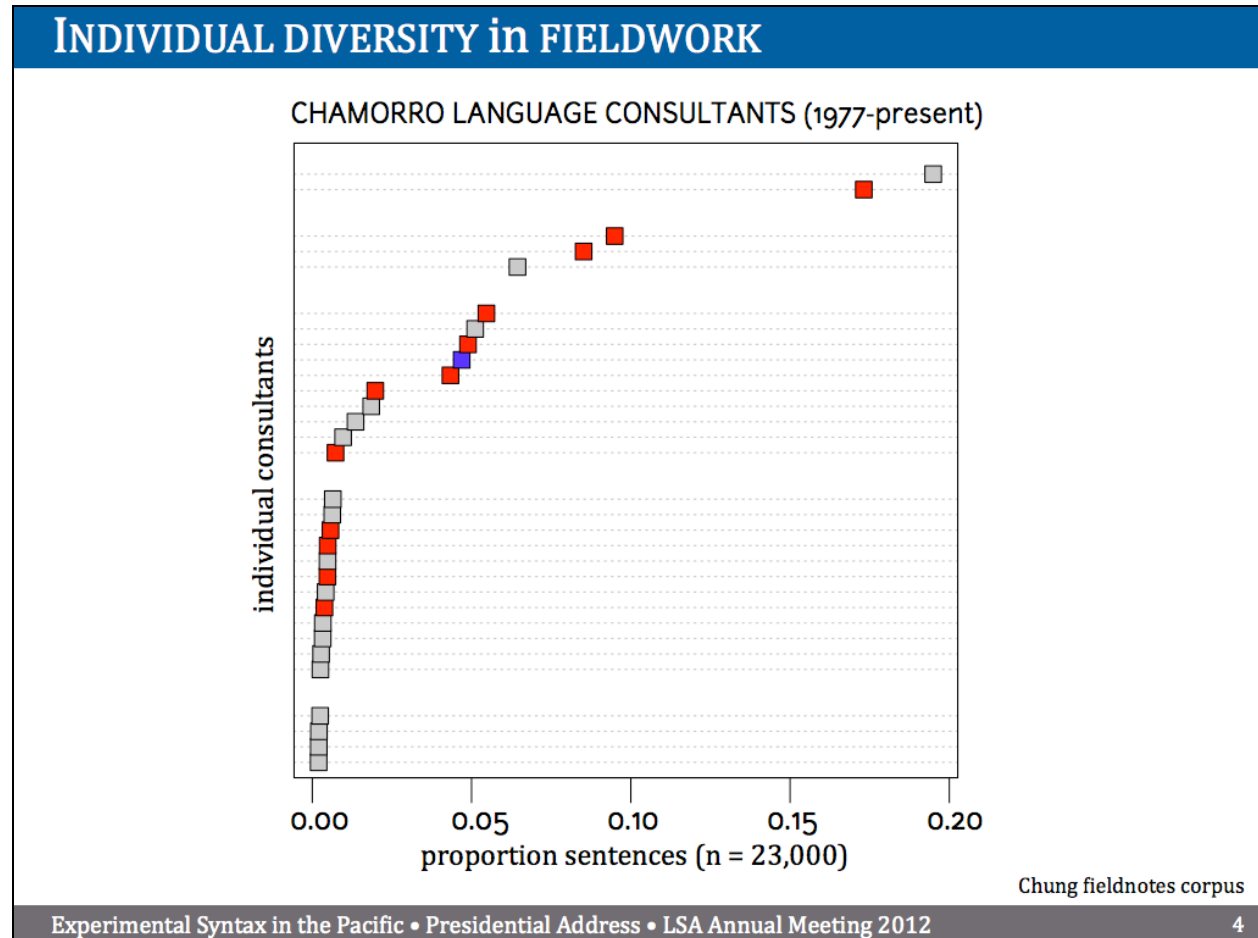
A glance at some well-known descriptive grammars of other understudied languages reveals that this situation is not unusual. Whether the description is based on texts, elicited sentences, or both, the number of speakers who are principal contributors is typically fewer than 15.

PRINCIPAL DATA SOURCES FOR 5 DESCRIPTIVE GRAMMARS	
	main consultants
R.M.W. Dixon (1988). University of Chicago Press. **A Grammar of Boumaa Fijian**	6 (recorded texts; p. 10)
R.M.W. Dixon (2004). Oxford University Press. **The Jarawara Language of Southern Amazonia**	12 (recorded texts; p. 13)
Jack B. Martin, with the assistance of Margaret McKane Mauldin and Juanita McGirt (2011). University of Nebraska Press. **A Grammar of Creek (Muskogee)**	2 (fieldwork; p.c.)
Keren Rice (1989). Mouton de Gruyter. **A Grammar of Slave**	>20 (fieldwork; p.c.)
Edward Sapir (1990[1912]). Mouton de Gruyter. **The Takelma Language of Southwestern Oregon** In *The Collected Works of Edward Sapir, VIII, ed. Victor Golla*	1 (fieldwork; p. 14)

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These small numbers raise an issue. Although data gathered by fieldwork reflect the linguistic intuitions of the individuals consulted, it can be hard to determine the extent to which these data generalize to the broader community of speakers.

Psycholinguistic experimentation and linguistic fieldwork face different challenges. Our point is that each methodology can begin to address these challenges by incorporating insights from the other. Psycholinguistic experimentation could potentially reach a wider range of languages by drawing on the individual-centered, culturally sensitive ethos of fieldwork. And linguistic fieldwork could potentially draw on experimental techniques to broaden its empirical coverage beyond data gathered via one-on-one interaction. This bridging of methodologies could well open up the exploration of new research questions—questions that might not even arise if the two methodologies continue to proceed on separate tracks.

What practical steps can be taken to effect this cross-fertilization? A number of research groups are now grappling with this question, in Caucasian languages and Mayan languages.[ii] Here we report and reflect on our efforts to combine psycholinguistic experimentation with linguistic fieldwork in our research on the syntax of Chamorro.

Chamorro is an Austronesian language indigenous to the Mariana Islands. The language has some 45,000 speakers in the Marianas and numerous speakers in the continental U.S., but it is widely believed to be on the cusp of language endangerment. Some brief words to situate this language in socio-cultural context: The Mariana Islands, a chain of islands in the Western Pacific, have been under foreign domination since the late seventeenth century.
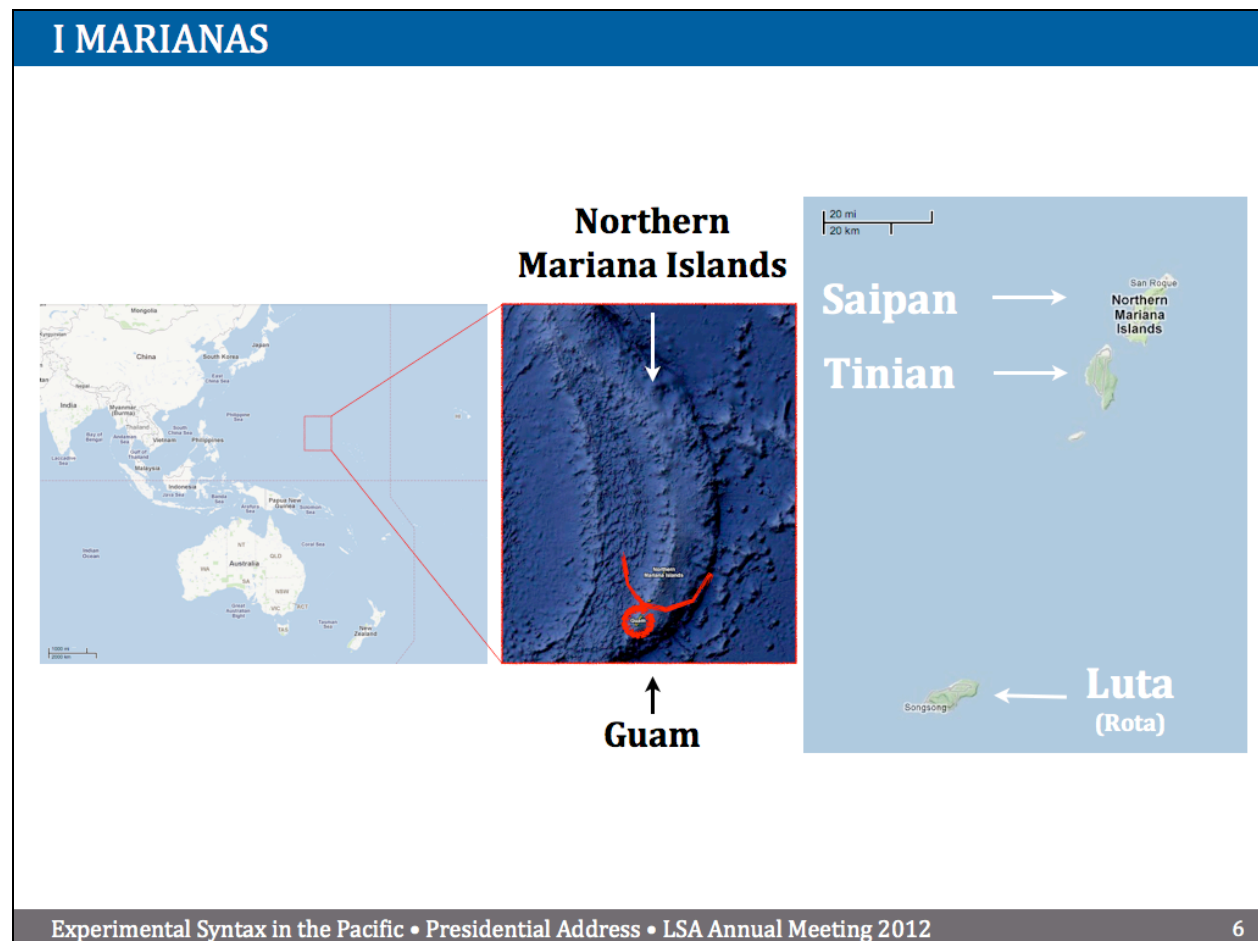
They are now divided into two political entities: the U.S. Commonwealth of the Northern Mariana Islands (the CNMI) and the unincorporated U.S. territory of Guam. Although Guam has

a larger number of Chamorro speakers, the language is better maintained in the CNMI, where almost all Chamorros aged 55 or over are fluent speakers and there are many speakers in the 30-55 age range. (The number of speakers under the age of 30 is distressingly low.) Our research was conducted in the three main islands of the CNMI: Saipan, Tinian, and Luta.

The CNMI has two indigenous populations, Chamorros and Carolinians, as well as numerous immigrants and foreign residents from elsewhere in Micronesia, the Philippines, East Asia, South Asia, and the continental U.S. In this multilingual, multicultural environment, English is the prestige language and the language of public settings. Chamorro was the language of most Chamorro homes until the economic boom of the 1980's and early 1990's, when many families hired foreign domestic workers to provide childcare. Today, both the Chamorro language and Chamorro culture are under threat. Still, there is growing support for maintaining the Chamorro language and strengthening Chamorro culture, which emphasizes family, community, respect for elders, reciprocity, and group effort, and draws clear lines between community members (*tåotao tånu'*) and outsiders.

Turning now to syntax: Chamorro is a head-initial language. The clause consists of a predicate, which can be any major category type, followed by arguments and adjuncts. Although the relative order of arguments and adjuncts is flexible, the neutral word order of clauses containing verbs is *Verb Subject Object*. In the clause in (1), the verb is *fåhan* 'buy'.

(1) **Ha fåhan si Vicente i gima' Antonio.**
     AGR buy NM Vicente the house.L Antonio
     'Vicente bought Antonio's house.'

Pronouns that are subjects, direct objects, or possessors can be null—in fact, they must be null if they are cross-referenced by agreement in person. In (2), both the pronoun subject and the pronoun possessor must be null.

(2) **Ha fåhan i kareta-hu nigap.**
     AGR buy the car-AGR yesterday

'He bought my car yesterday.'

Constituent questions are formed by wh-movement. The interrogative phrase is moved to the left edge of the interrogative clause, as shown in (3).

(3)   **Håyi fumåhan ___ i kareta?**
        who? WH[SBJ].buy the car
        'Who bought the car?'

The grammatical relation of the interrogative phrase is registered on the predicate by a special morphological agreement known as wh-agreement. Wh-agreement is realized overtly in some circumstances but unpronounced in others. For instance, when the interrogative phrase is the subject of a realis transitive clause, wh-agreement is realized by the infix *-um-*, as in (3). When the interrogative phrase is an oblique, wh-agreement is realized by nominalization of the predicate. But when the interrogative phrase is the subject of an intransitive clause, wh-agreement is unpronounced. Compare (4a) and (4b).

(4)   a.   **Måttu gi paingi si Francisco.**
             AGR.arrive LOC last.night NM Francisco
             'Francisco arrived last night.'

       b.   **Håyi måttu ___ gi paingi?**
             who? arrive LOC last.night
             'Who arrived last night?'

The grammatical description of wh-agreement has been fleshed out in several earlier, fieldwork-based studies.[iii] In our joint research we sought to explore a novel question: what is the impact of wh-agreement on the real-time comprehension of constituent questions in Chamorro? For instance, does this special agreement change the way that hearers understand the dependency formed by wh-movement, and thus confer a functional advantage?

Two aspects of the profile of wh-agreement supply useful probes for this investigation. First, when the interrogative phrase is a direct object, the realization of wh-agreement is *optional*. Either the agreement is spelled out overtly, as nominalization of the verb plus the infix

-in-, or else it is unpronounced, in which case the verb looks just like the verb of a non-question. The two options, which are truth-conditionally equivalent, are illustrated in (5).

(5)   a.   **Håfa   ha fåhan si Maria ___ gi   tenda?**
                what? AGR buy   NM Maria   LOC store

        b.   **Håfa   finahån-ña   si Maria ___ gi   tenda?**
                what? WH[OBJ].buy-AGR NM Maria   LOC store
                'What did Maria buy at the store?'

Second, Chamorro allows constituent questions to be formed on certain possessors when the determiner of the entire possessive DP is the null indefinite article. In such cases, the interrogative possessor undergoes wh-movement, stranding the rest of the possessive DP, and the predicate does *not* show wh-agreement. In (6), for instance, the possessor of the direct object has undergone wh-movement, and the verb looks just like the verb of the corresponding non-question.

(6)   **Håyi un fåhan [karetå-ña ___]?**
        who? AGR buy   car-AGR
        'Whose car did you buy?'

These patterns point to a paradigmatic difference that could play a role in processing. When wh-agreement is overtly realized, it provides a direct cue to the grammatical relation of the interrogative phrase. But when the verb does not show wh-agreement, the interrogative phrase could, in principle, bear a range of grammatical relations. Does this difference have an effect on real-time comprehension?

An off-the-shelf psycholinguistic study that attempted to address this question might involve participants reading a series of questions which might be flashed word-by-word on a computer screen. Each participant might be asked to read some 100 questions and rate the grammaticality of each on a 7-point scale. Participants' reading times would provide the basic measure of incremental processing. Participants might be recruited through advertisements,

announcements in courses, and the like. Such an approach would have faced many challenges in the very different cultural context of the CNMI. Most speakers of Chamorro are literate in English but not in Chamorro. Older Chamorros—those most likely to be fluent speakers of the language—tend to have limited experience with test-taking and limited computer skills. Chamorro culture affirms group activities with a social or community-building purpose, but devalues activities that are viewed as solitary, isolating, or initiated by outsiders. The cultural emphasis on direct personal interaction would have made it hard to recruit participants through advertisements or other relatively anonymous means.

Our efforts to design an experimental study that would be culturally appropriate and would deliver accurate real-time measurements led us to make numerous departures, large and small, from standard data-gathering methods. Our experiment involved *listening* rather than reading, *anomaly* judgments rather than grammaticality judgments, and was relatively short. Participants were asked to listen to 40 recorded questions and judge whether each made sense (*måolik*) or was anomalous (*ti måolik*). The 40 questions included 12 target questions—questions of the direct object or its possessor—that crossed the pragmatic plausibility of the interrogative phrase as direct object with the presence or absence of overt wh-agreement. For instance, each participant heard one target question from the set shown in (7):

(7)   a.   **Kuåntu   na chinina   prinensåm-mu nigap   gi talu'åni?**
   how.many? L   shirts   WH[OBJ].iron-AGR   yesterday LOC afternoon
   'How many shirts did you iron yesterday afternoon?'

   b.   **Kuåntu na patgun låhi prinensåm-mu nigap   gi talu'åni?**
                     boys
   '#How many boys did you iron yesterday afternoon?'

   c.   **Kuåntu   na chinina   un prensa   nigap   manggas-ñiha?**
   how.many? L   shirts   AGR iron   yesterday   sleeves-agr
   'How many shirts did you iron their sleeves yesterday?'

   d.   **Kuåntu na patgun låhi   un prensa   nigap   chininan-ñiha?**
                     boys   *shirts-agr*
   'How many boys did you iron their shirts yesterday?'

Notice that (7a) makes sense; (7b) is anomalous. (7c) and (7d), which both make sense, are questions of the *possessor* of the direct object. They differ in that the interrogative phrase would make a plausible direct object of the verb in (7c) but an implausible direct object in (7d). The target questions were counterbalanced for the animacy of the interrogative phrase and the animacy of the possessed noun. (8) shows another set of target questions:

(8) a. **Håyi siha na må'gas tinektok-mu   nigap   gi fandånggu?**
         who? PL   L   boss   WH[OBJ].hug-AGR   yesterday   LOC wedding
         'Which bosses did you hug yesterday at the wedding?'

    b. **Håfa siha na kumpaniha tinektok-mu nigap gi fandånggu?**
                 company
         '#Which companies did you hug yesterday afternoon?'

    c. **Håyi siha na må'gas un toktuk   nigap   asaguan-ñiha?**
         who? PL   L   boss   AGR   hug   yesterday   spouse-AGR
         'Which bosses did you hug their wives yesterday?'

    d. **Håfa siha na kumpaniha un toktuk nigap ma'gas-ñiha?**
                 company   boss-agr
         'Which companies did you hug their bosses yesterday?'

The entire listening task took about 6 minutes to complete and was presented in two formats. Participants whose occupations involve frequent computer use—teachers and accountants—did self-paced listening.[iv] They advanced the recorded question by pressing a computer key. (The question was not displayed on the screen.)

Other participants simply listened to a recording of the question while looking at a laptop screen that showed two boxes, a green box with the word *måolik* and a red box with the words *ti måolik*.
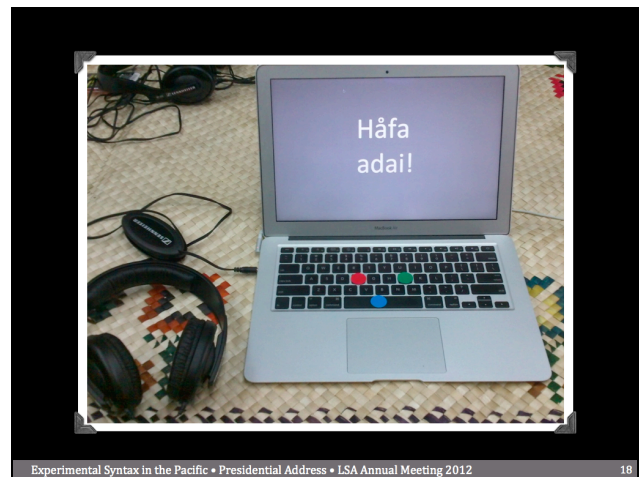
Their eye movements were recorded, with their permission, by the laptop webcam and later coded blind by multiple annotators. This simple method gave us a record of how their comprehension proceeded.

We guessed that participants would react more positively to an anomaly task than to a grammaticality task. We also guessed that they would be willing to listen to a maximum of 40 questions. Finally, we felt that participants would be more highly engaged if we conducted the experiment entirely in Chamorro. That structured the division of labor among the three of us. During experimental sessions, Matt set up the instrumentation and played the Chamorro instructions, which had been recorded earlier by Manny; Manny expanded on the instructions and answered questions; Manny and I collected the personal data and elicited participants' reactions during the debriefing. We made efforts to conform to cultural norms in many smaller ways: for instance, by using a flashing X to announce the next stimulus instead of the standard flashing cross, which we felt might raise issues for older speakers, many of whom are devout Catholics. Each participant was compensated with a 4GB flashdrive. Flashdrives are relatively rare in the CNMI, so these became an attraction: older participants would sometimes come accompanied by a much younger relative who did not participate, but who would be given the flashdrive.

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Speakers were remarkably willing to participate, for two reasons. First, one of us is a Chamorro who is deeply involved in cultural and educational activities in the CNMI. Second, public awareness of language issues has been fostered by the Chamorro dictionary project, a community-based, NSF-funded effort to revise the 1975 *Chamorro-English Dictionary* by Topping, Ogo, and Dungca.[v] (Manny is one of the heads of the dictionary project; I am the project linguist.) The dictionary project has significant community involvement in the CNMI and has generated much good will. On all three islands, project members provided the crucial human infrastructure for our study, serving as participants and organizing our access to other speakers. Without the groundwork laid by the dictionary project, our study would not have succeeded.

In all, 112 Chamorro speakers on Saipan, Tinian, and Luta took part in the study: 40 in self-paced listening and 72 in webcam eye-tracking. They completed the task in various venues:

the Chamorro Cultural Village Centers; government offices, public libraries, public schools, and a public health center; private homes and gardens; a restaurant.

Participants ranged in age from 19 to over 80. The median age was 35 for self-paced listening and 49 for eye-tracking. In the debriefing, most participants said that they would be willing to take part in such a study again. At the same time, there were ways in which our study could have met cultural expectations more successfully. In the experimental sessions, many participants wanted to consult with others about particular stimuli, or assumed that they would be responding as a group to each stimulus. We did not manage to construct a protocol that would allow for such group interaction. Participants also asked repeatedly whether our experimental task could be made relevant for the community; for instance, whether it could be used to help teach the Chamorro language. The issue of relevance to the community will need to be addressed directly in our future research.

What did the data reveal? Previous research on the comprehension of dependencies formed by wh-movement broadly supports the idea that listeners actively complete the dependency before the extraction site is reached, projecting obligatory or likely grammatical roles before direct evidence that the associated constituent was absent. A number of researchers have argued that this active completion is, in part, a response to pressure to satisfy syntactic and semantic requirements of the verb, the displaced constituent, or both, as soon as possible.[vi] This view led us to probe for an anomaly effect before the extraction site is reached—specifically, in the vicinity of the verb but before the gap. In the data gathered by both methods, we found evidence for such an effect when wh-agreement is *overt*.

In self-paced listening, the effect shows up as longer listening time. When the verb was overtly inflected for WH-agreement, participants listened significantly longer to the next segment of the question when the interrogative phrase made an implausible direct object.
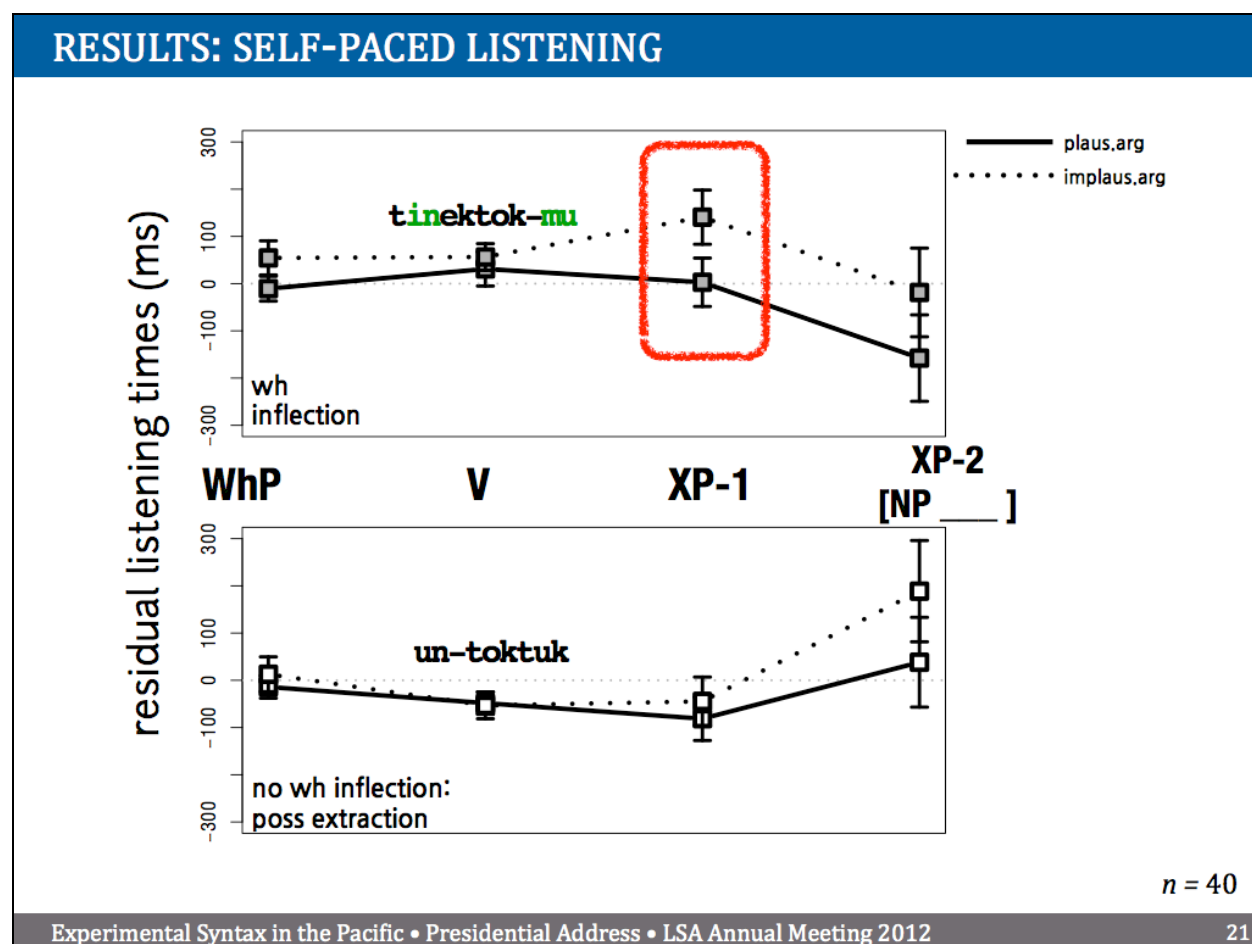
This can be seen from the chart at the top of the panel, which plots the average residual listening times for the four segments of the question when the interrogative phrase was plausible as the direct object (the solid line) or implausible (the dotted line). The difference in listening times at XP-1—the PP or adverbial phrase immediately following the verb but preceding the verb's other argument—was statistically significant. See the red box.

In contrast, when the verb did not show WH-agreement, there was no comparable difference in listening times until participants reached the last segment of the question—the segment containing the extraction site. See the chart at the bottom of the panel.

In webcam eye-tracking, the effect shows up as preference in eye gaze. When the verb was overtly inflected for wh-agreement, participants' gaze was sensitive to whether the interrogative phrase was plausible or implausible as the direct object. Specifically, participants

tended to look at the appropriate response category (*måolik* for plausible, *ti måolik* for implausible). In contrast, when the verb did not show wh-agreement, there was no such sensitivity. The next chart shows participants' preferences for looking at *ti måolik* (as opposed to *måolik*) while listening to XP-1.
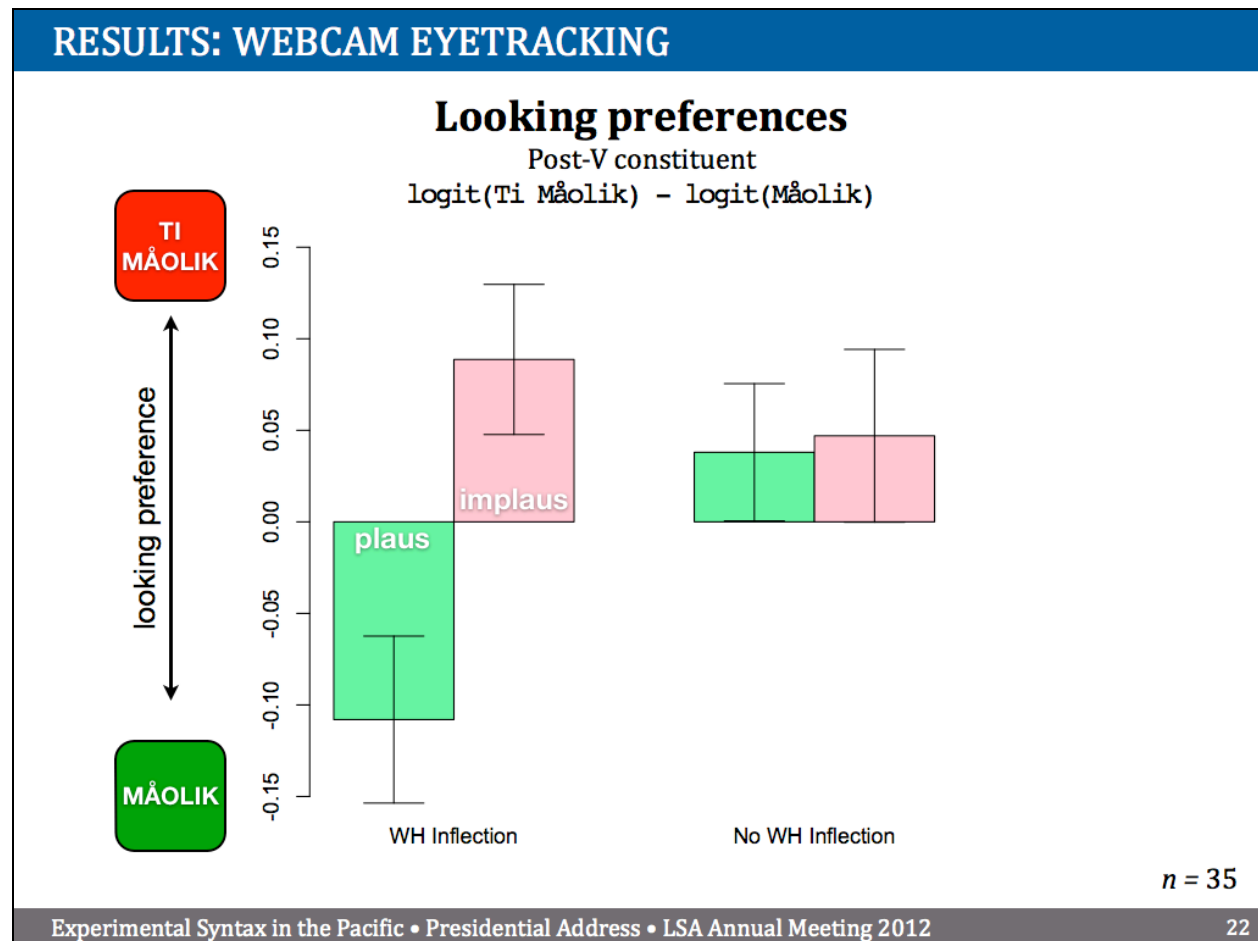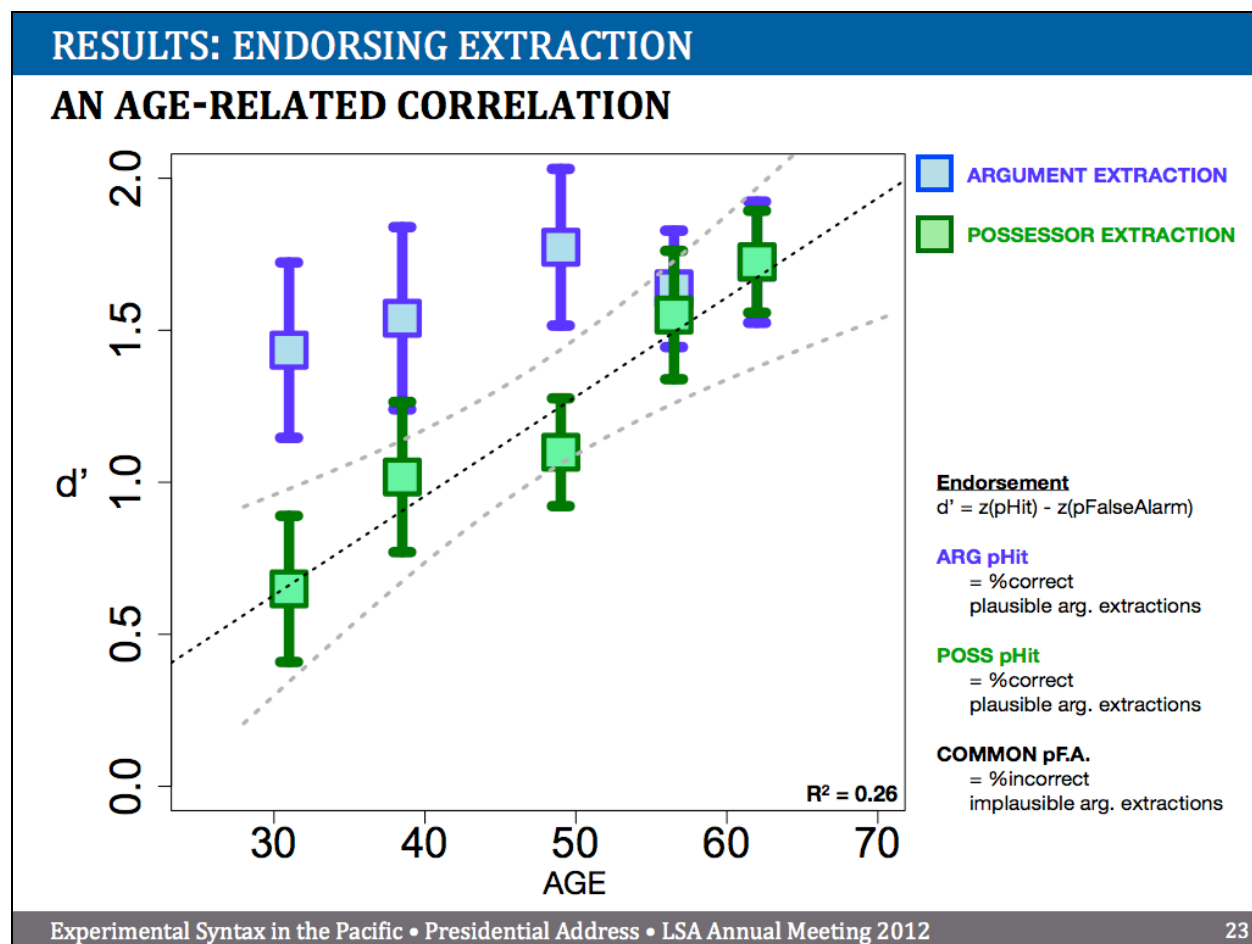

A positive score on the *y*-axis shows an overall preference to look at *ti måolik*.

The two types of evidence converge to argue that wh-agreement facilitates the processing of wh-dependencies. When the verb is overtly inflected for wh-agreement, the dependency is completed earlier and possibly faster. This is a significant result. Importantly, such a result could not have been achieved by investigating well-documented languages that are not endangered, because such languages, in general, happen not to have wh-agreement.

Over and above this result, our study contributed in ways we had not initially anticipated to the grammatical description of Chamorro. Here are two such contributions.

A. In both versions of the study, participants first listened to a question and then judged it as sensible (by pressing a green key on the laptop keyboard) or anomalous (by pressing a red key). This judgment provided a measure of their comprehension of the question. We found that participants' judgments were generally accurate (meaning that they aligned with our expectations) when the interrogative phrase was a direct object or some other argument of the verb. But when the interrogative phrase was a possessor, accuracy was inversely correlated with age. Participants aged 55 or older were generally accurate—as accurate as when the interrogative phrase was an argument of the verb. But participants younger than 55 identified significantly more of the sensible questions as anomalous. See the chart on the next slide.

RESULTS: ENDORSING EXTRACTION

AN AGE-RELATED CORRELATION

ARGUMENT EXTRACTION
POSSESSOR EXTRACTION

Endorsement
d' = z(pHit) - z(pFalseAlarm)

ARG pHit
= %correct
plausible arg. extractions

POSS pHit
= %correct
plausible arg. extractions

COMMON pF.A.
= %incorrect
implausible arg. extractions

$R^2 = 0.26$

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To us, this difference in accuracy suggests a linguistic change in progress: wh-movement of possessors is disappearing from the language of younger speakers. Conceivably, the reason why speakers younger than 55 judge some "sensible" questions of possessors to be anomalous is that their control of this construction is, in one way or another, incomplete. (Chamorro has other constructions that can be used to question a semantic possessor, so this change would not lead to a decrease in expressive power.) Notice that evidence for this change could not have emerged from my fieldwork, even though this fieldwork has been ongoing since 1977. This is because all of my consultants, past and present, are now at least 50 years old, and the vast majority are now over 55

B. The target questions in our study were constructed so that a phrase, XP-1, immediately follows the verb. The presence of this phrase lengthens the time to the extraction site and

therefore makes it easier to detect anomaly effects that occur earlier in the question. Recall that in Chamorro, the neutral word order of clauses containing verbs is *Verb Subject Object*. So in examples in which the possessor of the direct object is questioned, a natural choice for XP-1 would have been a full DP subject. However, our initial attempts to construct questions of this type encountered an unexpected problem: questions like (9) are robustly ill-formed.

(9)   ***Håyi ha lålaksi si nanå-mu   chininå-ña?**
         who? AGR sew   NM mother-AGR shirt-AGR
        ('Whose shirt is your mother sewing?')

But comparable questions are grammatical and natural when the subject is a first or second person pronoun, as shown in (10).

(10)   **Håyi un   lålaksi chininå-ña?**
        who? AGR sew   shirt-AGR
        'Whose shirt are you sewing?'

The pronoun subject in (10) is cross-referenced by agreement in person and therefore must be null. This is ultimately why XP-1 in our target questions is always a PP or adverbial phrase, not the subject DP.

What is responsible for the mysterious ill-formedness of the question in (9)? A highly similar contrast involving transitive clauses that are *not* questions emerged from my electronic database. Consider clauses in which the direct object is a possessive DP with the null indefinite article, like (11). When the subject is a full DP and the possessor of the direct object is a pronoun, the clause is—surprisingly—ill-formed.

(11)   a.   ***Kao ha   li'i' si Maria patgon-mu nigap?**
           Q   AGR   see NM Maria child-AGR   yesterday
       ('Did Maria see your child yesterday?')

   b.   ***Ha fåhan si   Jose karetå-ña sa'   ma'åsi'   nu guiya.**
       AGR buy   NM Jose car-AGR   because AGR.sorry OBL her
       ('Jose bought her car because he felt sorry for her.')

But when the subject is a first or second person pronoun, the clause is grammatical and natural,

as shown in (12).

(12)   **Ti   bai faggas matå-mu.**
           not AGR punch   face-AGR
        'I won't punch your face.'

Further, the clause is grammatical when the subject is a full DP, but the direct object has a

determiner other than the null indefinite article, as in (13).

(13)   a.   **Kao ha   li'i' si Maria i   patgon-mu nigap?**
           Q   AGR   see NM Maria the child-AGR
           'Did Maria see your child yesterday?'

   b.   **Ha fåhan si Jose i   karetå-ña sa'   ma'åsi'   nu guiya.**
       AGR buy   NM Jose the car-AGR   because AGR.sorry OBL her
       'Jose bought her car because he felt sorry for her.'

These contrasts bring to mind the person-animacy constraints that restrict the legal

combinations of subject and direct object in Chamorro transitive clauses. These constraints have

been analyzed as obviation effects by Aissen (1997).[vii] Among other things, they ensure if the

subject is a full DP, the direct object cannot be an animate pronoun. See (14).

(14)   a.   **?/*Ha li'i' hao si Dolores   nigap.**
           AGR see you NM Dolores   yesterday
                ('Dolores saw you yesterday.')

   b.   ***Anai humånao si Juan para i   tenda, ha li'i' gui' si Maria.**
        when AGR.go   NM Juan to   the store,   AGR see him NM Maria
       ('When Juan went to the store, Maria saw him.')

But if the subject is a first or second person pronoun, there is no problem (see 15).

(15)   **Hu li'i' hao.**
       AGR see you
          'I saw you.'

What we have just seen is this: when the direct object is a possessive DP with the null indefinite article, the constraints are sensitive not to the direct object as a whole, but rather to the direct object's *possessor*. That is why (11) is ill-formed: the subject is a full DP, but the *possessor* of the direct object is an animate pronoun. This fact puts us in a position to understand the surprising ill-formedness of questions like (9). Recall that possessors can undergo wh-movement in Chamorro only when the D of the possessive DP is null. Suppose wh-movement of the possessor leaves behind not a trace, but rather a null resumptive pronoun. Then (9) contains a transitive clause of the right type to be ruled out by the person-animacy constraints. It contains the only type of direct object whose possessor can undergo wh-movement—a DP headed by the null indefinite article. But the subject of the clause is a full DP, while the possessor of the direct object is an animate (resumptive) pronoun. Under this analysis, in other words, (9) is *expected* to be ill-formed.

Two questions arise at this point that are easily answered. If wh-movement of possessors is via resumption, why is the resumptive pronoun always null? The answer is that this pronoun *must* be cross-referenced on the possessed noun by agreement in person, so for Chamorro-specific reasons it *must* be null. Second, is this a resumptive pronoun of the intrusive (or "rescue") variety, as in English? The answer is no. Resumption evidently does not rescue wh-movement of the many types of possessors that are inaccessible to extraction in Chamorro: possessors of predicate nominals or obliques, possessors whose possessive DP is headed by a determiner other than the null indefinite article, and so on. See (16).

(16) a. ***Håyi malago'-mu   para ma'estråñ-ña hao?**
           who? WH[OBL].want-agr FUT   teacher-AGR   you
           ('Whose teacher do you want to be?')

      b. ***Håyi un li'i' i   ga'-ña ga'lågu?**
           who? AGR see the pet-AGR dog
           ('Whose dog did you see?')

Notice, finally, that the person-animacy constraints are sensitive only to pronouns that are *animate*. Transitive clauses like (17), in which the subject is a full DP and the direct object is an inanimate pronoun, are grammatical and natural. (All inanimate pronouns in Chamorro are null.)

(17) a. **Hu espiha ha' i lepblu, lao ha chuli' i che'lu-n Miguel *pro*.**
           AGR look.for EMP the book,   but AGR take the sibling-L Miguel
           'I looked for the book, but Miguel's sister had taken it.'

      b. **Po'lu i   se'si' anai ti   para u hagu' i patgun *pro*.**
           put   the knife COMP not FUT AGR reach the child
           'Put the knife where the child cannot reach it.'

Therefore, the resumption analysis makes a prediction: questions of the possessor of the direct object should be well-formed even when the subject is a full DP, as long as the questioned possessor—and hence the null resumptive pronoun it leaves behind—is *inanimate*. This turns out to be correct, as (18) shows.

(18) a. **Månu   na kareta ha fa'måolik si Jose [makinå-ña *pro*] nigap?**
           which? *L car   AGR fix   NM Jose engine-AGR   yesterday*
           'Which car did Jose fix the engine of yesterday?'

      b. **Håfa   na måkina para u   ripiti si Maria [na'ån-ña *pro*] agupa'?**
           what? L   machine FUT AGR repeat NM M.   name-AGR   tomorrow
           'What machine's name is Maria going to repeat tomorrow?'

In short, wh-movement of *possessors* leaves behind a null resumptive pronoun. But wh-movement of *other types* of DP's leaves a gap. The person-animacy constraints make this quite clear for wh-movement of direct objects. If the moved direct object in the question in (19) left behind a resumptive pronoun, the result should be ungrammatical for the same reason that (14) is. But instead, (19) is well-formed.

(19)   **Håyi ha li'i' si Dolores ___ nigap?**
         who? AGR see NM Dolores   yesterday
          'Who did Dolores see yesterday?'

All this matters for the following reason. It is a subtle analytic point that wh-movement of possessors involves null resumption, but wh-movement of other DP's does not. That point might never have emerged at all without the very specific demands imposed by the list of experimental stimuli we needed to construct for our study. In other words, the process of constructing the experimental materials can *itself* be a process for discovering patterns in the language, which can lead to new insights.

It is time to sum up. We hope to have shown that the culturally sensitive ethos of traditional fieldwork has much to contribute to psycholinguistic methods. At the same time, psycholinguistic methods can provide an efficient means of augmenting the empirical coverage provided by the one-on-one interactions of traditional fieldwork. The intertwining of these methodologies could well have a further consequence, namely, to increase the routes by which speakers of understudied languages can serve as active researchers on their own languages. The team ethos of experimental psycholinguistics makes room for a community member who is not a professional linguist to play a crucial role as scientific investigator, and to do so more actively and publicly than is usually the case in fieldwork. This is positive.

Clearly, there is no need to validate every grammaticality judgment or linguistic intuition via experimental methods. Sprouse, Schütze, and Almeida's research[viii] on the cross-speaker validity of introspective judgments reported in textbooks and journals makes this massively clear. In other words, we are not suggesting that psycholinguistic methods should (or could) *supplant* traditional fieldwork or the introspective methodology of generative grammar. Just as clearly, not every understudied language presents a situation amenable to broader-scale psycholinguistic research. The sort of research we have described may be unfeasible or

inappropriate in languages that are highly endangered, spoken by very small populations, and so on.

Four years ago, at the 2008 Annual Meeting, I voiced the concern that a reliance on experimental methods might itself present a barrier to the ability of understudied languages to contribute to linguistic theory. My co-authors and I now close the circle: Under the right circumstances, experimental research on understudied languages is possible and can contribute in multiple ways to the understanding of language.

Si Yu'us ma'åsi' para hamyu todus.

Si Yu'us
ma'åsi'!

Thank you

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[ii] See the papers presented at the 2012 LSA Annual Meeting Symposium "Psycholinguistic Research on Less-Studied Languages", organized by Alice Harris.

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