Comments on pre-reading quiz 2

1. Let's imagine a sender-receiver game where there are 3 world states (1, 2, and 3), three signals (a, b, and c) and three acts (1, 2, and 3, where the correct act for state 1 is act 1 and so on).

Here is a sender strategy (where the number to the left of the -> is the world state and the letter to the right is the signal the sender will choose):

1-> a
2-> c
3-> b

Which of the following receiver strategies will guarantee that the receiver will be able to select the correct act based on the sender's signal? (the letter to the left of the -> is the received signal, the number to the right is the act the receiver will choose).

- ○ a->1
b->2
c->3
- ○ There is no receiver strategy that guarantees successful communication for this sender.
- ○ a->2
b->1
c->3
- ☑ a->1
b->3
c->2

The order of these options will be different from what you saw, but the one I have ticked above is the correct option:
when the world is in state 1, the sender sends a, the receiver receives a and selects act 1;
when the world is in state 2, the sender sends c, the receiver receives c and selects act 2;
when the world is in state 3, the sender sends b, the receiver receives b and selects act 3.

2. Here is a receiver strategy :

a->1
b->2
c->1

Which of the following sender strategies will guarantee that the receiver will be able to select the correct act based on the sender's signal?

- ○ 1->a
2->b
3->a
- ☑ There is no sender strategy that guarantees successful communication for this receiver.
- ○ 1->a
2->b
3->c
- ○ 1->c
2->b
3->c

I think there is no sender who can communicate all 3 world states successfully to this receiver. The problem is that there's no way to get the receiver to select act 3, therefore the sender can never get the receiver to select the appropriate act when the world is in state 3.

3. Let's go back to a simpler world, where there are two states, two signals, and two acts. Assuming that the sender wants to communicate about both world states equally often, on average how often would the following sender and receiver communicate successfully?

Sender:
1->a
2->b

Receiver:
a->1
b-> *either* 1 *or* 2, selected at random every time

- ○ They will never communicate successfully
- ○ On average half the time
- ☑ On average three quarters of the time
- ○ They will always communicate successfully

This is a bit trickier.

Firstly, the two world states occur equally often, so half the time we'll be communicating about state 1, half the time about state 2.

For state 1, the sender sends a and the receiver selects act 1 - that's perfect communication all the time about world state 1 (which occurs half the time).

For state 2, the sender sends signal b. Based on signal b, the receiver selects act 1 or act 2 at random, i.e. on average half the time they will select act 1 (which leads to a failure to communicate) and half the time they will select act 2 (which is a success). So they communicate succesfully about world state 2 half the time.

Putting these together: 100% success on world state 1 which occurs half the time, 50% success on world state 2 which occurs half the time, means that they communicate successfully on three quarters (75%) of their interactions.

4. The sender-receiver game is intended to be a very simple model of communication. We are going to get quite a lot of mileage out of this model and, I think, derive some important insights about how more complex linguistic systems might emerge and evolve. But it's clearly inadequate as a model of human language. What do you think the single most important missing feature is? Use the text box below to say what this is and explain briefly why.

I'll be interested to see what you think about this!