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THE ROLE OF JOINT CONTROL IN THE DEVELOPMENT OF NAMING

BARRY LOWENKRON

CALIFORNIA STATE UNIVERSITY, LOS ANGELES

In my earlier comments (Lowenkron, 1996), I pointed out that Horne and Lowe's (1996) account of the naming relation seems to be deficient in explaining how novel stim-

uli come to be selected in response to their names after the names are learned as responses to the stimuli. I also suggested that this deficiency could be remedied, and several strengths could be gained, by appreciating the role *joint control* plays within the naming relation. Lowe and Horne (1996, p. 318), however, assert that applying the joint control account to the naming relation involves two problems: first, that it engenders an anachronism with respect to the order in which the

Preparation of this article was supported by Grant HD 29232 from the National Institute of Child Health and Human Development. I thank Michael Hixon for his clarifying comments on some issues that appear here.

Address correspondence to Barry Lowenkron, Department of Psychology, California State University, Los Angeles, Los Angeles, California 90032.

component responses develop, and second, that the notion of joint control is merely redundant with the notion of the naming relation. I argue here that neither assertion is correct. Interpreting the development of generalized stimulus selection in terms of the role of joint control does not involve an anachronism, nor is the account redundant with the naming account. Rather, appreciating the role of joint control allows for an account that is significantly more explicit and far more general than the naming account.

*Does the Joint Control Account
Stumble on an Anachronism?*

As described earlier (Lowenkron, 1996, p. 253), when it is under joint control, the selection response is actually an *autoclitic* that reports which comparison stimulus brings the currently rehearsed sample topography under joint control. Thus, as illustrated there (Lowenkron, 1996, Figure 1, Panel A), when a person is vocally instructed to find the printed number sequence 135476 from a list of six-digit sequences, he or she will rehearse that topography (“135476”) as a self-echoic while perusing the list. When the correct sequence is encountered, any further rehearsals of the topography occur under joint control, for now, in addition to self-echoic control, the rehearsed topography is also (i.e., jointly) emitted under the *tact* control produced by the printed sequence on the page. By pointing to the printed number sequence that initiated this change from self-echoic to joint self-echoic/tact control, the person selects the sequence specified by the original spoken numbers. The pointing response is thus an autoclitic, because it reports to the observer about an event (the onset of joint control) that affected the verbal behavior (the rehearsed topography) of the speaker (Lowenkron, 1991).

Now Horne and Lowe (1996) document the fact that children learn to select objects in response to spoken words before they learn other verbal responses. Because the joint control account has the selection response as an autoclitic, Lowe and Horne (1996) observe that the joint control account seems to require that children learn autoclitic responses before they learn other responses. This, they argue, would involve an anachronism because autoclitics report

about stimulus control over other responses. Therefore, these other responses must develop first.

Their observation is not unreasonable given the brevity of my earlier account, but neither is it correct. The actual course of development of joint control, and its relation to the naming relation, may be seen most clearly by tracing through Horne and Lowe’s (1996) own account. Thus, the first panel in Figure 1 illustrates the three primary verbal relations and their order of occurrence as documented by Horne and Lowe. The first repertoire infants acquire consists of the *unmediated selection* of stimuli in response to their names. Later (up to several months), children acquire vocal responses in the form of echoic and self-echoic behavior (the second repertoire) and tacts (the third repertoire).

Now we come to the crucial question. What happens next, so as to move the child from these simple operants to the generalized semantic processes attendant to language usage? Horne and Lowe (1996, p. 200) provide one account by postulating the emergence of the higher order naming relation. Another possibility is illustrated in Figure 1 (Panel II): In an environment more complex than the one in which the unmediated selection response was originally trained (i.e., with more alternatives available, or with delays until named objects appear), the sample name is given. To maintain the sample in this complex environment, the child rehearses it as a self-echoic (Panel IIA) while searching for the named object (Michael, 1996). When the sought-after object is encountered, the onset of joint control occurs as the child emits a self-echoic that is now also a tact for that object (Panel IIB).

Here is where the anachronism is resolved. As a result of the prior training in unmediated selections of this and other objects in response to their names (e.g., Figure 1, Panel I), the child now selects the named object here, and doing so is reinforced (Panel IIC). As a result, the selection of an object that evokes a tact that enters into joint control with the currently rehearsed self-echoic is adventitiously reinforced (Panel IID). If this same process were to continue with many other objects, whereby the subject rehearses their names while seeking them out, emits the name under joint tact/self-echoic control

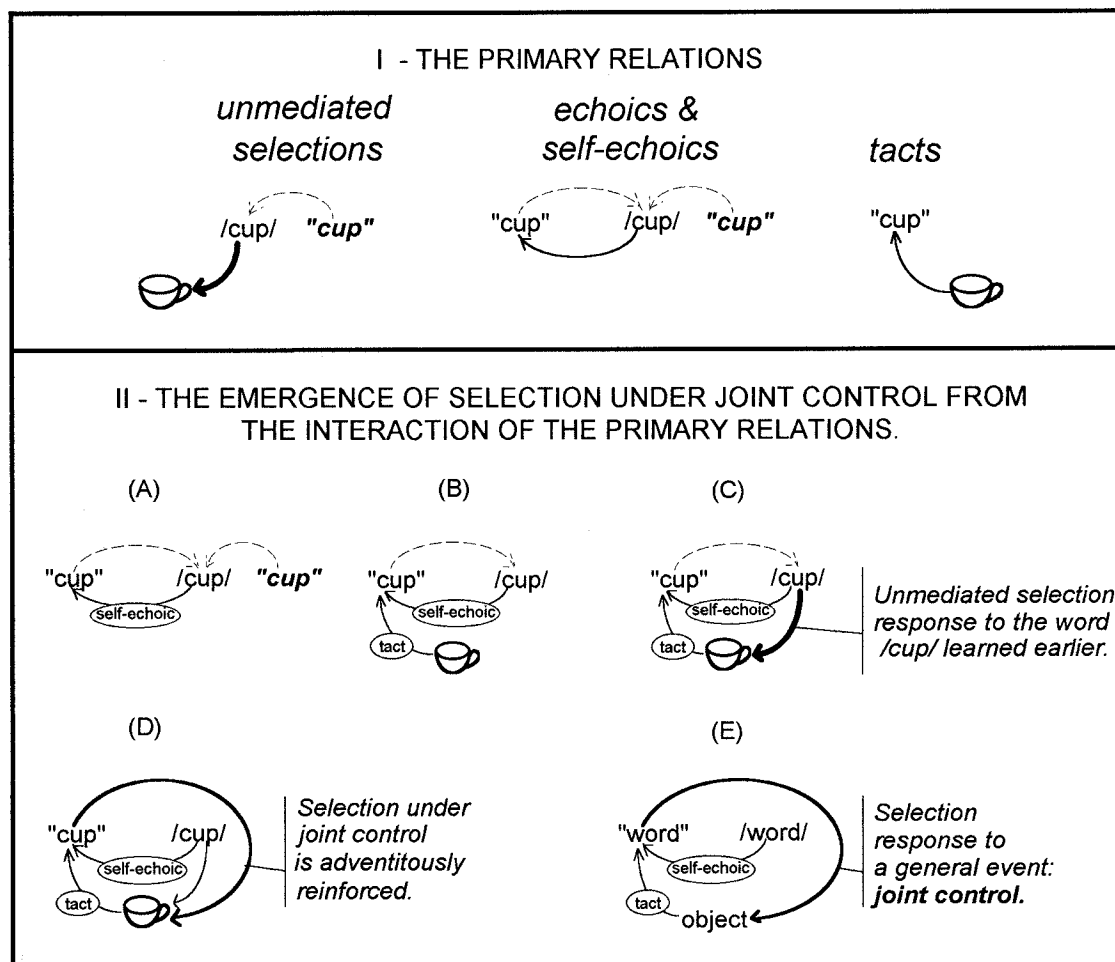


Fig. 1. The development of selection under joint control. Words spoken are denoted as "cup," and words heard by the subject are denoted as /cup/. Solid lines indicate responses, and dashed lines indicate auditory productions. Panel I: the three primary verbal repertoires. Panel II: the interaction of the three primary verbal repertoires to produce selection under joint control. (A) In a selection task, upon hearing /cup/, the child rehearses it as a self-echoic. (B) When a cup is encountered (for which the child previously acquired the word *cup* as a tact), the child's rehearsal now occurs under joint tact/self-echoic control. (C) As a result of the prior training in the unmediated selection of the cup in response to the heard word /cup/, the child now selects the cup. (D) Selecting the cup results in adventitious reinforcement for selecting a stimulus that evokes a tact that enters into joint control with the topography of the current self-echoic. (E) After experience selecting several stimuli under joint control, stimulus control of the selection response transfers from the unmediated selections illustrated in Panel I to the generic joint control event, so that any object evoking a tact that enters into joint control with the current self-echoic will be selected by the now autoclitic selection response, thereby producing generalized selection (the name-object relation) to any stimulus that evokes a consistent tact (the object-name relation).

when the object is encountered, and selects the object because of the earlier, unmediated, selection training, one could reasonably expect that stimulus control of the selection response would transfer from the individual objects to the generic, joint control event itself (Panel IIE). There is thus no anachronism:

Before the requisite tacts and echoics have been acquired, selection responses are unmediated: They are evoked directly by the named objects. Selection under joint control, by an autoclitic response, only occurs after the tacts and self-echoics have been acquired and have come to interact.

*Is the Joint Control Account
Redundant with Naming?*

The second point Lowe and Horne (1996) raise, regarding the redundancy of the joint-control account and their own account, may be answered by noting that the former is both more parsimonious and more general. Thus, unlike naming, the joint control account finds the varieties of speaker behavior described by Skinner (1957) entirely sufficient to describe symbolic behavior in the listener. In doing so, it treats the development of semantic language competence strictly in terms of the acquisition of specifiable operants and changes in stimulus control over these operants. Rather than appealing to generalized response classes and higher order relations, under joint control, generalization is the result of the transfer of stimulus control to a generic event: the onset of joint control.

Aside from its parsimony, the mechanism of joint control is both more efficient and more plausible. On the naming account, each time the child learns a new tact, both listener and speaker behavior for the name-object pair must be practiced by implicit rehearsal as some higher order naming relation is activated (Lowe & Horne, 1996, pp. 317–318). Thus, all novel behavior is considered to be the product of prior covert rehearsal. The joint control account, on the other hand, makes no such demands, either mechanical or conceptual. On this account, only tacts need be acquired. Generalized selection occurs de novo whenever one of these novel tacts enter into joint control with the child's self-echoic rehearsal of the name of the stimulus currently sought. Efficiency is thus gained in this account because it assumes less practice on the part of the subject to produce the same behavior as the naming relation, and because truly novel behavior can emerge here untrained and unrehearsed. Plausibility is gained by not positing performances (covert rehearsal) that we do not observe in our own behavior as we learn new words.

Beyond its greater efficiency, joint control allows a more general account than does naming. Thus, as illustrated earlier (Lowenkron, 1996, Figure 1, Panel B), joint control easily accounts for responding that involves prepositions describing relations between stimulus elements, something the naming re-

lation seems not to address. Thus, the selection of a dot in a circle in response to that description only requires the subject to select the comparison that evokes the phrase *dot in circle* as a tact, while the child rehearses the description as a self-echoic. Under joint control, selection in response to phrases that contain prepositions only requires that the child be capable of accurately tacting with those prepositions.

There is more: The role of joint control has been documented across a wide range of generalized relations (e.g., identity matching; matching based on order [before/after], size, orientation, and oddity) as well as in generalized goal-oriented behavior (Lowenkron, 1984, 1988, 1989; Lowenkron & Colvin, 1992). Joint control also provides an explicit account of many sorts of symbolic and conceptual behavior that have heretofore resisted a rigorous behavioral account. All of this suggests that replacing the notion of higher order classes with joint control as the mechanism of semantic relation provides a significant improvement in the parsimony, the efficiency, the plausibility, and the generality of the account.

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