Intellectual Restlessness: A Preface

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1   Reality Exploration

Exploring reality is the enterprise that drives the inquiring mind. Regardless of the domain of inquiry – be it biology for the biologist, chemistry for the chemist, physics for the physicist, society for the sociologist, or language for the linguist – if we take a giant step back, we discover shared building blocks across domains of inquiry. We share motivations for exploring reality (puzzles, problems, and questions), common approaches to analysis, and a desire to analyze reality in the service of understanding puzzles, solving problems, and answering questions.

True riches, measured in the depth of understanding reality that one's analysis provides and the ability to communicate those new insights to others, are available to those who not only recognize the building blocks of the process they use to explore reality but who also apply an understanding of that process to communicate their ideas both within their own field and across disciplines. Indeed, an improved understanding of the *process* of reality exploration leads not only to a deeper understanding of reality, but also to an ability to reconstruct our path of discovery – the latter of which leads to more effective communication of our ideas to others and, if we are truly successful, an improvement in our ability to understand others.

No one understands this better than K.P. Mohanan who, when pressed by a student (see Ann, this volume) to describe what he meant by "analysis", was at a loss for a simple explanation. In the exploration of reality, one is confronted with one's observations and a desire to analyze them. But, what does analysis mean? Mohanan (1996) responds that there must at least be four possible kinds of analysis:

(1)   a.   Analysis as break-up and labeling
        b.   Analysis as the crystallization and articulation of an intuitively apprehended pattern
        c.   Analysis as mechanical procedure
        d.   Analysis as an explanation to a puzzle

It is hard to find examples in real life (academic or otherwise) where only one of the four modes in (1) is used, though different enterprises may rely on a particular mode more heavily than others. In linguistics one does a little bit of everything.

When analyzing the constituents of a sentence, there is a lot of break-up and labeling, (1a). Depending on one's pet theory, a sentence may be broken up into NPs and VPs; or into subject, predicate and object; or themes and rhemes, topics and comments. Sometimes such breaking up and labeling is done rigorously, requiring empirical motivation for each constituent and its category, and at other times it may be applied more intuitively. For example in qualitative analysis in chemistry, breaking-up and labeling is a careful and rigorous procedure so that one can determine, without risk of poisoning, if a sample of blue crystals is $CuSO_4$ (Copper Sulphate) or sugar crystals from a serving of Blue Curaçao. In biology, when labeling parts of an animal's body as head, neck, torso, and the like, boundaries are less obvious since it may be hard to determine, for example, where a head ends and a neck begins. This is also true of linguistics when one tries to decompose phrases into words, morphemes or phonemes. The boundaries are not always clear, and the linguist must exercise rigor in establishing the labels and their corresponding parts.

Thus given the intricacies of natural language, for the linguist, intuition, (1b), is a valuable tool that helps one grapple with complexities that, if approached systematically, would require the analyst to address infinite possibilities. Consider, for example, the five-word sentence *the boy pinched the elephant* (see cover design). By relying on intuition, an observer, let's call him Moe, would probably suggest the following constituency: [[the boy] [pinched [the elephant]]]. Moe's proposal is likely to have come from an intuitively apprehended pattern observable from other sentences such as *Joey kissed a cow*, *The frog tickled her*, and *Raccoons wear dark glasses*. If asked to articulate his intuition, Moe might point out a do-er, an action and a victim in each sentence. This may, on closer examination, be inadequate, but Moe's intuition has provided him with a head start because he can now examine his intuition against more carefully related examples until he arrives at a rigorously tested theory. Had Moe not appealed to his intuitions at all, he would have had to try any of the more than twenty possible

groupings of the five-word sentence before arriving at the grouping best supported by empirical evidence.[1]

Mechanical procedures, (1c), are also of great value in linguistics. There are at least two ways of thinking about mechanical procedures. In Mohanan (1996), it is understood as taken a sample of something to be analyzed and then running a series of operations to uncover properties of that sample. This is typically done in DNA testing where a sample is put through a standard series of operations to reveal the DNA coding. In linguistics, this approach is particularly useful in statistical analyses of corpora, where tagged items are counted and then subject to a series of statistical procedures to yield generalizations. Additionally, a mechanical procedure can be one in which a set of procedures are applied to produce a desired result. This is best exemplified in engineering where, let's say, the civil engineer must figure out the procedure for building a bridge (e.g. to build a suspension bridge such as the Brooklyn Bridge requires a series of steps: sink caissons, build bridge towers, then run the wires and cables over and across the bridge towers and, finally, lay the bridge surface).

The latter approach to analysis is prevalent in the rewrite rules and derivations of linear grammars. Consider, for example, Tianjin, a Northern Mandarin language, where syllables undergo tone sandhi. Among the many sandhi rules, when two syllables both carrying rising tones, R, are adjacent, the initial R surfaces as H, i.e. R→H/__R (e.g. *haoR jiuR* → *laoH jiuR* 'good wine'). Also, when an R syllable precedes a syllable with a high flat tone H, then the R surfaces as H, i.e. R→L/__ H (e.g. *haoR renH* → *laoL renH* 'good person').[2] Now, consider an input of /RRH/. The attested surface form turns out to be [HLH] regardless of morphosyntactic configuration. To get the attested form, one has to mechanically apply the R→H rule before the R→L rule. The mechanical procedure produces the right results but it brings into question why the procedures are the way they are.[3]

Finally, explaining puzzling phenomena, (1d), is also a type of analysis applied by linguists. For example, if sentences are made up of words, why

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[1] Use of intuition is common in literary, music and art appreciation where a pattern has to be intuitively apprehended, crystallized and then articulated. For example, listen to Rachmaninov's "Rhapsody on a Theme of Paganini", Bach's "Goldberg Variations" or any music that is a variation on a theme. One's intuition might quickly identify the presence of a pattern but extricating and articulating that pattern requires considerably more effort

[2] For detailed analyses, see Chen (2000) and Wee (2004) and references cited therein.

[3] It is important to note that the proposal and/or application of a procedure does not entail/require an explanation or understanding of any more substantive principles at work . For example, one can calculate the standard deviation of a set of values without knowing what standard deviation means.

do arbitrary strings of words not form grammatical sentences? In other words, why can we say *The child pinched the elephant*, but not **Elephant the the pinch child*? Both strings are made up of the same words, and the meaning is not obscure: because elephants cannot pinch, the only sensible interpretation is one where the child is doing the pinching. It is puzzling that one sequence should be unacceptable. In fact, many other unacceptable sequences can be as easily constructed. Likewise, if words are made up of sequences of phones, why can't any arbitrary sequence of sounds be a potential word? For example [sput] is possible in English but **[zbut] is not; [sut] and [put] are possible words in Cantonese, but **[sput] is not. Physiologically, all of these sequences can be uttered, so physical limitations do not provide an explanation, and semantics plays no role in this puzzle because we are only exploring sound sequences that make up possible words.

If you are puzzled as to why some sequences are acceptable but not others, then you are experiencing one of the main motivations that drive linguists. Linguists are concerned with puzzles. In simple terms, a puzzle is a situation where our expectations of randomness or regularity are not met by empirical observation. When confronted with a puzzle, there is a strong urge to figure out how the situation came to be the way it is. Are there rules and laws governing how all the elements in the situation interact? Did the situation come to be the way it is because of a chain of related events? In the example involving *The child pinched the elephant*, an explanation (i.e. analysis in the sense of (1d)) for the unacceptability of **Elephant the the pinch child* might be a set of statements on English syntax. For example, an English declarative sentence must have the order NP followed by VP (i.e. S→ NP VP), where NP is made up of a Det N (NP → D N) sequence and VP → V NP. Violations to these laws, such as those found in **Elephant the the pinch child* produce unacceptable sentences.

Despite our attempts in the above paragraphs to exemplify each notion of analysis in (1), as illustrated by the example just presented, the reality is that it is the rare situation that can be approached with only a single mode of analysis. In this most recent case, the solution to the puzzle, (1d), was enhanced by the application of a mechanical procedure, (1c). Instinctively, the inquiring mind is likely to employ a combination of analytical modes. Taking that instinct, evaluating our process for exploring reality, and being able to articulate those processes in terms like (1) takes us one step closer to truly mining the riches of intellectual inquiry.

We take another step towards intellectual riches by simply asking: What triggers us to engage in analysis in the first place? Mohanan (1996) suggests there are three situations, given in (2), which motivate inquiry: puzzles, problems, and questions.

(2)   Three kinds of motivation for inquiry
        a.   Puzzles
                A situation where one's expectations of regularity or
                randomness are not met
        b.   Problems
                A situation where there is a mismatch between the current
                situation and an ideal situation
        c.   Question
                A situation where the characteristics of some X is not
        known

Language poses many puzzles for the linguist, so it is unsurprising that many examples of puzzles, (2a), have been given above. But in other domains, problems, (2b), are just as likely to trigger analysis. Consider, for example, deciding on the best course of action for next Valentine's Day. The problem is a situation in which you currently have no sweetheart, but ideally would win one. The problem triggers more than one type of analysis: you label and identify your beloved person's likes and dislikes (1a), calculate the cost of chocolates and flowers within the parameters of a budget (1c), and apply intuition (1b) to arrive at the best combination of timing and mode of delivery.

In medicine it is common to know a result without knowing the characteristics of its cause. So analysis here is often triggered by questions, (2c), For example, cancer is an insidious disease in which tumors appear, a person weakens and, without treatment, will eventually die. Years ago, the simple question "What is (are) the cause(s) of cancer?' triggered a line of inquiry which (when appropriately funded) continues to lead scientists to apply the entire arsenal of analyses. Thankfully, the question has been partially answered – but, as in many explorations of reality, a simple question triggers an entire industry of analyses.

And though it seems as if we digress with inquiries regarding love and disease, lessons from understanding how we explore reality informs our examination of language in this volume. Having been exposed first-hand to the thought processes that characterize Mohanan-the-restless-intellectual, the presentations in this volume reflect, in various ways, a continuing conversation with him – not only about linguistic content and details of analysis but also a meta-conversation about one's approach to reality exploration.

2   Discovery

As noted above, puzzles in language are easy to find. Recall the puzzle mentioned earlier, that utterances are made up of units of sounds. If this is all that is known, one would expect that any combination of sounds would be acceptable. But the null hypothesis is quickly dispelled. Consider, for example, the sequence [lcc] which is an acceptable pre-pausal consonant cluster in Malayalam as in [a.ka.lcca] *distance*. Given this, it is mysterious that [lcc] is not allowed word-initially (Mohanan 1986:73). This asymmetry is a puzzle which demands an explanation and motivates further inquiry (which in this case was taken up in T. Mohanan 1989).

   Answering such questions in linguistics provides insight as to how natural human languages work and generates building blocks for developing an architecture of mental grammar. Most of the contributions in this volume have a strong puzzle-solving flavor, though are by no means restricted to only puzzle-solving. In the area of phonology, Kiparsky's contribution explains how puzzling phenomena related to reduplication can be addressed by a layering of constraints, an insight inherited from his earlier models of lexical phonology. Peng's contribution is an analysis of very intricate puzzles in Kikuyu that can be addressed by ranking a small and simple set of universal constraints. This shows that explanations to puzzles may have simple postulates, but are certainly not simplistic.

    Simplistic answers are all too common in explorations of reality where explanations are attributed to singular causes, curiosity is satisfied, and careful observations are abandoned. In contrast, Donohue's presentation of the competition between breathiness and nasality in Palu'e exemplifies the value of obtaining a full picture of data before jumping to conclusions. In the same careful spirit, Kroeger presents not only the rule for accounting for Kimaragang's vowel harmony patterns, but argues that the rule must be a lexical one. On a more diachronic front, Leben and Ahoua's contribution explains the patterns of tone change in the Kwa languages of Côte d'Ivoire by the addition and deletion of tonal links in adjacency. Shifts can also take place when languages come into contact. In this volume, Bao explains how, when two languages come into contact and produce a third language, the influence of one of the languages, though no longer visible in terms of surface elements, may persist in the form of rules and constraints, Another case of language contact is given in Wee's squib on split-gemination in Hong Kong English, where the puzzle is really a paradox that he believes is addressable if linguistic representations are allowed to have information correspond unfaithfully across nodes.

   As one can see, it appears that the natural laws of human languages themselves form patterns of their own, often revolving around central sets of

phenomena, synchronically or diachronically. This triggers the need for deeper explanations as to why natural linguistic laws pattern the way they do. An attempt to answer such questions in the area of phonology is made in the contribution by Mohanan, Archangeli and Pulleyblank.

In the domain of syntax, Oh and Zubizarreta's contribution compares the double object constructions in English and Korean to reveal that both languages may share similar structures or have differing ones depending on whether the double object construction is one that pertains to a goal or to a benefactive. Likewise in Matsumoto's contribution, a comparison of Malayalam, Yuroba and Japanese reveals that logophoric pronouns tend to respect the perspective of the first-person (P-PIVOT) rather than other possible deictic centers.

Theoretical understanding does not just come from relating similar phenomenon across languages, as exemplified by Alsina in his theory of structure sharing that allows for raising and long-distance dependencies to be captured under one analytical umbrella. And Dalrymple shows how a review of earlier analyses can bring about new ones with new insights as she shows how what was invisible to the Path Containment Condition (Mohanan 1984) can now be captured in an LFG setting for gap relatives and correlative binding. The multi-dimensional approach to the study of grammar is also found in Levin and Sells' contribution where puzzles appear inseparable in terms of syntax and semantics. In their study, the unpredicated use of particles with surface contact and change of state verbs is possible only if telicity can be determined solely from the properties of the expressed location object. Tham extends that multi-dimensional view (crucially for her, the separation of categorical and relational properties) to even bigger domains of discourse, and shows how strategies useful for puzzle solving is really not domain specific. It would be narrow-minded to think that language must be audible, and in this volume, Neidle provides agreement puzzles in ASL that likewise require the analyst to look at complex interactions between different levels/dimensions of grammar ranging across phonology, morphology, semantics and syntax. However, structures in the mind extend beyond language, and here, Vijayakrishnan demonstrates how strategies used in the study of grammar may be applicable to the study of music.

3   Pattern Interaction in Life and Language

Good answers to puzzles are often tested by some kind of modeling, so that one can better see if they reflect empirical observations. In this area, we

have contributions from Bresnan and Nikitina, Yatabe, Paolillo, and Fong and Anttila. Drawing upon corpora (Switchboard corpus and Treebank corpus in particular), Bresnan and Nikitina show, with the help of stochastic OT, how the theoretical machinery of LFG match corpora, thus predicting gradience in dative alternation as well as categoricity. Despite their extensiveness, corpora do not provide negative data, and Yatabe takes care of that by employing questionnaires, with responses which argue for a linearization-based theory of syntax. Like Bresnan and Nikitina's work, Paolillo's contribution and that by Fong and Anttila center around a similar fascination with variation in the surface manifestation of mental grammars. Paolillo's main idea is to put weights in grammars (see also Mohanan 1993) so that probabilities may be calculated. Fong and Anttila's approach is to create typological orders (T-orders).

Distinct though the above models are, they are successful in capturing the complicated patterns of variation that exist in reality. While improving on explanations given to puzzles, these works also point in the direction of how theoretical developments may be brought to bear on problem solving. Since problems are defined in (2b) with respect to some ideal, they exist only when one has a particular goal in mind. In the case of linguistics, goals may range from the desire to have a naturally communicating robot, to a way of re-creating the human brain with respect to language acquisition and production, and to simulating a human community. Precise models such as those given by Bresnan and Nikitina, Yatabe, Paolillo, and Fong and Anttila allow us to find ways to narrow the gap between goals like those and our current understanding of language in real life. This bridging of modeling and real life is best seen in the treatment of complex predicates by Butt, King and Ramchand. In their contribution, a debate takes place in the lively setting of a pub where arguments for computational implementation are pitched against calls for sound grammatical architecture through rigorous theorizing. The outcome of their discussion requires the serious researcher to understand fundamental assumptions across frameworks, unsurprisingly by now calling to mind Mohanan's analysis of inquiry and reiterating the value of not only exploring reality but also understanding how we explore it. The work by Butt, King and Ramchand puts an exclamation point on the theme of this volume, and provides apt tribute to their teacher.

4   Inquiry after all

In short, this volume is primarily an exploration of puzzles in the linguistic domain and proposals for how to capture those patterns.   From one perspective, the value of such an enterprise would be to identify and apply

solutions to problems. Yet, from our Mohanan-influenced perspective the enterprise is valuable for the insights it provides, because – more important than simply providing an answer – solutions generate deeper questions, as suggested by (2c). Such questions are typically of the kind "What is X?" Given our understanding of phonological patterning, for example, can we state what "opacity" is in theory-neutral terms (i.e. in terms that makes as few theoretical assumptions as possible)? Or, what is "logophoricity"?

Take the notion of "grammaticality": What is "grammaticality"? To the lay speaker, often steeped in prescriptivism, an utterance must conform to a rule in a grammar book to be "grammatical". To some linguists, a specific theory of grammar may color their interpretation of "grammaticality" such that, for an analyst steeped in a pre-OT model of language, "grammaticality" may mean that an utterance, S, perfectly obeys the rules of a language, L. And to an analyst working within the OT framework, "grammaticality" is not accounted for in terms of absolutes, but rather in terms of what is optimal, that is, the best form in terms of the conflict resolution given by L's grammar. But, as Alsina (p.c.) points out, linguists are better served by treating "grammaticality" as a theory-independent meta-feature of data that captures the acceptability (or not) of an utterance. This leads us back to the lay speaker and her community for data, which raises the questions of which acceptability judgment should one consider in the study of that particular language's grammar – that of the speaker's I-language or her community's (notions Chomsky (1965, 1985) carefully teased apart) and how to conduct that study? The contributions in this volume make stabs from both angles with careful studies of a small set of informants in some papers and rigorous studies of corpora in others. We leave the final word in the hands of the reader.

The point is to observe the benefit of taking a step back and dedicating time and effort to question the patently "obvious" building blocks of analysis. Sometimes the labels we rely on to communicate our ideas take on realities of their own. Recall the path of inquiry initiated for Mohanan when faced by the need to explain "analysis". Indeed, such questions lead us to situations which challenge one's basic philosophy of inquiry, something that Mohanan is mindful of when he looks at data, methods, ideas and concepts in linguistic research. Mohanan, our prime example of intellectual restlessness, evolves his philosophy by actively solving puzzles of all kinds – for him they lie in the realm of phonology, syntax, and semantics. He regards specific frameworks in those sub-fields as useful only so far as they provide the means to express and capture insights. As a result, Mohanan is framework-agnostic and can express his ideas about syntax within frameworks as diverse as Government and Binding and Lexical Functional Grammar. And when he finds frameworks overly restrictive for

expressing insights, he creates new ones, as in Grammatical Semantics (T. Mohanan and Wee 1999, also taken up in Levin and Sells, this volume). This spirit of open-minded inquiry is also manifest in his critique of phonological models regardless of the model of the day; he was at it during pre-OT days (Mohanan 1993), and continues even now when OT is prevalent (Mohanan 2000 and Mohanan, Archangeli and Pulleyblank, this volume).

Simply put, questioning reality is invigorating, no matter one's motivation or mode of analysis. Mohanan spreads that excitement to those around him, and to areas beyond linguistics. It takes little prompting (especially over a cup of tea in the morning, or a glass of beer on a muggy afternoon) to coax a story or two from those who have worked with Mohanan about the influence of his passion on their ideas and ways of approaching their own work. Ann and Hung capture their stories in this volume, and M.T. Mohanan punctuates that section with her prolegomena – really, a field guide to a life in linguistics.

In this collection of papers, Mohanan's teachers (Paul Kiparsky and Joan Bresnan), his friends, colleagues and students come together to honor his enthusiasm for and significant contributions from exploring various realities in linguistics and the patterns that surface from such explorations. The preceding paragraphs provide only a glimpse of the papers collected here, and in so doing, may seem to imply that they fit into neat little categories. In reality, the papers are richer than we could do justice to in a few words, so it is this *collection* that celebrates a spirit of inquiry infused with the courage and desire to uncover and face realities — not unlike that depicted in the Matrix movie trilogy and inspiring Mohanan's fascination with the REDPILL – here interpreted as REALITY EXPLORATION AND DISCOVERY: PATTERN INTERACTION IN LANGUAGE AND LIFE.

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Cover design:

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