A Discussion of the Lojban System of Place Structure

Daniel Evans

Lojban is a simple, powerful, and fascinating language. I first found it through a post on Reddit, which linked to the official website. I'd had a mild interest for a few months until the following winter, when I just started looking at the grammar more in-depth. I was blown away by the versatility and completeness of the language. The place structure system especially impressed me. In each root word, or *gismu*, is embedded up to five other concepts that can be extracted using a few other, simple words. I assume that the reader has a basic knowledge of lojban grammar, including the functions of the *fa* words, the *se* words, and *lo…ku* conversion. For the purpose of this paper, I will include a few essential vocabulary terms:

- *mi* – the first person pro-sumti
- *ti* – the near-speaker demonstrative pro-sumti
- *fa, fe, fi, fo, fu* – 1st, 2nd, 3rd, 4th, and 5th place markers
- *se, te, ve, xe* – 2nd, 3rd, 4th, and 5th place converters
- *lo…ku* – the veridical descriptor/article and appropriate terminator (selbri to sumti converter)
- *dunda* – x_1 [donor] gives/donates gift/present x_2 to recipient/beneficiary x_3 [without payment/exchange]
- *nanmu* – x_1 is a man/men; x_1 is a male humanoid person [not necessarily adult]
- *gerku* – x_1 is a dog/canine/[bitch] of species/breed x_2
- bersa – x_1 is a son of mother/father/parents x_2 [not necessarily biological]

Using just these these words, we can achieve much:

1. A simple, active voice sentence:
    - *lo nanmu ku dunda lo gerku lo bersa* – **The man** gives **a dog** to **his son**. (assuming that the man isn't giving the dog to just any random son of any other random man, there is no need to say “his” in lojban here)
2. The same sentence, but with a change in word order, and therefore emphasis (or so it does

occur in some languages):

- *lo nanmu ku dunda fi lo bersa ku fe lo gerku* – **The man** gives **his son a dog**.

3. A passive voice sentence:
   - *lo gerku ku se dunda lo nanmu lo bersa* – **The dog** is given by **the man** to **his son**.
4. The idea of an entity that performs the action of giving:
   - *lo dunda ku* – (open to interpretation) a giver, a donor
5. The idea of an entity that is (typically) given:
   - *lo se dunda ku* – a gift, a present, something that is given (a more literal translation)
6. The idea of an entity that receives something:
   - *lo te dunda ku* – a receiver, a recipient, a beneficiary, etc…

In addition to many more things when we take into consideration *tanru* and other features of lojban. However, I believe that the system is somewhat flawed. I recently started studying Russian, the relevant part of which is the declension system. For those who don't know what declension is, it is when you *inflect* a word (that is, change some part about it, usually a syllable at the end) to change its *case* (which indicates what the word is doing in the sentence, like subject, direct object, means by which something is done, etc…). While the place structure in lojban is indeed unambiguous, it's somewhat unintuitive. For example, look at numbers two and three above again. Number three isn't so bad, but it does require that you have absolutely no question about place structure. Number two is a bit worse, as jumps back and forth between places (first place, *fi* third, *fe* second), requiring even more that you have in mind the place structure while talking and listening. While memorizing the place structure for any given word isn't that hard, memorizing them for 1300 would be a bit difficult.

Look at the cases for Russian:

- Nominative: typically indicates the agent of an action
- Accusative: typically indicates the direct object of an action, a length or destination
- Genitive: typically indicates quantity, most “of” phrases, origin, or possession
- Dative: typically indicates the indirect object of an action
- Instrumental: typically indicates a means by which an action is done or with what something is
- Prepositional: typically indicates location, and some time expressions

There is more to be said about these cases, but it's not necessary to go into the ins and outs in this paper. However, given those descriptions, look at a possible new definition for the word dunda (note that I use the first letter of each case instead of writing it out):

- *dunda* – **NOM** [donor] gives/donates gift/present **ACC** to recipient/beneficiary **DAT** [without payment/exchange].

Let me give a quick explanation. The words in the nominative case lets you know what is making everything happen in the sentence. The word in the accusative case lets you know what is most directly affected by the relationship.[1] The word in the dative case lets you know what less directly affect by the relationship.

Now, let's pretend that lojban has cases, and are marked by the following:

- **NOM**: ∅ (nothing)
- **ACC**: *fe*
- **GEN**: *se*
- **DAT**: *te*
- **INS**: *ve*
- **LOC**: *xe* (note I change this to **LOC** for *locative*, which turns out to be a more appropriate name for the uses the case fulfills)

Note that with cases, the *fa* words and *se* words will be useless (they are used to indicate place structure, which I'm replacing here with cases/declension). That being said, I've used them to mark case. Now, look at this sentence:

- se mi zdani ti

1 One might ask, why is the thing being given considered the thing most directly affected by the relationship? This probably goes into more linguistic theory than I'm trained for, but my argument would be that the entity in the nominative has *direct control* over the object being given. Perhaps he put it in the mail or is extending it out in his hands. Whether or not the intended recipient takes it, the giver still is giving the thing being given.

If you know what the word *zdani* means, pretend you've forgotten. You're in lojbanistan, and you're talking to a native in English. You're walking around what looks like a neighborhood, and he walks up to what is quite obviously a house. He gestures toward it and says, “se mi ti zdani”. You do know, however, how the cases work, and what “mi” and “ti” mean. You roughly translate this as “I-**GEN** this-(right here) [probably a house]”, or, a bit more naturally, “This is a [probably house] of me,” and, finally, with confidence that what appears like a house out of which the man's wife and children have come to greet you, “This is my house.” This is a reasonable assumption. You check you lojban-English dictionary and see the definition is such:

- **NOM** (x_1) is a nest/house/lair/den/[home] of/for **GEN** (x_2)

Indeed, it checks out. The point here is to illustrate this following: *using cases, the “case structure” of any root word is suddenly extremely intuitive*. If one understand what cases are (and it simply takes a bit of explanation), then everything in a lojban sentence is now, at the same time, unambiguous **and** intuitive. Yes, place structure combined with the *fa* and *se* words is truly unambiguous, but it doesn't really tie words together intuitively. This way, changing word order is a cinch, and doesn't require excessive thought to decipher the grammar.

Now consider the word *klama*. It deals with motion. Given that and the knowledge of the cases, let's try to determine what the case structure might be. To do so, let's run through the cases:

1. Nominative case:
    - We know that the nominative case indicates whoever or whatever is making the relationship or action happen. In the context of “going” or “movement”, surely the thing in the nominative is the thing that is actually going or moving.
2. Accusative case:
    - In the case of *dunda*, the accusative case marked who or what was receiving the action. Whoever or whatever is receiving the gift could be thought of as the destination of the gift.[2] In the context of motion, it is entirely appropriate to think of the accusative case marking the end destination.

2 One might ask, “Then wouldn't the person who gave the object be in the genitive, as it marks origin?” My response would be that even though the object originated from the person giving, the fact that the person was performing the action is more important.

3. Genitive case:
    - My description of the genitive case says that it can indicate origin. This will work here.
4. Dative case:
    - Nothing really comes to mind. Maybe someone can be moving for someone else, but this seems to be an entirely different concept that could probably be represented by another word entirely.
5. Instrumental case:
    - What am I using to go? My feet? A car? A plane? My hands? This would probably indicate the method of transportation.
6. Locative case:
    - Where am I? If I'm going by foot, I'm probably on the ground, the road, or a sidewalk. If I'm in a car, I'm on the road. A plane – the air. My hands – hopefully something soft. This will indicate, generally, where you're located while your traveling.

After going through this, let's make our own *possible* definition for the word *klama*:

- *klama*: **NOM** goes to destination/endpoint **ACC** from origin/starting point **GEN** by means of/in vehicle/by mode of transportation **INS** on/through path/medium **LOC**

And now, we'll compare it to the official definition:

- *klama*: **NOM** (x_1) comes/goes to destination **ACC** (x_2) from origin **GEN** (x_3) via route **LOC** (x_4) using means/vehicle **INS** (x_5)

Here, we can see how an intuitive definition is easily deduced, given the semantics behind each of the cases. One might ask, “Is it possible to use this case system for any given lojban word?” Or, more importantly, “Is it possible to assign this system to any current or future lojban word without making exceptions? That is, is this system complete enough to handle the full range of human thought and communication?” My answer is that *I do not know*. However, it works for Russian and many, many other languages – why would it fail here? If this system isn't complete enough, I am inclined to think that it would be possible that we could define a new case that captures any missed ideas – the goal

being to look at a new concept of relationship that does indeed require a new case. I do not intend to claim that the six-case system is perfect, but it does cover a lot of ground (if not all ground). At the end of this paper, I will pick lojban words with varying definitions and convert them to a case system[3] to demonstrate how well it can work.

At this point, I hope that two points are clear for my case for cases:

1. *fa* and *se* words can make sentence grammar extremely confusing. Marking case eliminates this without losing *any* clarity (i.e., it remains *just as unambiguous as before the original place structure system*)
2. A *case structure* is much more intuitive, which may help reduce any *semantic ambiguity* in any given sentence, thus making things easier to understand. Instead of having an arbitrary place structure, there's a case structure that makes semantics much more clear.

Now, if you know much about lojban, you should have noticed that one *big thing* hasn't been addressed yet: converting selbri to sumti. In the examples I gave earlier, I mentioned that the word *dunda* has embedded in it the idea of a giver, a gift, and a receiver, and that these can be extracted by using the *lo…ku* construction. This is *very easily and intuitively* taken care of. Consider this, in official lojban: *lo dunda ku*. We know that the x_1 place of *dunda* is someone who gives, the giver. The *lo…ku* construction extracts that idea from the x_1 place and says, “Here, use this giver idea as a sumti.” In official lojban, to extract the idea of the gift or receiver, you use the appropriate *se* word: *lo se dunda ku* – a gift; *lo te dunda ku* – a receiver. What is this doing exactly, and what are the implications?

The *se* words switch out whatever happens to be the first thing in a selbri to the appropriate spot. This can be stacked, too, allowing constructions such as *se ve te klama* – From the origin x_1 goes x_2 on path x_3 to destination x_4 by means of transportation x_5. This allows you (even forces you) to change word order. It switches around the place structure so that you can put emphasis where you want it. This ends up not being a very good use (as to say something in *any* order becomes very hairy very quickly – *do se te dunda ti mi*), so we have the *fa* words. But, changing the word order around by *switching out the first place with any other place* allows you to extract any other meaning out of a lojban word. This can be achieved very similarly with a case system: Just as the *lo…ku* construction

3 I won't use this particular one. It will be explained at the end.

extracts the first place structure, adding a case word in front of a selbri can extract the appropriate case-meaning from the selbri. First, consider these examples, in official lojban:

- *dunda*: x_1 gives x_2 to x_3
- *se dunda*: x_1 is given by x_2 to x_3
- *te dunda*: x_1 receives x_2 from x_3
- *se te se dunda*: x_1 gives x_2 x_3

Performing a *lo…ku* conversion on those examples yields *a giver, a gift, a receiver,* and *a giver*, respectively. Indeed, the last example is overboard, but you get the idea. It can get confusing *very easily*. And, apart from changing word order (and, thus, extracting meanings for selbri to sumti conversion), it is useless.[4] In addition, it's in efficient to have to think of the *third* place of a sumti every time you want to talk about it. It would be more indicative of the role of that entity if a case was associated with it. Since there is no other use for these words, I'll explore how it might be done with a case system.

In any given bridi, you have either sumti, selbri, or cmavo that say you're happy about it or if it was in the past (or what have you). If you indicate case for a sumti, you indicate the role the sumti is fulfilling in the selbri's case structure. If you indicate case for a selbri, you extract the meaning of the appropriate entity that might fill the spot of that case in that particular selbri. Consider the following:

- *mi fe ti dunda se do* – I give this to you.
- *mi nelci lo fe dunda* – I like the gift.
- *ko .ei dunda te mi lo fe platu* – Give me the building plans!

I must admit, it was a bit strange to think of "*fe dunda"* as "the thing that goes in the *fe* spot of *dunda*", but I would argue that it's much easier than recalling "the thing that goes in the second spot of *dunda*". In either case, it's a different way of thinking (as it is when learning any new language), but I believe that a case system is, I'll reiterate, much more intuitive. Instead of learning rigid structures, one learns a definition based in meaning, in content. I would like to say again that this would result in

4 I haven't delved deep into lojban grammar yet, so forgive me if I am in error in saying this. While preparing this paper, this is the main thing that I can think of that would make this a hard system to implement.

no loss of clarity. No ambiguity would come of this change.

This concludes my claim and supporting arguments. I mentioned earlier that I would provide some more example definitions to demonstrate the case system. I will try to use gismu of varying length and content. One may contact me at my e-mail: daniel.e2718@gmail.com. Thank you for reading my paper, and please contact me with any questions or comments. I would especially love if someone in the Logical Language Group would contact me and tell me what they think. Also, please note that I am not trying to point out something terribly wrong with lojban—it's incredibly fascinating—rather, I would like to contribute if possible.

Example Definitions of Lojban Gismu Using the Proposed Case System

Here's a list of possible cases with some explanations of their *typical* functions and cmavo markers:

- Nominative (**NOM**) ∅: The nominative case names the subject or agent of an action. It marks whatever is *doing* or whatever is *being*.
- Accusative (**ACC**) *se*: The accusative case something most directly affected by the relationship.
- Dative (**DAT**) *se fi*[5]: The dative case indicates for whom or what an action is done, or an indirect object.
- Genitive (**GEN**) *te*: The genitive case indicates, in a very broad sense, origin. Expanding on that idea can include possession, quantity, or being a "part of" something. This can be a more abstract case.
- Terminative (**TER**) *te fi*[6]: The terminative case indicates the end of an action or length.
- Instrumental (**INS**) *fe*: The instrumental case indicates an instrument, tool, a means by which, or something in the likeness of which an action is done.
- Locative (**LOC**) *fo*: The locative case indicates something on or in which an action is done.

And now, on to the definitions. Note that I have copied *directly* from the official wordlist, the definitions of which I have simply modified to demonstrate the case system.

- *dunda*: **NOM** [donor] gives/donates gift/present **ACC** to recipient/beneficiary **DAT** [without payment/exchange]
- *klama*: **NOM** comes/goes to destination **TER** from origin **GEN** via route **LOC** using means/vehicle **INS**
- *tavla*: **NOM** talks/speaks to **DAT**[7] about subject **LOC**[8] in language **INS**
- *cusku*: **NOM** (agent) expresses/says **ACC** (sedu'u/text/lu'e concept) for audience **DAT** via

5 The accusative and dative cases go together very naturally (as they often indicate direct and indirect object). Thus, they both have *se*, and the dative gets an added *fi* to indicate that it receives the result of the action (usually).

6 The genitive and terminative cases go together very naturally (as they often indicate movement, transfer, or otherwise a relationship between two distinct points.

7 The use of the dative here is to more closely parallel the definition of *cusku*

8 This is taking from Russian. I figured that the "locative" would make sense, because one can talk **on** the subject of *something*.

expressive medium **INS**

- *benji*: **NOM** transfers/sends/transmits **ACC** to receiver **TER** from transmitter/origin **GEN** via means/medium **INS**†
- *fapro*: **NOM** opposes/balances/contends against opponent(s) **ACC** (person/force ind./mass) about **LOC**[9] (abstract)
- *renvi*: **NOM** survives/endures/undergoes/abides/lasts/persists through **ACC** for interval/duration **TER**
- *melbi*: **NOM** is beautiful/pleasant to **DAT** in aspect **INS** (ka) by aesthetic standard **ACC**
- *mifra*: **NOM** is encoded/cipher text of plain-text **GEN** by code/coding system **INS**; **NOM** is in code; **INS** is a code
- *moklu*: **NOM** is a/the mouth/oral cavity [body-part] of **GEN**
- *mluni*: **NOM** is a satellite/moon orbiting **GEN** with characteristics **INS**, orbital parameters **LOC**[10]
- *spuda*: **NOM** answers/replies to/responds to person/object/event/situation/stimulus **DAT** with response **ACC**
- *gidva*: **NOM** (person/object/event) guides/conducts/pilots/leads **ACC** (active participants) in/at **LOC** (event)
- *savru*: **NOM** is a noise/din/clamor [sensory input without useful information] to **DAT** via sensory channel **INS**†
- *klama*: **NOM** comes/goes to destination **TER** from origin **GEN** via route **LOC** using means/vehicle **INS**
- *sorcu*: **NOM** is a store/deposit/supply/reserve of materials/energy **GEN** in containment **LOC**
- *statil*: **NOM** has a talent/aptitude/innate skill for doing/being **INS**
- *gunka*: **NOM** [person] labors/works on/at **ACC** [activity] with goal/objective **DAT**

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† Some of these could also be in the locative, considering how I defined *klama* earlier in the paper. However, the definitions sometimes say "means/medium". These could be disambiguated.

9 I assume this is a fulcrum.

10 I assume this calls for information regarding its position in relation to the body that it's orbiting.