The Targeting System of Language

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1. Overview
This talk is from a book now near completion that aims to unify deixis and anaphora
  as a single system of "targeting".

A speaker's attention can come to be on a particular entity, her "target",
  that she wants to communicate about to a hearer.
This target can be located near or far in either the speech-external (deictic)
  or the speech-internal (anaphoric) environment.
She thus needs the hearer to determine her intended target and have his attention on it
  jointly with her own at the relevant point in her discourse.
The problem: how to bring this about. She cannot somehow reach into the hearer's cognition
  and directly place his focus of attention on that target.

The solution: the speaker linguistically initiates a three-stage procedure in the hearer.
  At the relevant point in her discourse, the speaker places a "trigger" that starts this procedure.
English triggers include: *this/these, that/those, here, there, yonder, now, then, thus, so, such,
  yay, thisaway, thataway,* personal pronouns, relative pronouns, tense markers.

Stage 1: The trigger directs the hearer to find certain elements of information.
  These are "cues" to the target.
Such cues belong to ten distinct categories, representing ten different sources of information.

Stage 2: Equipped with the cues he has found,
  the hearer uses them in combination to determine the speaker's intended target.

Stage 3: Having determined the target,
  the hearer maps his concept of it back onto the trigger in the speaker's sentence.
In accord with the trigger's syntactic relation to the sentence,
    he relates this concept to the full conceptual content of the sentence.

This entire sequence is here called "targeting" and underlies both deixis and anaphora.
It covers the use of a trigger, the three stages (including the use of cues),
  and the cognitive processing of both speaker and hearer throughout.

2. Survey of the 10 cue categories
Cues fall into ten categories: five groups of two categories each.
  Every instance of targeting has cues from at least two different categories.
Any 2 cues can be a) compatible and

i) corroborate each other, providing the same information about the target, or
ii) complement each other, providing different information about the target;
or can be b) incompatible -- the case shown last.

A. The lexical cue categories

1. Core cues: cues to the target that the trigger is lexicalized to provide directly to the hearer,
   in addition to initiating the 3-stage targeting procedure in him.
Eg, a speaker says (1a) or (1b) to a visitor as they enter a lab with a woman and machines in it.

(1) a. She's new here.   b. These are new here.

The triggers *she* and *these* provide the core cues that the target is, respectively:
   a) uniplex, an entity, animate, female, third-person.
   b) multiplex, entities, proximal, third-person.
Combining these with targetive cues (see below), the hearer respectively singles out
   a) the woman / b) the machines as the speaker's intended target.

2. Co-form cues: cues to the target provided by constituents (co-forms) around the trigger.
Eg, A customer in a pet shop with just one parrot looks at the clerk and, without gesturing, says (2).

   (2) That's the kind of parrot I like.

The trigger *that* provides the core cues that the target is uniplex, an entity, distal, third-person.
   The word *parrot* provides the co-form cue that the target has the property of being a parrot.
Corroborated indications: The target is a uniplex entity.
   Complementary indications: The target is distal (from the trigger) and a parrot (from the co-form).
Combining these cues, the hearer singles out the one parrot in the shop as the target.

B. The bodily cue categories

3. Gestural cues: cues provided by a gesture produced volitionally by the speaker to help guide
   the hearer to the target = a "targeting gesture"
Proposal: On viewing a targeting gesture, a hearer cognitively generates an imaginal chain
   of fictive constructs that connect the gesture spatially with the target.
Eg, a host says (3) to a guest while pointing toward a bookshelf with one free area on it.

(3) You can put your glass down right there.

The trigger *there* provides the core cues that the target is a location and distal.
   Alone, these core cues are not enough, since there are many distal locations in the room.
The gesture leads the hearer to imagine an intangible line extending from the speaker's finger
   to the shelf: a gestural cue indicating that the target is in that region of space.
Co-form cues from the phrase *Put your glass down* indicate that the target is a horizontal surface.

Combining these cues, the hearer singles out the free shelf area as the speaker's intended target.

In a second example that invokes disambiguation, a speaker who says (4) to a friend,
    wants to target a woman standing beside a man across a crowded room.
The speaker points a finger toward the couple, but is too far away to pinpoint the woman specifically.
    This is "lateral ambiguity" in gesturing.

(4) She's the director of our lab.

The gestural cue rules in the couple and rules out everyone else in the room.
    But by itself, it is not enough information to single out the woman as the target.
The core cues from the trigger *she* that the target is uniplex, an entity, animate, female, third-person
    provide "lateral disambiguation", and narrow down to the woman of the pair.
Or, disambiguation in the reverse direction: The core cues from the trigger *she*
    rule in every third-person woman in the room as a target candidate while ruling out every man.
Then the gestural cue provides disambiguation, narrowing those candidates down to the woman in the pair.

4. Corporal cues: cues from the location of the speaker's body in space at the time of the trigger.
Eg, a speaker at a fairground booth, asked about the wherebouts of Fred, says (5) without gesturing.

(5) Fred was here earlier.

The trigger *here*, now in its corporal sense (some languages have a distinct morpheme for this sense),
    provides the core cue that the target is the region surrounding the speaker.
The corporal cue consists of the speaker's actual location, which the hearer perceives directly
    (or would imagine if, say, on the phone).
Combining these cues, the hearer singles out the region around the speaker as the targeted location.
    The speaker did not need to gesture, say, by pointing down to the ground in front of her.

C. The colateral cue categories: cues provided by the entities that the speaker talks to or about

5. Targetive cues: perceptual stimuli from the target itself that help lead the hearer to it.
    Two types -- absolute and relative:

a. Targetive content cues: perceptual cues that a target provides to its own identity
    or other intrinsic characteristic.
Eg, a farmer says (6) to a guest as they round his house onto a field with a tractor in the distance,
    without gesturing or looking at the tractor.

(6) That's my tractor.

The trigger *that* provides the core cues that the target is uniplex, an entity, distal, third-person.
The word *tractor* provides the co-form cue that the target has the identity of being a tractor.
The physical tractor in the field provides the visual stimulus of its own identity as a tractor.

This is the targetive content cue, which corroborates the co-form cue.
Combining all these cues, the hearer settles on the tractor as the target.

b. Targetive salience cues: perceptual cues from a target that make it salient
    relative to its environment. Such salience has three bases:
The target is unique there; it is more unfamiliar or unusual than other entities there;
    some of its attributes are more intense than comparable attributes also perceivable there.
Eg, at a lake, just after a long plaintive sound is heard,
    a speaker, without gesturing, says (7) to a companion.

(7) That's a loon.

The trigger *that* provides the core cues that the target is uniplex, an entity, distal, third-person.
The sound provides a targetive salience cue through its uniqueness in that ambience
    and its unfamiliarity to the hearer, tending to rule it in and other concurrent phenomena out.
The perichronal cue from the sound's temporal nearness to the trigger tends to rule it in
    as a target candidate, and rule earlier phenomena out.
Combining these cues, the hearer singles out the just-preceding unknown sound as the target.
    (This targeted sound is in a metonymic relation with the "loon" in the equational sentence.)

6. Hearer-focus cues: cues metacognitively available to a hearer that the target is her current object
    of attention, where both the object and her attention on it are visible to the speaker.
    Eg, a speaker seeing the hearer staring at a particular car says (8) to her.

(8) That's a Ferrari.

The trigger *that* provides the core cues that the target is uniplex, an entity, distal, third-person,
    and directs the hearer to find all other available cues.
But she finds no gestural cue, and no targetive cue from something greatly salient in the environment,
    so she metacognitively notes her own attentional focus and its visibility to the speaker.
Combining the present and absent cues, she settles on the car as the speaker's intended target.

D. The background cue categories

7. environmental cues: perceptual stimuli from the target's surroundings that help the hearer
    single it out. Two types: environmental content cues and environmental structure cues.
Environmental structure cues include delineations
    that partition a scene's elements and regions from each other.
Eg, atop a hill, the speaker says (9) to a hearer while pointing down at the middle of a lagoon.

(9) At night, mist forms there.

The trigger *there* provides the core cues that the target is a location and distal.
The speaker's pointing provides the gestural cue that the target lies

where an intangible line extending from the finger intersects with the lagoon.
But is the targeted location to be that one intersected point, or some larger area around it?
The hearer's general knowledge provides the epistemic cue that mist does not form at a single point,
    but over an area. But then, what area?
The hearer additionally perceives an environmental structure cue: the perimeter around the lagoon.
Combining these cues, the hearer settles on the whole surface of the lagoon as the targeted location.

8. epistemic cues: any information that a hearer derives from his own knowledge and beliefs
that helps him determine the speaker's intended target.

a. Knowledge about entities.
Eg, the speaker says (10) to a friend and points with lateral ambiguity toward two men in a train station,
    one of them looking older and the other younger than the speaker.

(10) That's my father.

The trigger *that* provides the core cue that the target is uniplex, an entity, distal, third-person.
Pointing provides the gestural cue that the target lies where the intangible line from the finger ends.
    But this is laterally ambiguous, so these two cues narrow the pool only down to the two men.
The word *father* provides the co-form cue that the target is a man who has sired a child,
    however, by itself, this cue does not distinguish between the two men.
But the co-form cue also activates the conceptual category `father' in the hearer's knowledge store.
    This provides the epistemic cue that a father is older by some years than his child.
The phrase *my father* provides the further co-form cue that the target is the father
    of the speaker herself.
Combining all these cues, the hearer determines that the target is the man in the pair of men
    who looks older than the speaker.

b. Knowledge about discourse.
Eg, the speaker says (11) to a friend and points with lateral ambiguity toward a giraffe and an ibex
    in a zoo compound.

(11) That's an ibex.

The core and gestural cues together indicate that the target is one of the two animals.
The hearer's knowledge of discourse management provides the epistemic cue that the speaker would not
    assert as newsworthy something that is already known.
The hearer reasons that he would be assumed to know what a giraffe is,
    and so concludes that the speaker's intended target is the other animal of the pair.

E. The temporal cue categories.

9. chronal cues: the location in time of the moment at which a trigger occurs.
    Eg, The speaker says (12) to a guest.

(12) The bathroom is free now.

The trigger *now* provides the core cue that the target is a temporal interval
 that passes through the trigger's own moment of occurrence.
The hearer determines the chronal cue simply by taking cognizance
 of the moment at which she just heard the trigger.
Knowledge about bathroom usage provides the epistemic cue that the length of the targeted interval
 is in minutes -- rather than, e.g., hours or years.
Combining these cues, the hearer concludes that the target is an interval some minutes long,
 centered around the trigger's occurrence.
The hearer then further temporally locates the cited state -- the bathroom's availability --
 as occurring throughout this interval.

10. Perichronal cues: cues to the target based on the time of occurrence of other cues.
They indicate whether the time of occurrence of a potential cue is close enough to that
 of a particular trigger for it to serve as a cue to that trigger's target.
Eg, the speaker, jogging along with the hearer, points leftward while saying (13a) and, a moment later,
 points leftward again while saying (13b).

(13) a. That's my car. b. And that's my sister's car.

Looking just at the (13b) event, the core cue from the trigger *that* and the co-form cue
 from the word *car* inform the hearer that the target is a single distal car.
The timing of the gestural cue from the second pointing movement,
 and the timing of the targetive cue from the car then on the left,
provide the perichronal cues that the occurrence of those two cues
 is close enough to the trigger's moment for them to be relevant to it.
But the previous pointing movement and the car it pointed at are ruled out
 as providing gestural and targetive cues relevant to the present trigger.
 Their time of occurrence is too distant from it.

3. Interaction of compatible cues to a speech-external target

Eg, a wife and husband stop in front of a gift shop with diverse items on a platform behind the window.
 He had wanted to know what the color puce looks like; she spots it in the display and says (14).

(14) Those boxes are puce colored.

Here, a single cluster of gift items appears in the front portion of the platform.
Three separate clusters are arrayed left to right along the rear portion of the platform.
The middle cluster in the rear includes some boxes that are red;
 some boxes that are of a hue which is unknown to the hearer -- hue number 1;
 a single box with unknown hue number 2; and some statuettes of unknown hue number 3.
The front cluster has some boxes of unknown hue number 4.

As she says (14), the speaker points with lateral ambiguity toward the rear middle cluster.

The following "regularized description", with discrete consecutive steps, is meant only to suggest
what the hearer's processing may include, itself to be determined experimentally.

a. One core cue from the trigger *those* is that the target is distal, ruling out anything proximal.
But this cue is topological, so it must await interaction with further cues.

b. The orientation of the speaker's head and body provides one gestural cue:
the target is situated within the corridor of space extending forward from her front.
This rules out all entities located outside this corridor as candidates for target status.

c. A potential environmental structure cue comes from the perimeter of the platform
lying immediately within the corridor.
It may be the boundary of the region in which the target is located.
If so, it would rule out all target candidates outside that boundary within the corridor.

d. Combined with this last cue, the "distal" cue from the trigger *those* loses its relativity.
This distal cue now rules in the rear portion of the platform and rules out the front portion.
The target thus cannot be in the cluster at the front of the platform,
and puce cannot be unknown hue 4 of the boxes in that cluster.

e. A second gestural cue from the speaker's pointing finger confirms the environmental and core cues:
the target is in the rear portion of the perimeter-bounded platform.
This cue also rules out both side clusters and rules in the middle cluster as the target's location.

f. A co-form cue from the morpheme *box* is that the target has the identity of being a box.
This rules out the statuettes in the cluster, but rules in the remainder.

g. A co-form cue from the suffix *-es*, corroborating another core cue from the trigger *those*,
is that the target is multiplex.
This rules out the single box of hue 2, but rules in the red boxes and the boxes of hue 1.

h. An epistemic cue from the hearer's knowledge of discourse principles is that
the speaker would not present as new information
something that her addressee would be assumed to know already, such as what red is.
This rules out the red boxes and rules in the boxes of unknown hue 1 as the target.

i. The associated perichronal cues rule in the current gestural, targetive, and environmental cues,
but rule out such cues from previous or upcoming stops at shop windows.

Combining all these cues, the hearer concludes that the target is the boxes of unknown hue number 1
in the middle cluster at the rear of the platform currently in front of him.

4. Interaction of compatible cues to a speech-internal target
In its speech-internal environment, an utterance consists of two types of components:
1) its formal components, including its morpheme, word, and phrase constituents,
     plus the grammatical relationships that these bear to each other;
2) its semantic components, including the meanings of these formal components and their relationships,
    plus their pragmatic implications.

Eg, a man and a woman are alone in a room. He says the consecutive utterances (15a) and (15b) to her.

   (15) a. My sister led her mare down the hill toward some cowboys. b. She was dappled.

A regularized description of the hearer's possible processing:
a. The core cues from the trigger *she* are: the target is uniplex, an entity, animate, female, 3d person.
The hearer herself has the first four of these properties, but not the fifth.
    The speaker would have said *you* if targeting her.
This rules out the hearer herself as the target, but rules in other females as target candidates.

b. The hearer might next check her speech-external environment for females.
    But there are no targetive content cues indicating a female there.
This rules out the speech-external environment as the target's location
    but potentially rules in the speech-internal environment, that is, the discourse.

c. Perichronal cues from this discourse increasingly rule out portions of it the further they are
    in time from the trigger's occurrence and increasingly rule in portions the closer they are.
They may finally narrow the location of the target down to the utterances in (15),
    and rule out utterances outside them.

d. The formal components of (15a) include four noun phrases, a verb, and two prepositions,
    plus their contained and containing constituents and all their grammatical interrelationships.
Those of (15b) include a trigger, a verb, and an adjective,
    plus their grammatical relationships.
The core cue from the trigger *she* that the target is animate rules out all these formal components
    because they are not animate. But it potentially rules in some semantic components.

e. The semantic components of (15a) include the speaker's sister, her mare, a hill, some cowboys,
    an act of leading, and a path of descent and approach, among other indications and relationships.
Those of (15b) include a quality of dappledness and (from the trigger) a directive to find a target
    plus core cues to that target.
The core cue that the target is animate also rules out all the semantic components of (15b),
    none of which are animate, leaving only those of (15a).

f. The core cue from *she* that the target is an entity, applied to the semantic components of (15a),
rules out the act of leading and the path of descent and approach,
    and rules in the sister, her mare, the hill, and the cowboys.

g. The core cue that the target is animate rules out the hill, leaving the sister, mare, and cowboys.

h. The core cues that the target is uniplex and female rules out the cowboys, leaving sister and mare.

i. The adjective *dappled* provides the co-form cue that the target is dappled. But it has two meanings:
    [1] spots of different shades intrinsically present on the skin or fur of a nonhuman animal;
    [2] spots of light being reflected off of any surface.
Meaning [2] does not distinguish between the two remaining candidates since they both present surfaces.

j. An epistemic cue from the hearer's linguistic knowledge is that, for meaning [2] to be in effect,
    the adjective must be accompanied by a phrase referring to light or shade, as in (16).
But such a phrase is absent, ruling out meaning [2] and ruling in meaning [1].
    But meaning [1] applies only to nonhuman animals, ruling out the sister. The mare is thus the target.

    (16) My sister was dappled in the sunlight (that filtered through the leaves of the trees).

Combining all these cues, the hearer thus concludes that the target is the referent of the word *mare*
    in the speaker's current utterance, itself within the speech-internal environment.

5. Interaction of incompatible cues to a speech-external target

Above, a speaker's cue types were all compatible, corroborating or complementing each other.
    Here, the speaker purposely has certain cue types incompatible with others,
    leading the hearer to reconcile them so as to determine the target.
First, 2 unconflicted examples: a woman across a restaurant table from a man says (17a or b) to him.

    (17) a. I've got something in my teeth right here.
        <she touches her finger to the right side of her own teeth.>
      b. You've got something in your teeth right there.
        <she leans across the table and points her finger at the right side of his teeth.>

But now a hybrid of the preceding two examples, with incompatible cue types, yet equivalent to (17b).

    (18) You've got something in your teeth right here.
        <she touches her finger to the right side of her own teeth.>

The hearer's processing here has three phases.
A. The cue assembling phase, where he finds the following cues:
The core cue from the trigger *here* indicates that the target is a location proximal to the speaker.
The manual gestural cue from the speaker's pointing finger indicates that
    the targeted location is a spot on the right side of her teeth.
An environmental structure cue indicates that the speaker's body is the setting for the targeted location.
An ocular gestural cue -- where the speaker looks -- indicates that the targeted location is at the hearer's mouth.
A co-form cue from the phrase *in your teeth* indicates that the targeted location is at the hearer's teeth.

B. The cue assessment phase, with three operations.

1) Consistency checking: examines the cues for their mutual compatibility,
   based on principles such as plausibility.
Here, at face value, the cues together suggest an implausible conception -- eg, some of the hearer's teeth
   are in the speaker's mouth -- hence some of the cues are in conflict.

2) Clustering: segregates the cues into groups that are each internally compatible
   but that are incompatible with each other.
Here, the co-form cue and the ocular gestural cue are compatible with each other in one group,
   both indicating that the targeted location is at the hearer.
Incompatible with this first group is a second group -- the core, manual gestural, and environmental cues,
all compatibly indicating that the targeted location is at the speaker.

3) Evaluation: assigns opposite states of validity to the two incompatible groups
   on the basis of principles not yet fully worked out.
This operation yields the result that the two cues in the one group are "valid",
   and the three cues in the other group are "anomalous".

C. The resolution phase: the hearer retains the valid cues, and adjusts the anomalous cues.
   "Mapping" is the main operation in this adjustment.
Here, the hearer imaginally translates the location on the teeth in the speaker's body
   to the structurally homologous location on his own body.
A "rotational" mapping targets a location on the right side of his teeth.
  A "reflective" mapping targets a location on the left side.

After the resolution phase, the five cues in consideration are all mutually compatible,
   as they would have been at the outset if the speaker had instead said (16b).

References
   -- Note: all my published work can be found on my website:
   http://linguistics.buffalo.edu/people/faculty/talmy/talmy.html

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