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The whole is *more* than the sum of its parts:
Another way of teaching linguistics at the University of Papua New Guinea (UPNG)

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To raise new questions, new possibilities, to regard old problems from a new angle, requires creative imagination and marks real advance in science. ~ Albert Einstein[1]

ABSTRACT

Modern linguistic theory is the product of a deeply rooted tradition of scientific analysis of observable facts. "We understand something, when we know the atoms that compose it, and the laws of combination"[2] – this view has dominated linguistic inquiry particularly in the 20th century. Yet, there is more to Language than just its observable physical structures; this atomistic method of analysis, while providing a wealth of observable detail, misses the forest for the trees. Once broken into its smallest bits, the Humpty-Dumpty of Language cannot be put together again, for 'The Whole is *more* than the sum of its parts.'[3]

Based on this premise (and a synthesis of ideas, voiced in the past by David Hume, Ferdinand de Saussure, and Lev Vygotsky), a *dialectical* method of linguistic analysis has been developed and used at UPNG to teach linguistics since 2007. This paper points out the advantages of this unorthodox perspective on Human Language, presents the key principles of dialectical analysis, and reports on our students' responses and progress so far.

Introduction

A humorous definition of expertise describes it as "knowing more and more about less and less, until one knows absolutely everything about nothing." While that may be a Hasty Generalization, it is indisputable that descriptive linguistic analysis has fragmented into highly specialized domains over the last decades. In a recent publication, Christiansen and Chater contend that "Research on syntax, semantics, language typology and change, computational linguistics, language processing, child language acquisition and language evolution has become disconnected, and their proposals hopelessly incompatible" [1]. "The disintegration of the study of language," they write, "made us deeply uncomfortable as graduate students at the University of Edinburgh more than two decades ago; and we were by no means alone. Across our own university, and across the world, a variety of heterodox theoretical frameworks, computational models and empirical programmes were beginning to emerge" (Ibid.). In recent years, these 'minority' approaches have gained dominance; Christiansen and Chater credit cross-disciplinary work for this 'alternative' synthesis which "overturns past assumptions about the nature of grammar, reconnects language processing and learning with basic cognitive principles, and sees language as a product of cultural evolution — not guided by a genetically encoded 'Bauplan'" (Ibid.).

The winds of change were late to reach PNG, possibly because the linguistic "Gold Rush" since the mid-1960s has attracted primarily descriptive linguists to this "Land of a Thousand Tongues." Researchers from the Summer Institute of Linguistics (SIL) and Bible Translation Association (BTA) have done a lot of work in the field of language documentation and vernacular literacy.

[1] Einstein, A. and Infeld, L. 1966. Evolution of Physics. Simon & Schuster, N.Y., p.92.
[2] McGinn, C. 1999. Knowledge and Reality: selected essays. Oxford University Press, p.56.
[3] Aristotle: Metaphysics Book VIII, 1045a.8–10. http://classics.mit.edu/Aristotle/metaphysics.1.i.html

Distinguished scholars in Austronesian and Papuan linguistics, John Lynch and Terry Crowley among them, taught at UPNG, shaping its linguistics programme for years to come. So, when I joined the UPNG in March 2000, traditional descriptive linguistics course content was taught, just as it had been for decades.

However, the vortex of rapid socio-economic and cultural change, accelerated by the digital revolution at the turn of the century, profoundly affected the functioning of UPNG, and university life generally. Increased enrolments brought about new challenges and prompted concerns regarding the relevance of some of our course content, as students were unsure of their career prospects after graduation. Compounded by a steady decline in UPNG students' general academic performance, these concerns motivated innovation in the university curriculum.

Over the years, I had taught a wide variety of linguistics courses, ranging from general linguistics to the more advanced linguistic analysis, comparative linguistics, semantics and pragmatics, and the Survey of Linguistic Theories, among them. This exposure to multi-disciplinary influences and ideas had led to many *Eureka!* moments and new insights which, building on the creative imagination of Lev Vygotsky (1896-1934), David Hume (1711-1776), and Ferdinand de Saussure (1857-1913), finally crystalized into an unorthodox, 'minority' method of *dialectical* linguistic analysis.

Dialectical linguistics has now been taught at UPNG since 2007; the University Open College first published the Introduction to Linguistics course in 2009 [5], and textbooks for internal students were published by UPNG Book Shop Publishers in 2011 and 2017 [2; 3; 4]. The merits and advantages of the dialectical method of analysis in the study of language have been described in several journal articles [6 – 11], as well as presented in conferences and seminars. I am truly grateful to have been afforded the academic freedom to teach Dialectical Linguistics at UPNG since 2007.

Course Content and Structure

Like in Saussure's class over a hundred years ago, we begin with the question: "What is Language?" and discuss the importance of perspective in examining the object of our study, Language (Fig. 1):

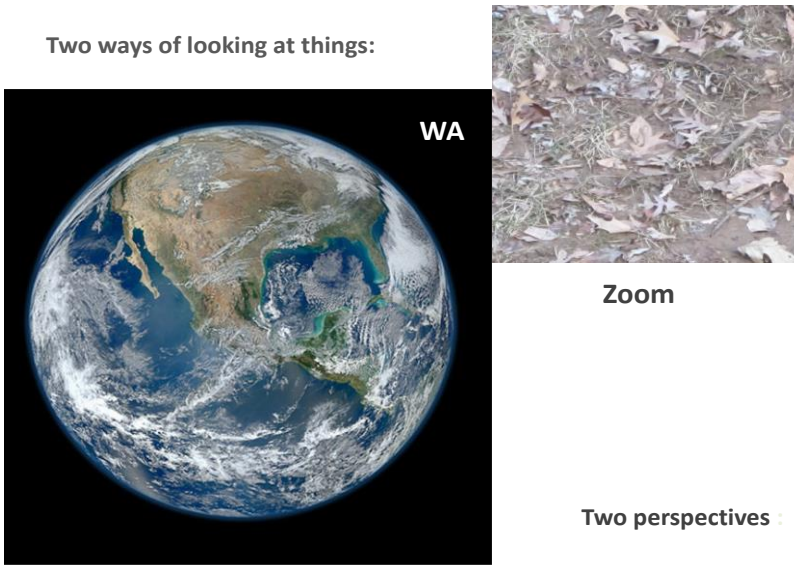


Fig. 1. Different perspectives: Synthesis (WA) + Analysis (Zoom)

We then learn about the two ways of looking at things: through the Wide-Angle (WA) lens of dialectics (**synthesis**) that allows us to see how parts of the Whole relate to each other, or through the Zoom lens of **analysis** which gives us a close-up picture of parts of the Whole in isolation, with no reference to the rest.

After a brief overview of dialectics and its fundamental laws, we discuss the natural process of cognition, and the importance of both Synthesis (WA) and Analysis (Zoom) in the process of learning. Thus, the students get to understand the method we will use in our inquiry, and begin to see that **Dialectical Analysis combines the advantages of both Synthesis & Analysis,** to give us a clear picture of what Language is. Students enjoy this introductory part of the course, because it helps them understand WHAT they will study in this course, HOW they will examine this object of study, and WHY we use this method (perspective is crucial when examining complex WHOLES such as Language, (Fig. 3).

Fig. 2. Importance of perspective in the study of complex Wholes

And so, we begin our study of Human Language by viewing it first as a complex Whole, through the WA lens, because *the Whole is more than the sum of its parts*.[4]

Language: the WA view

We juxtapose Language with biological 'languages' of sentient animals (and also of humans), and discuss its uniquely complex and interrelated psychological, physical, social, and historical nature, analogous in many ways to the 'body and soul' of human existence. While 'biological' languages express emotions and physical sensations (we all laugh and cry the same way), "Each ***word*** is already a **generalization** … a verbal ***act*** of **thought**; it reflects reality in quite another way than sensation and perception reflect it" [12].

Each word is already a generalization – an *Act* of Thought! This assertion encapsulates the quintessence of the dialectical, wide-angle view of Language in the organic unity of its properties:

- **Psychological**: language communicates meaning – there are no words in any human language without meaning
- **Physical**: we perceive language through our physical senses of hearing and sight, because its structures have physical substance (sounds/signs)
- **Social**: Language is a social communication code, learned and used in society; individual survival depends on the ability to communicate one's needs
- **Historical**: People live and think in time and space, compelled by their survival needs to communicate with others in their society.

[4] Aristotle: Metaphysics Book VIII, 1045a.8–10

Once the students begin to appreciate the organic complexity of Human Language, we ask yet another question: How can we get to really understand the mystery of Language?

In physical sciences, when they study any complex compound, they first identify the *smallest functional unit* of the compound which has all its properties intact, and then study its properties (because unit properties determine how those units interact with others). For example, the smallest functional unit of water is the molecule H_2O; its properties are different from those of the sub-unit elements (hydrogen and oxygen). Therefore, we can only understand water if we study the properties of the compound H_2O. Vygotsky contended that this scientific method (he called it 'Analysis into Units') must also be used in the Language sciences [12]. After in-depth discussions and numerous examples, we conclude that, indeed, if we want to really understand the *causes* of Language, what Language is, and how/why it works the way it does, we must first identify its ***smallest functional unit*** and then study its properties.

Analysis into Units

Descriptive linguistics typically views the *phoneme* as the smallest unit of language; however, can it be? A phoneme is a unit of the physical structures of language, but it does not have its psychological and social or historical properties. Therefore, ***word-meaning*** **is the smallest functional unit of Human Language**, because it has all its psycho-physical and socio-historical properties:

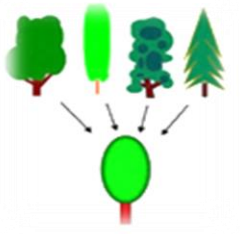


Fig. 3. Generalization

- **Psychological**: every ***word*** is already a ***generalization***, an act of collective social thought [Fig. 3]; therefore, all *words* have *meaning* (even '*nonsense'* or '*gibberish*'!)
- **Physical**: we are capable of producing/perceiving language because our physical brains have the circuitry to support it, directing our 'organs of speech'
- **Social**: word-meanings are the products of collective social thought; the double function of every sign in the social communication code is to (1) communicate and (2) carry meaning
- **Historical**: People live and think in time and space, communicating with others about things that concern them in their own time-space. This is why language changes in time-space.

Class discussions heat up at this point; we ask, "What is '*generalization'*? What is *Thought*? We all think, but what do we actually *do* when we think?" To learn about what it means, 'to *think*,' we turn to David Hume (1711-1776) who also pondered over these questions more than 270 years before us:

'… Though it be too obvious to escape observation, that different ideas are connected together; I do not find that any philosopher has attempted to enumerate or class all the principles of association; ... To me, there appear to be only ***three principles*** of connexion among ideas; namely, ***Resemblance, Contiguity*** in time or place, and ***Cause*** or ***Effect****.'* [13].

Fig. 4. *Why* was this flower named "Hooker's Lips"?

Thus, David Hume and Lev Vygotsky help us discover the mechanism of all Human Thought – **generalization**: **associations by perceived resemblance *cause* the contiguity of concept**.

Students get really engaged in contemplating the process of their own thoughts through triggers like the one on the left (Fig. 4), and in searching for more proof of concept genesis.

These smallest functional units of Language – word-meanings, in all their complex 'synthetic' nature – become the focus of our study.

Aristotle famously defined 'wisdom' as 'knowledge of the causes' of things [14]; so, we ask, "If we are born without Language, where do words come from? What *caused* Language? Why and how did humans acquire the ability to generalize, to abstract concepts from a multitude of similar concrete experiences, connected in memory?'

These questions fascinate our students; discussions of Piaget's stages of cognitive development, now corroborated by advances in neuroscience [15; 16; 17], help them discover how we learn to think/ speak 'Human.' Because Language processing is impossible without various language-supporting regions in separate parts of the brain being connected, it becomes clear to them that language can emerge only in the course of brain development.

Examination of the psycho-physical nature of language, its *biological foundations*, helps students understand the *causes* of Language. Comparison of brain connectivity in newborns vs. adults explains language development in babies [Fig. 5].

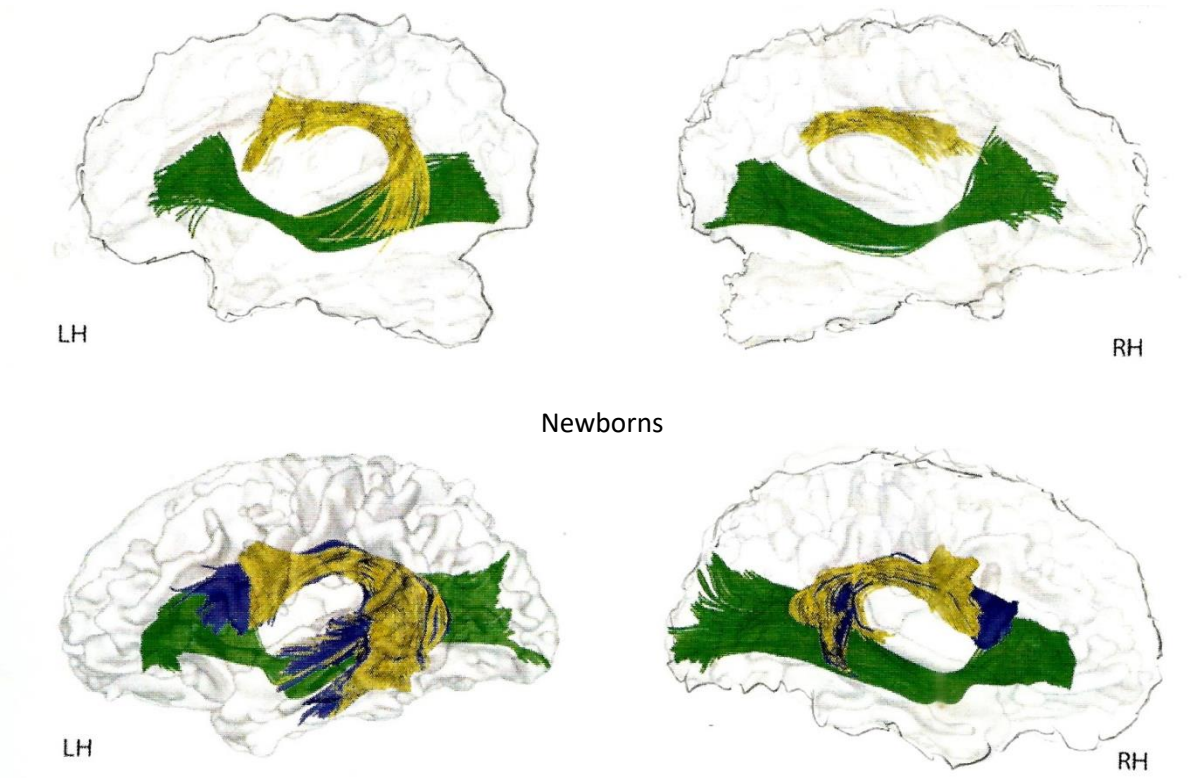
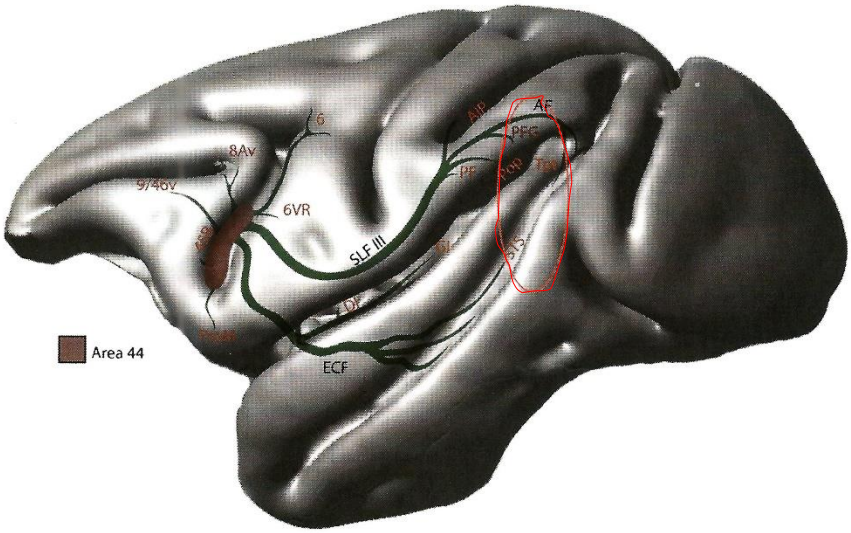


Fig. 5. Dorsal and ventral pathway connectivity in newborns vs. adults, as determined by diffusion tensor imaging. Source: Perani et al. 2011. Neural language networks at birth. Proceedings of the National Academy of Sciences 108 (38): 16056-16061, cited by Berwick & Chomsky [17].

They also get a perspective on the origins and historical evolution of language in the human species, as opposed to other intelligent animals [Fig. 6].



The fiber pathways in the macaque brain do not form a 'language circuit' as in the adult human brain in Fig. 6. Note the gap between the fiber tracts (circled in red).

Source: Frey, Mackey, and Perides 2014. Cortico-cortical connections of areas 44 and 45B in the macaque monkey. *Brain and Language* 131: 36-55.

Fig. 6. Cortical connections in the brains of intelligent animals [17]

Our look into the psycho-physical nature of Language and the biological foundations of the ability to compute perceived information into generalizations, helps us understand the ***causes*** of Language; students are hugely interested in our discussions of Piaget's stages in our cognitive development, development of language in babies, and language origins and evolution generally.

We next turn our attention to the study of its psychological nature – meaning, which has eluded the lens of Structuralism. Ferdinand de Saussure correctly saw the essence of Language in the union of the idea with a vocal sign, stating that

"... it is the combination of the idea with a vocal sign which suffices to constitute the whole language" [18].

This description of the Linguistic Sign captures a snapshot of the Sign's 'body' at a moment in time, but it fails to reveal its beating heart, the generalizing Mind of a living society. Saussure split his Linguistic Sign into two (the Signifier and the Signified), which is like separating a man's body from his soul, and then performing an autopsy, examining all the body parts and analysing the mind of the deceased.

Vygotsky's Analysis into Units focuses on '*live*' word-meanings: "The conception of word-meaning as a unit of *both* ***generalising thought*** and ***social interchange*** is of incalculable value for the study of thought and language" [12]. By viewing these functional units of language in their organic wholeness, we can now clearly see how the collective Mind of the society generates them by associating multiple experiences by resemblance, contiguity in space-time, and cause/effect. These mental associations produce a general concept, understanding, the idea – a generalization.[5]

[5] Enabled by the integrating power of the "language circuit" in the brain [Fig. 5].

Semantics and Pragmatics

All meaning is born this way, by generalizing minds. That is why Protagoras noted, over two thousand years ago, that "*Man is the measure of all things*"; in our class discussions, we interpret this gem as "*Mind is the measure of all Meaning.*" The collective social Mind provides us with its generalizations/understanding of the world we live in, and individuals learn to use this social code (denotative word-meanings) to build their own 'personalized' generalizations, according to social conventions. Thus, indeed, all meaning is subjective to the mind that creates it – collectively, societies make sense of the world they live in; each society sees reality through its own Mind's Eye; and we, individuals, learn to make sense of things in our own heads, commensurately with our mastery of the intricacies of our social 'communication code'; we all see reality through our own Mind's Eye (nobody can look through someone else's Mind's Eye).

Apart from the origins of Language, these discussions help students understand the inherent ambiguity of Language and the ultimate indeterminacy of meaning. All types of semantic change, grammaticalization, and syntax generally become logically comprehensible, and irresistibly interesting.

Having examined denotative word-meanings, and their *behavior in use* (meaning-as-use), we conclude that larger, compound units of meaning (phrases and sentences) are generated by the same mechanism of human thought, first described by David Hume - generalization:

Generalization is the mechanism of Verbal Thought.
But, Verbal Thought *is* Language.
∴ **Generalization is the mechanism of Language.**

This syllogism is both valid and sound; therefore, generalization is the *Rational Language Mechanism* that Saussure wished could be discovered. Its universal principles (associations by resemblance, contiguity in space-time, and cause/effect) shape the grammars of all the world's languages.

Syntax

Having determined what language is, our next task is to find out how it works. We now look into how speakers use the colourful tiles of social word-meanings to create word-mosaics (sentences), each with its own composite meaning, as exemplified below [in Fig. 7]:

Fig. 7. The Universal Principles of sentence structure: synthesis (SVC) **+ analysis** (recursion)

This ancient mosaic tells a story, that of a big fish swallowing the small one; similarly, the word-mosaic of every sentence says something about something (SVO, in whichever order they may come in a language).

Credit: Getty images; IPTC Photo Metadata
https://pin.it/azzmvox57lnhne

The diversity of human languages and cultures is well known. How can the same language mechanism generate such diversity of grammars? Just as individual personalities, opinions and tastes differ within every human society, so individual societies within the body of humanity have historically developed their collective 'personalities,' habits/ tastes, and ways of doing things (including building structures: architectural, as well as grammatical). This introductory course aims to acquaint the students with the two *universal* principles of sentence-building:

1. **Synthesis**: Connecting (in socially habitual ways) what we speak about with what we say about it into the Subject/Verb/**Complement** [6] pattern (in whichever order they come).
2. **Analysis**: Describing these major sentence constituents (we call them the 'bones' of the sentence 'skeleton') by resemblance, contiguity in space-time, or cause/effect (David Hume's universal principles of human understanding).

Viewed as the natural expression of the way we think, syntax becomes logically comprehensible. The excitement, when the students begin to discover these logical relationships between the words/ groups of words in the sentence, is palpable. We call this type of syntactic analysis 'Gnalysis' or 'Generalizing analysis', because we aim to understand (or generalize about) the reasons why the words have been used the way they have, in relation to others in the sentence. Gnalysis tracks the movement of human thought, in all its diversity; this is why it has the power to analyse structurally ambiguous sentences – it can view the structure from different perspectives.

The students become 'sentence mechanics' – they are trained to make sense of *why* words in a particular sentence were put together the way they have been. As 'sentence mechanics,' students use a few 'tools' (basic concepts), which we call the "**Toolbox**" for sentence analysis:

- **Sentence** = a word-mosaic meaning (saying something about something)

- **Parts of Speech** = functions of words/groups of words in the sentence; apart from the **Verb**, whose function is to *say something about the Subject*, the five universal 'journalistic' questions capture most of those functions:

  What? = **Noun**;

  Which? = **Adjective**;

  Where? When? Why? = **Adverbs** of Place/Time/Reason;

- **Phrase** = a group of words that **act together as one part of speech** (adjective, adverb or noun)
- **Clause** = a phrase that has sentence structure S/V/C

As stated before, Gnalysis aims to discover the logical relationships between words and groups of words in the sentence, tracking the movement of verbal thought. In Gnalysis, we follow 3 steps:

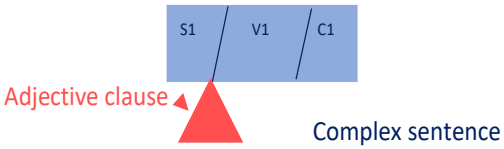
[6] We use the term 'Complement' instead of the habitual 'Object', because this space in the sentence structure may be left empty, or it may be filled by Predicate Nouns/Adjectives, not only by Direct/Indirect Objects.

1. Identify S/V/C patterns & how they relate to each other.
2. Determine the functions of words/groups of words within the sentence-mosaic by asking the universal journalistic questions.
3. ID the type of sentence structure and diagram the relationships between all its SVC patterns.

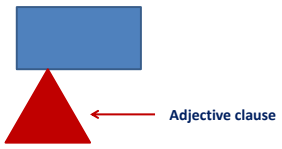
What the students love about Gnalysis is that they are free to choose any sentence they make themselves, or hear spoken, that intrigues them. They also love the flexibility of Gnalysis, which recognizes the relativity of individual perception, particularly when analysing structurally ambiguous sentences. They are 'discoverers' of the logical relationships within the structures of sentences they find interesting in any language they speak. In class, we mostly analyse English and Tok Pisin sentences, but individual students have attempted Gnalysis of Kuanua and Enga sentences also. In our diagrams, squares represent independent clauses, while triangles represent dependent clauses; for simplicity of our diagrams, phrases are not represented, but simply underlined and labeled.

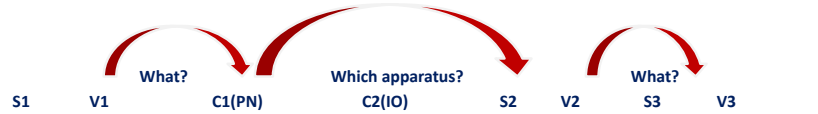
Some examples of Gnalysis:

S_1 Which those? V_1 $C_{1(DO)}$
S_2 V_2 What?
//Those / who do not move / do not notice / their chains //.

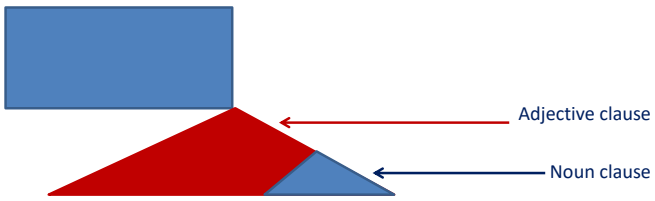


//Everything // you / can / imagine // is / real//.
Picasso





//Brain / is / an apparatus // with which /we / think / we / think//
Ambrose Bierce



Gnalysis helps students understand the structures of Verbal Thought, in all its physical permutations.

For more examples of Gnalysis, please refer to the *Syntax of Semantics*, the paper I presented at the 2013 Conference of the Linguistic Society of Papua New Guinea [7].

The last four of the 15-week course zoom in on the sub-unit elements: morphemes and sounds of language.

Morphology and Allomorphy

We discuss the overlap between the "smallest unit of language" (word-meaning), and the "smallest unit of meaning" (morpheme) concepts, in the case of free lexical morphemes, after which we cover the traditional content – classification of morphemes, some morphological analysis and allomorphy.

Phonetics and Phonology

This section, again, offers traditional content: a look at the 'organs of speech', transcription (IPA), and classification of speech sounds. Discussing phonology, we learn the new concepts of *phoneme*, *minimal pair*, and *minimal set*, after which we discuss sounds in connected speech, assimilation, and sound change. We also learn phonological rules, the rules of expressing sound change.

A New Synthesis into One Whole

'Wisdom is knowledge of the causes,' wrote Aristotle. In search of wisdom, we have used the lens of Dialectical Analysis, which combines the advantages of both synthesis and analysis. In conclusion, we pan out WA again, viewing Language as **One Whole** that is much more than the sum of its parts. Yet, having zoomed in on its smallest elements, we can now better see its majestic Oneness.

Table 1 summarizes the differences between the traditional *descriptive* vs. the *dialectical* course structure:

Introduction to Descriptive Linguistics	**Introduction to Dialectical Linguistics**
1. Phonetics	1. On Cognition, Knowledge & Understanding
2. Phonology	2. Language – a Complex Whole
3. Morphology and Allomorphy	3. Analysis into Units
4. Syntax	4. Semantics and Pragmatics
5. Semantics	5. Syntax
6. Pragmatics	6. Morphology and Allomorphy
	7. Phonetics and Phonology

Table 1. Descriptive vs Dialectical course structure.

Students' Feedback and Progress

Over the twelve years of teaching dialectical linguistics, the students' feedback has been very positive. Despite their relatively low levels of English proficiency, most students become actively engaged in the course, showing consistently high attendance and active class participation. It has been rewarding and inspiring beyond words to see interest, genuine wonder, and enthusiasm in the students' eyes.

A short survey of the 48 students in my 2018 class, conducted in the last week of the course, yielded the following results (Fig. 8):

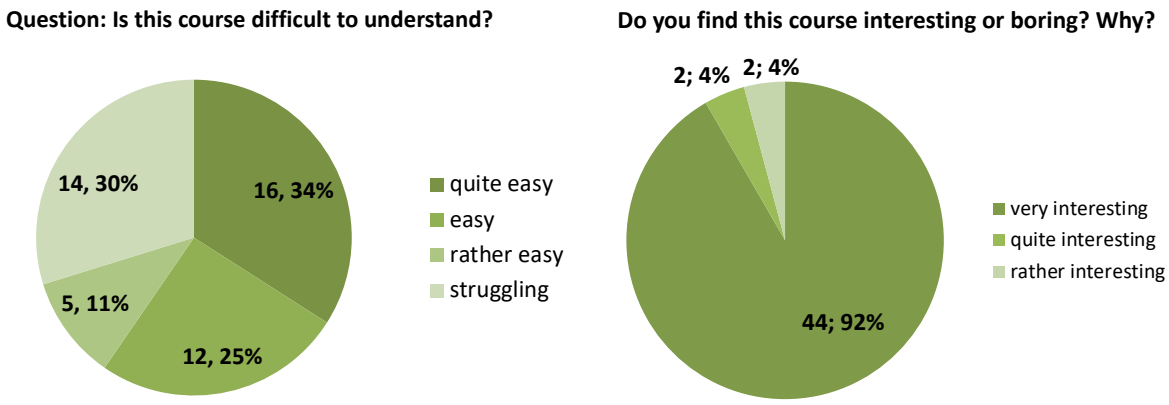


Fig. 8. Students' opinion survey results in Semester 1, 2018

Figures 9 and 10 present a selection of students' extended answers:

2. Finally, please share with me your thoughts about what you like and/or what you don't like about this course.

I like this course. It has helped me a lot in my other courses. I learned the basic properties of language including: syntax, sentence structure, nexus pattern, definition of thought and word. This are some of the concepts which I learned from my other courses but have not fully understood their concepts.

3. Do you find it interesting or boring? Why?

I find the course interesting because I am learning new ideas, facts and information about the importance of language, its structure and properties, and the usage. I have learned what the meaning or word is and how our minds create thoughts, abstract ideas and create words. I now see why animal languages differ from human languages and also what creates thoughts in our minds.

4. Easy or difficult to understand? Why?

I thought this course was going to be easy but it is challenging. I am one of the people who tak language for granted and ignore its fundamental concepts. This course is like an eye opening fo me, that is to see in my mind's eye what language really is about. There are concepts which I a yet to learn and understand like grammaticalization and how it is different from other types semantic change.

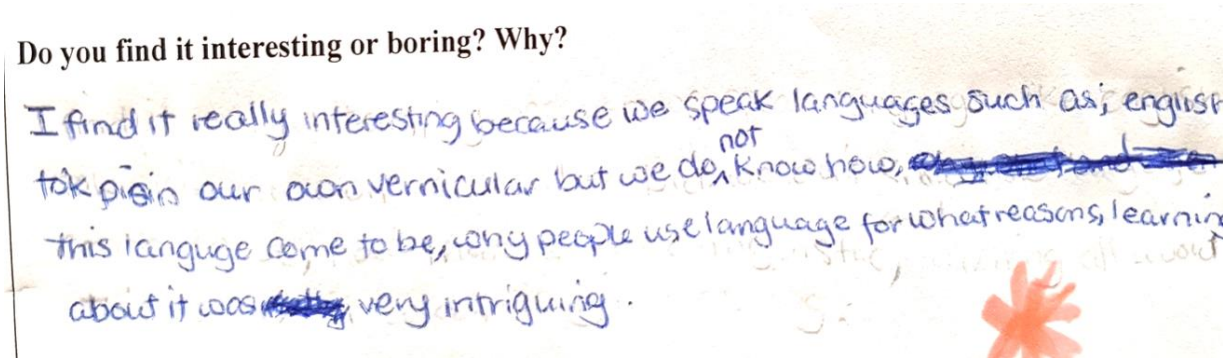


Fig. 9. Students' responses to the questionnaire in May, 2018.

Finally, please share with me your thoughts about **what you like** and/or **what you don't like** about this course.

There is nothing about this course that I don't like, everything about this course is just, awesome and I love it very much.

Do you find it interesting or boring? Why?

This course is just amazing and it's so interesting, because in everything we do, we use words (language) to communicate our thoughts, and sometimes we get things wrong because we don't understand some things we use to say and as a result we don't get what w want in life. But in this course we're learning the basic concepts to persuade people to get what we want.

Easy or difficult to understand? Why?

It is easy to understand. Actually the course is difficult to understand, but because the way you presenting and teaching this course just makes us understand it very much.

-Finally please share with me your thoughts about what you like and /or what you don't like about this course.

The Linguistics course is a very interesting course which I for one have enjoyed studying it so far. I feel very privileged to be part of this course because I will be one of the very few students in this institution to study language and know all the aspects of it.

-Do you find it interesting or boring? Why?

It is very interesting for me because at first I did not see the importance of language until I took up this course and was stunned by the amazement it (Linguistics Course) brought to me.

-Easy or difficult to understand? Why?

It is easy to understand, it just requires critical reading and analysis by the reader to fully understand the concept.

- I like this course because in this course I am learning more about language and my understanding of languages is being developed more.
- I do find this course really interesting because I am learning more about language and almost everything I learn is something new and that is the main reason why I find it interesting.

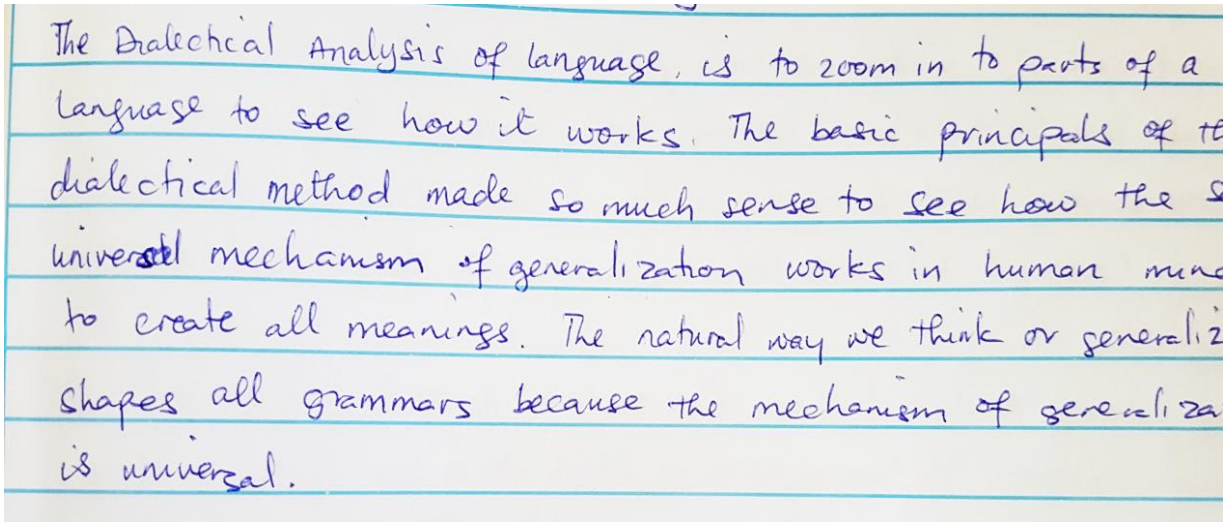

The Dialectical Analysis of language, is to zoom in to parts of a language to see how it works. The basic principals of th dialectical method made so much sense to see how the s universal mechanism of generalization works in human mind to create all meanings. The natural way we think or generaliz shapes all grammars because the mechanism of generaliza is universal.

Fig. 10. Students' feedback regarding the Introduction to Linguistics course content

Lessons Learned

Students enjoy discovering the *causes* of Language and why it works the way it does (enrolment has increased dramatically).

"Man is an animal suspended in the webs of significance he himself has spun," Max Weber (1864-1920) is known for saying; the social webs of meaning support and shape us, until we mature and become adult 'spinners' in our own right. Dialectical Analysis/Gnalysis helps our students become better thinkers – better spinners of their own 'webs of significance.' In the diversity of linguistic structures, they begin to see the practical purpose of their use. Viewed as socially practiced, habitual ways of generalizing by living, thinking and communicating minds, abstract rules of grammar become logically comprehensible expressions of the natural way human minds function, powered by the Rational Language Mechanism (i.e., universal principles of human understanding). When viewed through the lens of dialectical analysis, the diversity and richness of 'architectural styles'different societies have created to express the same basic relationships between things in the world add a new dimension to the study of linguistic typology. Dialectics opens up new horizons for comparative and descriptive analysis. The physical forms of language are no longer viewed in isolation from the workings of the generalizing minds that produce them in the course of social interaction. Thus, dialectical analysis 'connects the dots,' breathing life into the ever-changing 'styles' of thinking and speaking.

By raising new questions, new possibilities, and by regarding old problems from a new angle, it is hoped that dialectical linguistics also marks a step forward in our understanding of Human Language.

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