

THE EVOLUTION OF NAMING—JUST SO!

BOB REMINGTON

UNIVERSITY OF SOUTHAMPTON

In this important paper, Horne and Lowe intend to show that naming is responsible for equivalence and, to achieve this, begin by arguing that equivalence is not responsible for naming. This commentary addresses issues relating to both elements of this argument but in the opposite order from that adopted in the target article.

Equivalence Through Naming

Accepting for a moment that we understand the origins of naming, Horne and Lowe's account of the emergence of stimulus equivalence in laboratory tasks is rather convincing, at least by comparison with the alternatives. At the very least, adults and verbally competent children show the emergent behavioral properties characterizing equivalence following limited amounts of matching-to-sample training; no such reliable phenomena have yet been demonstrated in nonverbal humans and nonhuman animals. Under such circumstances, it seems almost perverse to argue against a mediational account: Acting as participant in a laboratory equivalence experiment—including one that relies on abstract stimuli to eliminate naming—is a simple way of convincing oneself of the salience of one's verbal behavior in this context. Of course, salience is no guarantee of functionality, and there is evidence from the implicit learning literature that in some cases instructions to formulate a task verbally undermine the acquisition of effective performance (Reber, 1993). In the present case, however, the evidence is to the contrary; teaching children who do not show equivalence to name the experimental stimuli leads rapidly to its emergence (Dugdale & Lowe, 1990).

It should be possible to test the naming hypothesis directly. Attempts to compare hard-to-name stimuli with more easily named items

(Mandell & Sheen, 1994) may not be optimal in that they rely on differences between subjects exposed to different stimuli to infer the role of naming. If the properties of the stimulus names themselves, rather than the stimuli named, determine how quickly and well equivalence classes form, it should be possible to identify groupings within the same pool of stimuli that are more or less easily related on the basis of their names. For example, consider an equivalence task in which the pictorial stimuli named in Table 1 are used to establish the three equivalence classes shown. The rapid emergence of equivalence should be facilitated by the existing phonological relationship between the names of each element of a stimulus class. This relationship is independent of the imposed arbitrary relationship between the pictorial stimuli themselves. Controlling for the salience of names and stimuli merely involves reassigning elements to different arbitrary classes, either pseudo-randomly or by reversing the matrix such that rhyme-linked items fill the columns. This latter condition might be expected to maximize the interference effect of established names. Such a study should show the positive or negative mediating effect of naming within a common pool of stimuli. If the participants are children, it would also be possible to establish relationships between the acquisition of equivalence and the development of phonological awareness (Goswami & Bryant, 1990) (a similar study is currently underway in the Psychology Laboratory at Southampton).

If the phenomena of stimulus equivalence do prove to be fully explicable as the product of verbal re-presentation, it is hard to avoid the conclusion that the sustained excitement generated in behavior analysts (e.g., Sidman, 1971, 1994) has been somewhat misplaced. Certainly, the equivalence literature has so far failed to influence research investigating the development of early language in normal human infants.

Address correspondence to Bob Remington, Department of Psychology, University of Southampton, Highfield, Southampton SO17 1BJ, England (E-mail: R.E.Remington@soton.ac.uk).

Table 1

Elements of visual stimulus equivalence classes linked by rime component of stimulus names.

Class	Element		
	A	B	C
1	boat	coat	goat
2	tree	bee	pea
3	cat	hat	mat

Naming Without Equivalence

Given the paucity of behaviorally oriented research on the origins of naming, Horne and Lowe's account, although necessarily speculative, is developed with great panache. Their approach has many virtues, not least of which is their resuscitation of Skinnerian conceptions of language development and the grafting of these ideas on to a broadly Vygotskian perspective. Because Horne and Lowe draw heavily on recent mainstream research on language acquisition, their approach builds significant and much-needed bridges between behavior analysis and developmental psychology. Such integrative activities should be warmly welcomed. One problem with the domain of Horne and Lowe's theory, however, is that it allows many other equally plausible processes to be proposed. I will take a single example stemming from their critical analysis of Hayes' theory of equivalence. In this context, the attempt by Lipkens, Hayes, and Hayes (1993) to teach naming skills directly to an infant child using operant procedures is relevant because its behavior-analytic orientation might allow features relevant to Horne and Lowe's account to be identified. In practice, however, it is difficult to identify precisely the relationships between the stimuli and responses that are involved in teaching naming.

Horne and Lowe are right to draw attention to the distinct differences between Lipkens et al.'s tasks and those conventionally used in equivalence research. For example, Lipkens et al. describe training listener behavior (*/name/* → picture) and testing for symmetrical tacting (picture → "name"). Their interpretation of these procedures (p. 216) suggests that auditory comprehension training established the relation, hearing name → seeing picture → pointing to picture, whereas the mutually entailed relation

tested involved seeing picture → hearing name to oneself → saying name (as a self-echoic). Horne and Lowe take exception to the idea of hearing to oneself (pp. 231–232), but there are at least two plausible routes by which seeing an object could afford such an outcome, neither of which feature in their account.

First, Horne and Lowe's own model describes a very similar phenomenon in the visual modality. For them, listener behavior involves responding discriminatively to a spoken name (e.g., */where's shoe?/*) by seeking it. As this pattern develops, the caregiver's request is said to function as a conditioned stimulus (CS) so that hearing a name gives rise to a Pavlovian visual-perceptual CR; "see[ing] X not only when X is present but when any stimulus which has frequently accompanied X is present" (Skinner, 1953, p. 266). Pavlovian conditioning can also presumably come into play if children are exposed to object → */name/* relations. They are; the developmental literature indicates that caregivers often link objects to their names by showing approval of a child's listener behavior (e.g., a child hears */Yes, shoe!/* when she finds one; Horne & Lowe, p. 195, Figure 5). This provides the necessary pathway for the development of auditory CRs (e.g., hearing */shoe/* to oneself on seeing a shoe). Horne and Lowe's conclusion that this process "certainly does not feature in Skinner's account of verbal behavior" (p. 232) is therefore a little wide of the mark.

A second possible route for the emergence of hearing to oneself is apparent in verbal comprehension training procedures during which a picture is presented to the child, named, and pointed out by the experimenter. Does this establish the experimenter-specified */name/* → picture relation (i.e., listener behavior) or a Pavlovian picture → */name/* relation? Although the picture's significance is marked by pointing to it when its name has been spoken (*/name/* → picture), its first appearance precedes its name (picture → */name/*). Here then, is another way in which teaching listener behavior can also produce picture → */name/* associations, that is, auditory CRs. Following hearing the name, the child may echo it while looking at the highlighted picture (picture → "name"), as Horne and Lowe suggest. Thus, the sugges-

tion that a child may hear words to herself is no less plausible than the suggestion that she may see objects to herself, but the latter plays a role in Horne and Lowe's theory, whereas the former seems to be excluded. Looking more broadly, voices heard to oneself may have some important roles to play in understanding human behavior (Chadwick & Lowe, 1994; Jaynes, 1977). The general point here relates to the difficulty of identifying exactly which of the many possible relations between objects, words heard, and words said are actually functional in the development of naming. Observational data are notoriously difficult to interpret, but difficulties persist even with the elaborate methodology of training studies.

It would, however, be a mistake to overestimate these problems. We are not dealing here with processes of biological evolution but with the way in which their products interact with environmental contingencies, so there is no need to be forced back to pale-

ontological methods and just-so stories, however well grounded and convincing. Through a set of behavioral interactions that take place in plain sight, almost every human on the planet acquires the ability to name in the first 24 months of life (those who don't can tell us something too). Given this, it is hard to understand why, to date, so important a process has been so little researched by behavior analysts. The mystery deepens when one considers that naming, if not equivalence, is a prerequisite for rule-governed behavior—a central focus of human operant research in recent years. One can only concur with Horne and Lowe's desire for a systematic program of experimentally driven developmental behavioral research. To achieve this, however, behavior analysts will need to talk to developmentalists. It would be more than a little ironic if discussion of an issue as important as the origins of naming did not find a wider audience than the aficionados of stimulus equivalence.

EQUIVALENCE RELATIONS, NAMING, AND GENERALIZED SYMMETRY

D. CARR AND D. E. BLACKMAN

UNIVERSITY OF WALES, CARDIFF

In charting in detail the development of speaker-listener behavior in children and the fusion of speaker-listener functions that they term *naming*, Horne and Lowe provide an enlightening account of why the concepts of verbal behavior and stimulus equivalence have become so interwoven in the contemporary literature. A central idea in their provocative paper, however, is that naming is the primary unit of behavior that occasions the behavioral effects usually interpreted as re-

flecting the emergence of equivalence relations: "Naming should not be viewed as *mediating* the establishment of stimulus classes: Naming *is* stimulus-classifying behavior" (pp. 226–227) (emphases in original).

Of particular interest in Horne and Lowe's account is their discussion of how intraverbal naming might effect an equivalence relation. The key process here is said to be self-echoic repetition related to each trained combination of stimuli (e.g., "up green up green; up triangle up triangle"). This gives rise to "intraverbally produced bidirectional relations" between each of the trained pairs (p. 220). It is clear from Figure 17 that without this prop-

Address correspondence to D. E. Blackman, School of Psychology, University of Wales College of Cardiff, P.O. Box 901, Cardiff CF1 3JG, United Kingdom (E-mail: BLACKMAND@UK.AC.CARDIFF).