LACUS FORUM XXXVII

Communication and Cognition: Multidisciplinary Perspectives

McMaster University

Reprint

LACUS Forum 37 Referees

Barbara Bacz
David C. Bennett
Lucas van Buuren
Douglas W. Coleman
Kara VanDam

Patrick Duffley
Connie Eble
Sheila Embleton
John Hewson
ShinJa Hwang

Michael Kliffer
Sydney M. Lamb
Alan K. Melby
Robert Orr
Alex Sévigny

H. Stephen Straight
William J. Sullivan
Patricia Casey Sutcliffe
Bernard Sypniewski
Sarah Tsiang

Reprinted from LACUS Forum XXXVIII:
Editors: Patricia Casey Sutcliffe, Michael D.Kliffer, Alex Sévigny, William J. Sullivan & Dan Mailman
Publisher: Studio MindStride / Houston TX

Reprinted from LACUS Forum XXXVIII:
Editors: Patricia Casey Sutcliffe, Michael D.Kliffer, Alex Sévigny, William J. Sullivan & Dan Mailman
Publisher: Studio MindStride / Houston TX

LACUS FORUM XXXVII

COMMUNICATION AND COGNITION: MULTIDISCIPLINARY PERSPECTIVES

EDITED BY

Michael D. Kliffer
Alex Sévigny
Patricia Casey Sutcliffe
William J. Sullivan
Daniel S. Mailman

Reprinted from LACUS Forum XXXVIII: Communication and Cognition: Multidisciplinary Perspectives
Editors: Patricia Casey Sutcliffe, Michael D.Kliffer, Alex Sévigny, William J. Sullivan & Dan Mailman
Publisher: Studio MindStride / Houston TX

XII

Hard-Science Linguistics

Reprinted from LACUS 37: Communication and Cognition: Multidisciplinary Perspectives
Editors: Patricia Casey Sutcliffe, Michael D.Kliffer, Alex Sévigny, William J. Sullivan & Dan Mailman
Publisher: Studio MindStride / Houston TX

Reprinted from LACUS 37: Communication and Cognition: Multidisciplinary Perspectives
Editors: Patricia Casey Sutcliffe, Michael D.Kliffer, Alex Sévigny, William J. Sullivan & Dan Mailman
Publisher: Studio MindStride / Houston TX

ORTHOCONCEPTS: HOW THE PROPERTIES THEY REPRESENT ARISE

Douglas W. Coleman
University of Toledo

Bernard Sypniewski
Rowan University

Abstract. The orthoconcept was introduced into Hard Science Linguistics as a way to describe properties of a physical reality formed in an observer. An orthoconcept is not a concept in a logical-domain sense but attempts to explain a person's understanding in physical-domain terms. An orthoconcept thus is a theoretical representation of a property of a person communicating; it does not necessarily correspond to something external to that person. We consider how orthoconcepts arise as a result of a combination of external events and the expectations of the person. The different understandings of a believer and a skeptic at a séance are used to illustrate how this can occur.

Keywords: Lies, Lying, Truth, Hard-Science Linguistics, Human Linguistics, Orthoconcepts

Languages: English

The orthoconcept was introduced into hard-science linguistics as a way to describe "properties of a real observer that model a physical reality and require an observer in which to form" (Yngve 2006:268). An example of this is shown in (1) - (3). Suppose we have a situation in which Mary calls to John from the next room and asks if the light is on. John sees the overhead light and a light switch. Following the notation of Yngve (2006), we would model the relevant aspects of this situation as a linkage (l) consisting of two participants (which we model as [Mary] and [John]) and two props (which we model as [light] and [switch]). The participants and props model physical subsystems of the larger physical system modeled by the linkage.

(1) [Light Query] = [Mary] + [John] + [light] + [switch]

John is not only engaged in the event as one of the people communicating but is also an observer of the situation, a fact which we describe in terms of an observer linkage in (2a) and a corresponding property of the role part [John-observer] within that observer linkage in (2b). Note the role part [John-observer] is the functional aspect of John as a part of the observing linkage [Obs Light Query]. As Yngve has shown elsewhere (2006), orthoconcepts are best handled as properties of observer role parts.[1]

[1] This is an appropriate point at which to clarify the key distinction between participants and role parts in a Hard-Science Linguistics model. A participant is a model of a physical subsystem within a linkage model — specifically, a model of a person as a physical system. In contrast, a role part is a model of the physical cause-effect aspect(s) of that person within the larger system. An example, would be when either of two different people enters into a system (modeled as a linkage) with the same cause-effect potentials within that system (e.g., as a customer in a check-out line, modeled as the role part [customer]).

Reprinted from LACUS 37: Communication and Cognition: Multidisciplinary Perspectives
Editors: Patricia Casey Sutcliffe, Michael D.Kliffer, Alex Sévigny, William J. Sullivan & Dan Mailman
Publisher: Studio MindStride / Houston TX

(2) a. [Obs Light Query] = [John-observer] + [Light Query]
b. [John-observer]<[Light Query] = [Mary] + [John] + [light] + [switch]>

In HSL notation, brackets [ ] identify systems / subsystems and pointed brackets < >, properties of systems / subsystems. The general form to identify a system and one of its properties is [System Name]<Property Name>.

A property of the linkage [Light Query] might include whether it is in progress or not at a given time. We would represent such a linkage property as [Light Query]<in progress> or [Light Query]<-in progress> (the minus sign "-" indicating Boolean false).

A property of the switch as in the on or off position could be represented as a property of the prop [switch], a subsystem of [Light Query], thus, as [switch]<in on position> or [switch]<-in on position>.

[John-observer]<[Light Query] = [Mary] + [John] + [light] + [switch]> explicitly identifies <[Light Query] = [Mary] + [John] + [light] + [switch]>, the orthoconcept, as a property of [John-observer].

Here we are modeling John's understanding of the communicative interaction in which he is taking part, but doing so in terms of the physical-domain systems involved, without creating entities by assumption. Thus, an orthoconcept is not a concept in a logical-domain sense. Rather, it attempts to explain a person's understanding in physical-domain terms, rather than in the logical-domain terms of a concept.

Following Yngve (2006), if John understands the light to be off (not on), we describe this in terms of John having a certain property which we describe in the role part [John-observer].[2] See (3).

(3) [John-observer]<[light]<-on>>[3]

To sum up what is being shown in (1) – (3): (1) models John and Mary communicating about the state of the light, (2a) relates John's understanding of this interaction to the interaction itself, and (2b) models John's overall understanding of the interaction.

One might infer from this model that the orthoconcept

[John-observer]<[light]<-on>>

[2] The reader may wonder why we do not simply make the observer role part a subsystem of the linkage [Light Query] instead of modeling a separate observing linkage. There are cases, however, in which one can have an understanding of (be an observer of) a linkage in which he/she is not taking part. Yngve (2006) gives the example of a person watching a game of tag who has an understanding of who is "it", even while not being a player in the game. Thus we adopt the approach of using a separate observing linkage in all cases simply because it provides a single, general solution.

[3] The following is *very important* to note. In (1), [light] and [John] model physical subsystems within the linkage modeled as [Light Query]. However, in (3) "[light]" is part of the representation of a property of John, that is, his understanding of the state of the light: <[light]<-on>>; it does not model a physical system. The importance of this becomes clear below.

Reprinted from LACUS 37: Communication and Cognition: Multidisciplinary Perspectives
Editors: Patricia Casey Sutcliffe, Michael D.Kliffer, Alex Sévigny, William J. Sullivan & Dan Mailman
Publisher: Studio MindStride / Houston TX

as a property of [John-observer] in [Obs Light Query] is somehow derived directly from the property of the prop [light] in [Light Query]. Yngve (MS in progress) recently has elaborated on the construct of orthoconcepts first presented in Yngve (2006) by saying,

> not only does formalizing the observer give us 'concepts' (orthoconcepts) in the observer of what is being observed, it gives us 'attribution' or 'predication' of properties that the observer expects and confirms in expectation procedures executed during the observing (here hearing). The properties that get 'predicated' here come from 'connotations' but they don't have to. They could come from any property expected as a result of hearing or seeing etc.

Take the case of John and Mary discussing whether the light is on. According to the earlier view (as elaborated by Yngve just above), this allows us to describe an orthoconcept like

[Mary-observer]<[light]<on>>

even when the light is in fact off. The property that is being predicated (represented by [Mary]<[light]<on>> in an observing linkage with Mary as observer) does not have to come from the actual state of affairs (represented by <[light]<-on>> in the original linkage of which [Mary] is included).

In many cases, this seems to work very well in explaining many aspects of behavior when people are communicating (Yngve 2006, Sypniewski & Coleman 2010, Coleman 2010). But we must be careful what we mean when we refer to an OBSERVER LINKAGE. As we will show, we cannot directly derive an orthoconcept in the observer linkage from something in the linkage that models the original assemblage[4] of people and objects being observed.

1. OBSERVATIONS AND THE OBSERVER. There are cases in which people behave as if something were out there to observe when it is in fact not present in the physical domain. For example, if two people are at a séance, one a skeptic, the other a believer in the occult, their communicative behavior will differ greatly if they hear a rapping noise from under the table and a third party asks, "What was that rapping?" Following Yngve (2006), we would describe this via a linkage and two observing linkages.

(4) [Séance] = [medium] + [skeptic] + [believer] + [table]

The linkage [Séance], shown in (4), describes the physical system of interest. Within it, we see four physical subsystems of special interest. Three are the people involved, which we model as the participants [medium], [skeptic], and [believer]. The fourth subsystem of interest is the table, which we model as the prop [table].

(5) [Obs Séance B] = [believer-observer] + [Séance]

[4] The term ASSEMBLAGE refers to the actual physical system (not our model of it), consisting of the people communicating, relevant physical objects, other parts of the surroundings, and the energy and means of energy flow. In HSL, a linkage is a model of an assemblage as a whole. We model the physical subsystems of the assemblage as participants, props, the setting, and channels, respectively. We model the functional cause-effect aspects of these physical subsystems as role parts, prop parts, setting parts, and channel parts.

Reprinted from LACUS 37: Communication and Cognition: Multidisciplinary Perspectives
Editors: Patricia Casey Sutcliffe, Michael D.Kliffer, Alex Sévigny, William J. Sullivan & Dan Mailman
Publisher: Studio MindStride / Houston TX

We can describe an observing linkage for the believer ([Obs Séance B]), shown in (5). Now suppose that during the séance there is a rapping sound in the darkened room. While the skeptic will probably attribute the sound to some chicanery on the part of the medium, the believer is far more likely to attribute the sound to a supernatural agency, i.e., a spirit. We describe this understanding of the believer in terms of a property of our model of the believer as observer, that model being [believer-observer]. This property is represented as [believer-observer]<[spirit]<rapping>>. In the observer role part we use to model the skeptic as observer, on the other hand, there is no equivalent orthoconcept. Rather, there is one we would represent as [skeptic-observer]<[medium]<rapping>>.

Linkage	[Séance]		**Linkage**	[Obs Séance B]
Participants	[medium] [skeptic] [believer]		**Role Part**	[believer-observer]
Prop	[table]		**Observed Linkage**	[Séance]
Channel	[rapping]			
(a)			**(b)**	

Figure 1. The Linkages [Séance] and [Obs Séance B] and Their Key Parts.

It is clear that in the case of the believer, we cannot follow a line of inference that derives [believer-observer]<[spirit]> from a system [spirit] in [Séance], since no such system exists there (See Figure 1; refer also to footnote 3.). Orthoconcepts in observer linkages cannot be directly derived from the ordinary linkages with which they are associated. Rather, they must arise as a result of a person's properties in response to contemporaneous events in the person's environment. Our model must properly describe that, as we will see below.

2. Observing and expectation. During the séance, the skeptic and the believer have different expectations: the believer expects a spirit; the skeptic expects chicanery. In HSL, we can model how these expectations result in different understandings in the two people as to what is or is not present in their environments.

2.1. Expectations involving orthoconcepts. Let us suppose that under certain circumstances the believer is likely to expect the presence of a spirit. These circumstances might include attending a séance, being in a house said to be haunted, and so on. We can describe such an expectation via an expectation procedure (Yngve 1996:263-64). The generic form for an expectation procedure is shown in Boolean notation in (6), as a group of setting and control procedures. These are explained one at a time, below.[5]

(6) a. set :: expectation
b. event :: -expectation
c. expectation : del-exp, Δt_1
d. -expectation x del-exp : next[6]

[5] Setting procedures are indicated with a double colon "::", control procedures with a single colon ":".

[6] In HSL notation, "x" indicates Boolean and. This should not be confused with "+" in linkage

Reprinted from LACUS 37: Communication and Cognition: Multidisciplinary Perspectives
Editors: Patricia Casey Sutcliffe, Michael D.Kliffer, Alex Sévigny, William J. Sullivan & Dan Mailman
Publisher: Studio MindStride / Houston TX

In (6a), *set* represents the condition which creates the expectation; (6a) as a whole is called a SETTING PROCEDURE. A setting procedure indicates that when the expression on the left becomes true (changes from false to true), the property on the right becomes true. The property on the right does not automatically revert to false when the expression on the left changes back to false. Thus, when *set* becomes true, *expectation* is set to true. In (6b), the occurrence of the expected event (*event* becoming true) fulfills the expectation; that is, it sets *expectation* to false. In (6c), we see what is termed a control procedure. In a control procedure, the value of the expression on the left controls the value of the property on the right. Hence, in (6c), the value of *expectation* is matched by the value of *del-exp*. However, there is a time delay on *del-exp* (indicated by Δt_1) such that when *expectation* changes to false, del-exp will change to false only after the time Δt_1 has elapsed. In (6d), we see another control procedure. When the expectation is satisfied (when *expectation* goes back to false) AND ("x") *del-exp* is still true, *next* becomes true for the period remaining in Δt_1.[7]

Here is the expectation procedure for our believer, showing how it gives rise to the believer's understanding that there is a spirit present (7). Material in /* */ explains the HSL notation in ordinary prose. Further explanation follows in the next paragraph.

(7) a. <location/séance> :: <expect spirit>
/* at a seance, the believer expects a spirit */

b. <hear/rapping> v <hear/moan> v <see/shadow> :: <-expect spirit>
/* rapping, moaning, shadows fulfill the expectation */

c. <expect spirit> : del-exp, Δt_1
/* while the spirit is expected, set a delay on extinguishing the expectation, Δt_1 */

d. <-expect spirit> x del-exp :: <[spirit]<in contact>>
/* when the expectation is fulfilled and waiting, understanding of the situation includes that a spirit is in contact */

e. <-location/séance> :: <-[spirit]<in contact>>
/* when the believer leaves for another location, his understanding that a spirit is present returns to false */

In (7a-e) we see an expectation procedure to describe the believer's expectation that a spirit will be present in the environment. It models an aspect of the role part of the believer, [believer-observer], as an observer in the linkage [Obs Séance B]. In (7a), we represent the creation of the expectation when [believer] is in the setting [séance]. We state this by means of the property <location/séance>. One possible setting is given here, but the list could be much longer (including houses believed to be haunted, graveyards, so-called reality programming on TV about the occult, etc.), or could be stated in terms of a property or set of properties common to the settings instead of by listing the settings themselves. In (7b) some possible events which ful-

definitions, used to indicate the part / whole relation of subsystems to a system.

[7] Thus, without the delay in Δt_1, there would be no overlap in *-expectation* and *del-exp* being TRUE, and no output value of TRUE would be produced at the end of the expectation procedure. The output of true is needed to signal that the expectation procedure has completed and it is time for the next procedure to be performed.

Reprinted from LACUS 37: Communication and Cognition: Multidisciplinary Perspectives
Editors: Patricia Casey Sutcliffe, Michael D.Kliffer, Alex Sévigny, William J. Sullivan & Dan Mailman
Publisher: Studio MindStride / Houston TX

fill the expectation are stated; these could include hearing rapping or a moan, seeing a shadow, and so on. The control procedures in (7c) and (7d) limit the timing during which the expectation can be fulfilled.[8] The fulfillment of the expectation results in the activation of the property <[spirit]<in contact>> by setting its value to true.

As a property of the role part [believer], <[spirit]<in contact>> is the orthoconcept [believer]<[spirit]>. That is to say, what we show explicitly here in theory is that the orthoconcept arises as a result of a combination of external events and the expectations of the person. Above, note that (7d) is given as a setting procedure (note the double colon "::") rather than a control procedure (which would be indicated by a single colon ":"). This is because the orthoconcept [believer]<[spirit]> is activated by this expectation procedure (sets its Boolean value to true) and remains active until some other change in conditions — such as a change in the setting to one in which a spirit is not expected — deactivates it (resets its value to false). This is indicated in (7e), which resets the orthoconcept [believer]<[spirit]> back to Boolean false when the believer moves to a setting in which a spirit is not expected.[9]

2.2. Expectations involving 'attributions' (properties in orthoconcepts). Being at a séance creates an expectation in the believer that a spirit may be observed. When a rapping sound is heard and no obvious cause can be determined, the believer is likely to attribute the rapping to the action of a spirit.

In HSL, we describe the rapping sound in terms of a channel:

> A *channel* is a representation in linguistic theory of the physical means of energy flow and the energy flow itself in an assemblage that includes just those properties that are required to account for the communicatively relevant energy flow in the assemblage (Yngve 1996:128).

Thus, we can model the rapping sound by the channel [rapping], a part of the [Séance] linkage we might elaborate as (8). See also Fig. 1 (a), above.

(8) [Séance] = [medium] + [skeptic] + [believer] + [table] + [rapping]

We can model the sensation of the channel [rapping] in the believer as an orthoconcept of [believer], (9).

(9) [believer-observer]<[rapping]>

We must be careful to distinguish between the physical energy flow, which we model as the channel [rapping], and the believer's understanding of it, which we model as the orthoconcept [believer]<[rapping]>.[10] To see why, consider the believer's understanding of the cause of the rapping sound: he believes it to be the action

[8] The timing depends on a number of factors at different levels of description, for example, attention due to salience of the stimulus (where change blindness might be involved, for example), general rate of decay of signals at the neurological level, and so on.

[9] For example, the believer might see a pen levitating over a table during a séance and understand a spirit to be the cause. The same person, in a science classroom, however, would be likely to interpret the pen's behavior as a trick arranged by the science teacher (e.g., by lifting it with magnets).

[10] See also Yngve (1996) discussing "People, Sound Waves, and Illusions", esp. pp. 1-3).

Reprinted from LACUS 37: Communication and Cognition: Multidisciplinary Perspectives
Editors: Patricia Casey Sutcliffe, Michael D.Kliffer, Alex Sévigny, William J. Sullivan & Dan Mailman
Publisher: Studio MindStride / Houston TX

of a spirit, even if it is actually the medium using a device hidden under the table or concealed under clothing.[11] Thus we would distinguish (10a), an actual property of the assemblage modeled as a channel in the linkage, from (10b), an orthoconcept including the believer's attribution of a property to a sensation.

(10) a. [rapping]<source/[medium]<rap with stick>>
b. [believer]<[rapping]<source/[spirit]<rap psychokinetically>>>
c. [skeptic]<[rapping]<source/[medium]<rap with stick>>>

In (10a), we model the actual source of the rapping sound as a procedural property of the medium, [medium]<rap with stick>. In (10b), we model the believer's understanding of the source of the rapping sound as a spirit using supernatural powers to affect the physical domain.

In (10c), we model the skeptic's more accurate understanding of the source of the rapping sound; it seems to mirror (10a). But this is not to say it can in some sense be directly derived from (10a) or that expectation is absent as a key factor in the skeptic's understanding. The skeptic's past experience with mediums is likely to create an expectation that the medium in this séance is faking the noise. This is represented in (12) as an aspect of the role part [skeptic-observer] in the observing linkage [Obs Séance S] (11).

(11) [Obs Séance S] = [skeptic-observer] + [Séance]

(12) a. <location/séance> :: <expect trickery>
/* if at a séance, be ready to identify trickery from the medium */
b. <hear/rapping> v <hear/moan> v <see/shadow> :: <-expect trickery>>
/* hearing rapping or moan, seeing a shadow fulfills the expectation of trickery */
c. <expect trickery>>> : del-exp, Δt_1
/* while trickery is expected, wait (delay the expectation) */
d. <-expect trickery>>> x del-exp :: <id>
/* when the expectation is fulfilled and waiting, proceed to id */

The skeptic's understanding of the trickery performed by a medium would depend on his experience and might include devices to fake supposedly supernatural noises, to levitate the table or other objects, to release odors, and so on; see (13).

(13) [skeptic-observer] <identify trickery> =|<id> x <hear/rapping> ::
<[medium]<rap with stick>>,
<id> x <hear/moan> :: <[medium]<fake/moan>>,
<id> x <feel/table levitate> :: <[medium]<lift/table>>,
<id> x <smell/odor> :: <[medium]<release/odor>>,
(etc.)

In (13), the selection procedure [skeptic-observer] <identify trickery> is used to model the skeptic's attribution of the cause of purportedly supernatural events during

[11] A very simple example is an apparatus concealed in the table which the medium can operate with one foot, making a rapping sound on the table top, far enough from where he is sitting that it appears he cannot be the cause.

Reprinted from LACUS 37: Communication and Cognition: Multidisciplinary Perspectives
Editors: Patricia Casey Sutcliffe, Michael D.Kliffer, Alex Sévigny, William J. Sullivan & Dan Mailman
Publisher: Studio MindStride / Houston TX

the séance. A selection procedure consists of a series of control procedures. It selects among a set of possible outcomes. Here, the possible outcomes are <[medium]<rap with stick>>, <[medium]<fake/moan>>, <[medium]<lift/table>>, <[medium]<release/odor>>, etc. The selection is based on which condition is present <hear/rapping>, <hear/moan>, <feel/table levitate>, <smell/odor>, etc., respectively. The selection is made only when <id> has been set to true (note the logical AND represented by "x").

3. Concluding remarks. Above, we have cases where different people hear the same noise but interpret it in completely different ways based on their expectations. It is not simply that they expect different events; their expectations create very different understandings of what is present in the assemblage. We have modeled this in terms of different sets of orthoconcepts attributed with different properties. HSL allows us to show explicitly within the theory how orthoconcepts arise as a result of a combination of external events and the expectations of the person.

REFERENCES

Coleman, Douglas W. 2011. *"Theory of Mind" in hard-science linguistics.* LACUS forum 36.91-99.

Sypniewski, Bernard. 2010. *Expectations.* Paper presented at LACUS Forum 36, Hamilton, ON, July 20-24.

—, & Douglas W Coleman. 2011. *Lies and lying in hard-science linguistics.* LACUS Forum 36.291-98.

Yngve, Victor H. 1996. *From Grammar to Science: New foundations for general linguistics.* Philadelphia: John Benjamins.

—. 2006. *Formalizing the observer in hard-science linguistics.* LACUS forum 32:267-76.

—, (with contributions by Patricia Casey Sutcliffe, Bernard Paul Sypniewski, and Lara Burazer). MS in progress. *Galileo's Gift and a New Science of Communicating.* Electronic typescript.

Reprinted from LACUS 37: Communication and Cognition: Multidisciplinary Perspectives
Editors: Patricia Casey Sutcliffe, Michael D.Kliffer, Alex Sévigny, William J. Sullivan & Dan Mailman
Publisher: Studio MindStride / Houston TX