

Samuel Pearce's
PROBE-VA
on the topic of

UNIVERSAL GRAMMAR & LANGUAGE ACQUISITION

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Abstract

The goal of this project was twofold: for one half, I intended to expand my knowledge on the topic of Chomsky's Universal Grammar theory through the reading of an introductory book on the matter and writing a paper summarising my findings and opinion on the concept. For the other half, I conducted an informal experiment with two participants in which I taught them the language Toki Pona¹ through two of the most common methods; one learned through pure immersion, while the other learned using the Toki Pona official course book. Finally, with the results of both halves of the project complete, I summarised my findings into three documents: the summary of the universal grammar introduction book, the review of the experiment results, and the account of how the project was conducted with a review of the process as a whole, which is this document.

¹Toki Pona is a minimalist language constructed by Sonja Lang in 2001. It has a very minimal lexicon which lends itself well to such a short experimentation period. I also am already fluent in it, which made it easy to immerse the participant.

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1 Foreword

The reason I chose this topic to study is because language is something that truly fascinates me. It is one of the very few important things that separates us from other animals and allows for humanity to not only preserve vital information and valuable culture for the next generation, but it also grants us many more opportunities to express our uniquely human creativity that, in my opinion, is what gives life purpose.

I would like to thank V.J. Cook and Mark Newson for their book: Chomsky's Universal Grammar an Introduction. Without it, I would not have been able to complete half of this whole project. Their accessible but still comprehensive introduction was truly invaluable.

I also want to express my sincerest gratitude towards my two experiment participants, Amin Haidar and Julian Werner. They both took a large amount of time out of their busy schedules to help me with my project. Without them, the project would not have the same impact. For this, I thank them heartily.

2 Introduction

Firstly, I'd like to make a note that this document will primarily deal with the results of the experiment on language acquisition. The summary of universal grammar will be a separate document. This document will either be appended to the end of the current document or in a separate file, if being viewed digitally.

2.1 Experiment Parameters

The experiment consisted of teaching both participants the language Toki Pona. Participant A would learn the language the "traditional" way: using vocabulary and grammar textbooks, while participant B would be forbidden from having any words or concepts explained directly through a third language; everything would have to be learnt through gesture, pictures, and explanations using previously explained words. Once the roughly three weeks were over, I would record the participants and I having a conversation in order to analyse the participants' fluency. Additionally, a test would be performed where I would give one participant some specific thing to describe and the other would have to explain to me what they were talking about to evaluate their explanation and comprehension skills more directly.

2.2 Hypothesis

My understanding of the language learning and language teaching process at the beginning of the experiment is quite limited. Until now, I have only ever tried teaching a language to my parents, which did not go very well. My expectations for how the process will work is that I will spend fixed periods of time with each participant explaining various concepts and being available for questioning as often as possible.

As for the teaching itself, I guess that conveying the extremely vague Toki Pona words' meanings through immersion alone without confusing the participant will be quite difficult and could lead to many issues in comprehension.

Though, I assume the amount of practice afforded to the immersion participant would drastically improve their immediate comprehension and speaking ability. My idea for the traditional-learning method would be that the participant will very quickly pick up a larger amount of the lexicon with more concrete understanding than the immersion participant, but will struggle to recall and apply the grammar to them rapidly enough for speech.

As for how the end result would be, my personal hypothesis on the participants' grasp on the language would be that, in general, the immersion participant would be able to recall the most common vocabulary and how to properly implement them into the grammar far quicker than the traditional-learning participant; however, I guessed that the traditional-learning participant would have a more correct usage of the language according to its official grammar than the immersion participant, while also being able to convey more complex topics due to their superior faculty over the vocabulary, but they would lack the speed required to utilise this knowledge in speech.

These are my hypotheses regarding how the experiment will go.

2.3 Note on Glosses

A few non-standard gloss abbreviations and elements are used throughout this document, so I have defined their meaning as well as the standard abbreviations here:

- The pictographic elements will be replaced in the glosses with simple descriptions of their contents and meaning in square brackets ([Image ; Intended Meaning]) E.g.: [Tree Image; Plants/Trees/Nature]
- Toki Pona includes context phrases that add extra information about the context of a sentence and build conditionals. The separator will be abbreviated as "CTXT" in glosses.
- All pronouns are abbreviated to just their person and number. E.g.: "You" → 2nd Person singular → "2SG"
- "PM" stands for the predicate marker which separates the subject from the rest of the sentence.
- "ACC" marks the accusative separator which separates the predicate from the direct-object.
- Additionally, some words can act as prepositions some times, but like verbs at other times. When a word is acting as a preposition, it has been marked as such. E.g.: "tawa" → "PREP.to"

2.4 Toki Pona Pronunciation

It's also worth pointing out how Toki Pona pronunciation works so the reader may correctly interpret the examples. If you know how to read the IPA², then you already know how Toki Pona is pronounced; every letter directly corresponds to its IPA equivalent, but given Toki Pona's limited phonology, pronunciation is not as important to get correct as it is in other languages. For those

²The International Phonetic Alphabet: <https://www.internationalphoneticassociation.org>

not familiar with the IPA, most consonants are pronounced as one would expect them to be: ‘t’ like ‘talk’, ‘p’ like ‘pet’, etc. The only special cases are ‘w’, which is always pronounced as in English (like the ‘w’ in ‘way’ or ‘water’), and ‘j’, which is always pronounced as in German (like the ‘y’ in ‘yes’ or ‘you’). The vowels are all consistent unlike English, which means they all have one sound:

- ‘a’ is always pronounced like it is in ‘car’ or ‘palm’
- ‘e’ is always pronounced like it is in ‘dress’ or ‘met’
- ‘i’ is always pronounced like the ‘ee’ in ‘fleece’ or ‘breeze’
- ‘o’ is always pronounced roughly like the ‘ou’ in ‘thought’
- ‘u’ is always pronounced like the ‘oo’ ‘goose’ or ‘choose’

Finally, in Toki Pona, the first syllable is always the stressed one:

- “toki” → “TOW-kee” (/ˈto.ki/)
- “soweli” → “SOW-weh-lee” (/ˈso.we.li/)
- “pimeja” → “PIH-meh-yah” (/ˈpi.me.ja/)

2.5 Pure Immersion Method

For both methods, the expectation that I would be able to spend regular sessions with the participants was quickly disregarded as unrealistic. Instead, due to the Coronavirus pandemic and our individual schedules, it made the most sense to sporadically practice the language through mostly digital interactions.

For the immersion participant, this entailed either discussing topics through a text-channel, which helpfully provided to opportunity to explain basic concepts through the use of pictographic imagery, and meeting — either in-person, or in a video game — the latter of which provided both ample example material and a basic system of gesturing which helped convey the meanings of my utterances.

In total, I would estimate that we spent about /// ASK HIM TOO ///6 hours speaking the language. The first few sessions were very difficult, as I had far fewer tools at my disposal to explain the concepts I was trying to convey, but once the most basic grammatical features were understood, I was able to bootstrap the participant’s understanding by progressively building on top of the previously understood material.

The first session took place in a text chat with the ability to send images. I attempted to establish the basic sentence structure and words to confirm their guesses with comprehensible pictographic substitution.

- (1) pona li [Thumbs Up; Good].
good PM [Thumbs Up; Good]
“Pona” (is) “good”.
- (2) ike li [Thumbs Down; Bad].
bad PM [Thumbs Down; Bad]
“Ike” (is) “bad”.

- (3) ala li [Red X-Shape; No/Incorrect].
 no PM [Red X-Shape; No/Incorrect]
 “Ala” (is) “no/wrong”.
- (4) lon li [Green Checkmark; Yes/Correct].
 yes PM [Green Checkmark; Yes/Correct]
 “Lon” is “yes/correct”.

Though there was some confusion at first as to the precise difference between “pona” and “lon”, this distinction, and many similar ones, would be cemented through examples and corrections. After the basic sentence framework was established, I tried conveying how the accusative marker worked through use of the transitive form of “to eat”

- (5) [Burger; Food] li moku.
 [Burger; Food] PM be-food
 “Food” (is) “moku”.
- (6) mi moku e moku.
 1SG eat ACC food
 I eat food.

This particle not having a direct translation became a frequent cause of frustration though, as the baseline we’d established was nowhere near enough to explain a complex grammatical feature. I persevered and assured them that they would gain an intuitive understanding of how it works through practice.

Soon enough, the participant had enough understanding that new concepts were generally easy to explain by relying on previous explained concepts. I was delightfully surprised by how much of the vocabulary they retained just by having to use it to ask questions and explain basic situations. The first moment that stuck out to me as probably the first sentence chain that could actually be considered a conversation was when I explained colours:

I began by asking if they wanted to learn the colours:

- (7) sina wile ala wile kama sona e nimi “kule”?
 you want not want receive knowledge ACC word “kule”?
 Do you want to learn the word “Colour”?

Which they affirmed with “lon”. So I continued with:

- (8) [Image of colour spectrum; Colour] li ‘kule’.
 [Image of colour spectrum; Colour] PM be-colour
 Colour is “kule”.
- (9) [Red Circle; Red] li ‘loje’.
 [Red Circle; Red] PM be-red
 Red is “loje”.
- (10) [Green and Blue Circle; Grue] li ‘laso’.
 [Green and Blue Circle; Grue] PM be-grue
 Grue (Green & Blue) is “laso”.

- (11) [Yellow Circle; Yellow] li ‘jelo’.
 [Yellow Circle; Yellow] PM be-yellow
 Yellow is “jelo”.

The participant’s knowledge was then confirmed by asking the following:

- (12) kasi li jo e kule seme?
 plant PM have ACC colour what?
 What colour do plants have?

To which the participant answered “laso?” which I affirmed with “lon!”.

Eventually, the most important grammar rules were understood and the bulk of the remaining words to be taught were simple verbs which could be explained through a picture accompanied by the phrase “This is X”. Over the course of the whole project, we periodically spoke in Toki Pona to reaffirm existing knowledge and learn new words. Another interaction which stuck out to me was a short remark I made after explaining how the number system worked:

- (13) tenpo kama, la mi sitelen e nimi sin tawa sina.
 time coming CTEXT 1SG write ACC word new PREP.to 2SG
 I will write (text) the new words to you.

Despite the fact that I accompanied the phrase with basic gestures to illustrate my point, I was quite taken aback at the fact that they understood it immediately.

2.6 Vocab & Grammar Method

The traditional-learning participant proved far easier to educate, simply because they were able to educate themselves with very little supervision; I gave them a copy of the official Toki Pona grammar book, which includes lessons about all the grammar as well as a dictionary and some sample texts.

I periodically checked in with the progress he was making, which was very sluggish at first, but with a deadline looming, they began by learning the entire lexicon in one go, given it’s small size, which they stated improved their ability to understand the grammar through the examples, now that they knew what all the words meant.

// INSERT Q/A example

This participant estimates they spent /// INSERT HOURS HERE /// hours studying the language independently. It really showed off one of the major benefits of this method of learning: it’s completely possible to do without a teacher and allows the student to proceed at their own pace. The immersion participant lacked this independence, and even though the lessons were tailored to fit their pace of learning, this was only possible, because I only had one student. If you tried to teach any significant quantity of people the language, people would likely be forgotten.

3 Results

3.1 Dialogue

/// DIALOGUE TRANSCRIPT ///

3.2 Conveyance Test

In order to gain some numerical data on the participants' comprehension and production abilities, I devised a test in which the participants must "play telephone"; I would give one of the participants a relatively simple concept which has no simple Toki Pona translation, which they would have to explain to the other and then afterwards, the listening participant would tell me what they thought the concept was. After that I could rank how close the final result was to the original topic on a scale of 1–10. After 6 rounds alternating who's explaining/listening, we can draw some conclusions about each participant's comprehension and explaining ability. As for rules, the participants are forbidden from using any language other than Toki Pona and may not say the the name of the topic.

3.3 Resultant Data

/// NUMERICAL RESULTS FROM THE CONVEYANCE TESTS AND HOURS
SPENT STUDYING ///

3.4 Discussion

/// CONCLUSIONS DRAWN FROM NUMERICAL DATA ///

4 Summary

4.1 Retrospective

/// HOW WELL DID THE RESULTS MATCH HYPOTHESIS, ETC. ///

4.2 Further Research

/// FURTHER RESEARCH COULD BE DONE WITH A LARGER SAMPLE
SIZE AND SANITISED PARTICIPANTS ///

4.3 Conclusion

/// HYPOTHESIS GOOD/BAD? WHY? ///

5 Work Schedule

5.1 Week 1

Planned Tasks

- Read UG literature
- Practice Toki Pona with participants

Performed Tasks

- Practice Toki Pona with participants

- Read UG literature

5.2 Week 2

Planned Tasks

- Write first draft of UG summary
- Practice Toki Pona with participants

Performed Tasks

- Practice Toki Pona with participants
- Read UG literature

5.3 Week 3

Planned Tasks

- Second, third, etc. drafts of UG summary
- Practice Toki Pona with participants

Performed Tasks

- Practice Toki Pona with participants
- First draft of UG summary

5.4 Week 4

Planned Tasks

- Finalise UG summary
- Interview and test experiment participants
- Compile results in final document

Performed Tasks

- Practice Toki Pona with participants
- Finalise UG summary
- Interview and test experiment participants

6 Learning Journal

6.1 Time Management

As with many of my projects, time management was a severe issue when it came to this project. I read the universal grammar textbook at the regular pace I would any other book and mainly focused on organising the experiment. This led to a huge amount of documentation work being pushed into the last week causing me to have to invest nearly all my free time into the project while also not being able to have the paper checked by others for glaring errors. Though I failed to realise the scope of the required documentation for the first half of the project, my time management skills improved significantly out of necessity during the last week-and-a-half; Each day was carefully scheduled to allow me to work on my Probe-VA, other TBZ projects, an IT module, and my regular work simultaneously. I value the experience gained from having to carefully plan my days, and am sure I'll put this newfound knowledge to good use during the VA next year.

6.2 Research Method

Overall, I'm quite happy with my research method, though mainly due to having a good source I was able to spend a good amount of time studying that I could reliably source when writing my summary of it. I must admit it became quite hectic when writing the summary to search for other sources to incorporate into the discussion, which led to some sources being included without me being able to fully scrutinise them as much as I would have liked to. For the next VA, I will make sure to do more cursory research to gather a wide range of initial sources so I can take the time to analyse each one carefully.

6.3 Experimentation Method

Given the hands-off nature that was enforced by the pandemic and our differing schedules, I don't feel there was much else I could have or should have done to improve the accuracy of my experimental findings; as I mentioned above in 4.2, for a scientifically rigorous study, a much larger sample size would be required and more sterile working conditions, as well as a larger timeframe, none of which were available. Therefore, I'm very pleased with how well the experiment went despite its lackluster conditions.

6.4 Writing Method

As explained above, I ended up having to write the largest part of the documentation in just a few days which lead to a far sloppier writing process than I would normally maintain. Though, I didn't only learn the importance of managing one's time correctly to create a streamlined and highly polished writing pipeline, I also had to take some interesting new approaches when writing the summary, as I had never really had to rigorously cite my sources before which severely hindered any kind of progress at first, but once I got to know what tools I could use to more rapidly find good sources, cite them correctly, and search the physical book I had, my writing sped up by a significant amount.

6.5 Future Improvements

All of the many things I learned about the process of writing carefully cited papers and managing one's time during an important project are very important to me and I plan on implementing and developing these newfound skills more in my future projects, because time management especially has always been an issue of mine. I guess this is why it's important that we have a *Probe* VA before the real thing to properly prepare our understanding of the task's scale and give us the required experience to tackle the real thing with newly developed skills. Overall, I'm very thankful to have been shown so starkly the consequences of poor time management as well as the important steps to take to avoid it in the future.

7 Declaration of Independence

I respect the intellectual property of other authors and do not claim their work as my own. I therefore clearly mark where I quote verbatim and also point out when I paraphrase or summarise the findings of others. This enables the reader to correctly assess the origin and quality of the information I have used. I make sure that the information I have obtained from others can be clearly distinguished from my own reflections and conclusions. Only then can my own performance be correctly assessed. I make sure that my bibliographical information is accurate enough to enable the reader to find the sources. I also clearly document scientific information obtained from the Internet according to the origin of texts and images with corresponding Internet addresses. I respect the authors' rights of my information sources and comply with the applicable legal regulations.

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