# Problems in the Psycho-Philosophy of Knowledge

I had originally intended to apologize for foisting still another hyphenated, barbarism ("psycho-philosophy") upon a long-suffering English language, but have decided instead to summon my *chutzpa* and demand your gratitude for not offering acronymically to improve our POK marks. You will in any event get nowhere by protesting that there can be no licit coupling of psychology and philosophy under the blanket of "knowledge"; for a major objective of this paper is to restore these unnaturally separated disciplines to their rightful intimacy in this matter. My overarching intent is to take inventory of what regarding "knowledge" there is for us to feel uncertain about, to weave a tapestry of issues within which each item of epistemic lore—theory or datum, problem or possibility—has its natural locus in relation to the whole. And psychology and philosophy are respectively the warp and the woof whose intertwining makes this fabric a cohesive unity.

To be sure, you may not have thought to doubt the legitimacy of my titular hyphenation. You are aware of how impatiently contemporary research psychologists dismiss the more intricate problems of cognition as "philosophical stuff," but have perhaps attributed this to superficial simplemindedness or a repressive intolerance for perplexity. What you may not know is that most philosophers have become equally disdainful of psychology's relevance to the theory of knowledge. Epistemology is a *normative* discipline, the argument goes, whereas psychology (scoff) is merely a descriptive science which can amass statistics from here to doomsday on how people in fact conduct their thinking without learning a thing about how they should think. To suppose that psychology makes contact with the philosophy of knowledge only through confusions of *ought* with *is*, however, is to pervert a small truth into a monstrous know-nothingism.

In the first place, the main ingredients of epistemology's subject matter— cognitive acts and their constituents—are psychological entities pure and simple, albeit abstract ones. To acknowledge this is no more to confound normative statements about these entities with descriptive ones than acknowledging developmental psychology to be an empirical science is to confuse the actual behavior of your children with the deportment you wish they would display. One pattern of behavior does not become less a psychological attribute than another merely through being the more praiseworthy of the two, and neither do the prescriptive/validational aspects of a theory of knowledge diminish the psychological nature of what this is a theory *about*. As I hope to illustrate below, there are probably few significant

problems of epistemology where philosophical progress is not seriously impeded by our lack of technically detailed understanding of the psychological mechanisms involved.

Secondly, although *is* and *ought* can always be distinguished in reference to any specific instance of reasoning, this does not preclude the very real possibility that how one *should* reason in a given case can in turn be adjudicated only in terms of higher-level descriptive principles. It could be, for example, that the psychology and philosophy of knowledge are like two lines of a fugue, each running through the same tonal sequence but forever out of phase. Although the actual interplay between normative and descriptive issues here greatly exceeds the reach of this simple analogy, anyone who presumes that the two classes of questions can be cleanly separated in the large just can't have thought very deeply about the logic of justifying one's beliefs (cf. Rozeboom, 1967b).

Finally, even if there were no other bond between them, normative and descriptive theories of knowledge find common cause and mutual indispensability in practical concerns for belief management. For whenever our *de facto* habits of thought are found significantly wanting by accepted standards of sound reason, bringing the former into congruence with the latter is a job wherein the psychological engineer seeks to realize the normative epistemologist's specifications. Admittedly, philosophers and psychologists have never to my knowledge officially joined forces to pursue such a practical objective, but the source of this separation does little credit to either party: Psychological science hasn't begun to learn enough about the detailed workings of cognitive mechanisms to spin off engineering enhancements of human rationality, while traditional philosophy of knowledge can lecture schoolboys on forms of the syllogism but has little if any guidance to offer in more advanced problems where mature intellects are genuinely in need of epistemic advice. Even so, it is of some importance to recognize that a body of literature and practica in advanced epistemic engineering does in fact exist, albeit not usually characterized in quite these terms. This is the material on *scientific methodology* developed by the various natural sciences and their dilettante city cousin, philosophy of science. When as psychologists we set out to study knowledge processes in others, we should not lose sight of the fact that we already have an extensive theory of knowledge embedded in the research customs of our discipline, and that when we seek to improve our research designs, our methods of statistical analysis, the operational solidity and inferential interpretability of our data, etc., we are working the frontiers of epistemology not with the armchair disinvolvement of an academician but with an existential engagement in its real-life consequences. For psychologists of knowledge, the *de facto* methodology of the natural sciences provides a body of empirical data incomparably more saturated with real cognitive issues than anything researched to date. And any philosopher who proclaims the irrelevance of descriptive to normative theories of knowledge

without first investigating whether technical science may not extensively exploit epistemic practices which have scarcely been recognized, much less thoughtfully evaluated, by extant philosophy of knowledge is living in the closed world of an arrogant fantasy.

Lest it appear from the foregoing that I have some strange antipathy toward philosophical epistemology, let me add at once that my ensuing framework for the psycho-philosophy of knowledge lies considerably closer to its philosophic grain than to the standard axes of psychological inquiry. Fifty years of peripheralist emphasis (essential as this has been to psychology's maturation as a science) has regressed psychology's comprehension of mentalistic concepts to such a primitive blur that at present, the psychology of cognition has much more to learn from philosophy than can immediately be repaid by exchange information of equal value. But with a little sophistication and effort, a resurgent psychology of cognition could suck the philosophic lemon dry and take command of advanced research in areas traditionally thought by philosophers to be their private reserve. As one who feels a professional allegiance to both disciplines, I have no special desire for psychology to usurp philosophy's epistemological birthright (nor do I expect this in fact to occur); but the dogmas of one era often seem quaintly naive a generation or two later, and philosophers who smugly continue to posit an abyss between the philosophy and the psychology of knowledge are striking epistemic postures more appropriate to this Century's beginning than to its end.

## The Forms of Knowledge

Foremost among the problems pertaining to any topic $t$ is the meta-problem of clarifying what sorts of things the concept of $t$ is intended to subsume. In the case at hand, since "knowledge" is a technical term of neither psychology nor philosophy but is imposed upon us in childhood by our mother tongue, problems of knowledge are of linguistic necessity problems pertaining to whatever it is that ordinary language denotes by this concept. The first requisite for research in the psycho-philosophy of knowledge is consequently to make sure that we are at least modestly aware of this term's commonsense usage. (I hope this preliminary need is evident to you, for unhappily it does not seem to be all obvious to a great many psychologists who apply cognition terms to their technical research with never a qualm for what, if anything, the latter has to do with the phenomena commonsensically envisioned by these concepts.[1] Even were space to permit, a detailed analysis of ordinary-language cognition talk would be inappropriate here; such analysis is just another of the problems which my present task is to inventory, not to solve. Rather, I shall with totally inadequate argument evoke highlights

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[1]For an all too appalling documentation of such abuses in the case of memory words, see Rozeboom, 1965.

of the "knowledge" concept's linguistic commitments and then show how these unfold into a complex array of thoroughly substantive questions far beyond the reach of any additional concern for linguistic usage.

To analyze the meaning of an ordinary-language concept (i.e. one which we acquire not through stipulative definition but from immersion in our linguistic community's use of it), we must first of all identify paradigmatic contexts of its natural occurrence and then tease out what states of affairs determine the intuitive correctness of this usage. Since cognition terms in general, and especially the cognates of "knowledge," occur most fundamentally as verbs, we shall here examine just the logic of "knowing" and leave as an open question whether this word's nominal and adjectival variants involve anything of further epistemic significance. And insomuch as "know" is a transitive verb grammatically requiring both a subject and object, our first task is to determine from the linguistic nature of those phrases which properly instantiate the blanks in sentence schema

$$\underline{\hspace{2cm}} \text{ knows } \underline{\hspace{2cm}}$$

what sorts of entities participate in the knowing-relation. That is, what, logically, can be known and who or what can know it?

On the face of it, the nature of knowers is obvious—they are simply *persons* and perhaps other sentient beings. Thus if $k$ is something knowable, then it is logically possible if not factually true that John Smith, 50 million Frenchmen, the Commissioner of baseball, and the greenest Martian ever to buzz Earth in a flying saucer all know $k$. (Contrarily, France, baseball, and green are thwarted by their logical types from ever knowing $k$.) Even here, however, two problems arise. One concerns the knower's implicit temporal boundaries. Since John Smith may know $k$ at one time but not at another, it is evident that knowing $k$ is not something attributed to a person's entire temporal extension but only to some more or less restricted segment (time slice) thereof. But how thick a time slice? Is knowing $k$ an instantaneous property which can come and go from moment to moment? (E.g., "I don't know $k$ just now, but I did two minutes ago and will know it again if you'll let me think for a second.") Or is knowing $k$ a property which must apply to a person for an extended period if it is to apply at all, and if so, for how long? Trivial as this question may seem, it relates to some important complexities in the psychological mechanisms of knowing to which I shall return later (p. *284*).

Secondly, in what ways if at all is a knower logically required to be humanlike or at least "person"-like (whatever that might mean)? Is it possible in principle, even if never true in fact, for a sparrow, an amoeba, a turnip, or a computer literally to know $k$? Although many philosophers of the ordinary-language school are disposed to answer questions like this in the negative on grounds that we just don't talk that way, I would argue to the contrary that construing the concept of knowing

to be *inherently* inapplicable to sparrows, amoebae, turnips, and computers is not only anthropocentrically myopic but a strategic blunder as well. Until we are clear on just what constellation of attributes counts in humans as "knowing $k$," we are in no position to avow that such traits never appear in lower organisms and complex inorganic systems; while in any event, failure of such properties to grace the infrahuman cases would be an empirical generalization about these entities rather than an analytic impossibility. Taking this scientifically factual question to be a linguistic issue is the ordinary-language philosopher's way of evading the real analytic problem here, which is to determine with technical precision the psycho-physical composition of an act of knowing.

Turning now to the *objects* of knowledge, we find through inspection of everyday usage such as

    1) John knows that February 2nd is groundhog day,

    2) John knows why his secretary left town so suddenly,

    3) John knows who broke the window,

    4) John knows how to swim,

    5) John knows how to yawn with his mouth closed,

    6) John knows double-entry bookkeeping,

    7) John knows the man who broke the window,

    8) John knows this wood like the back of his hand,

    9) John knows pain,

that English grammar recognizes three primary kinds of knowledge. The first, illustrated by (l)–(3), takes the form

$$s \text{ knows that } p,$$

where $p$ is a proposition, i.e. whatever it is that is conveyed by a declarative sentence. (Although (2) and (3) fill the blank in 'John knows' with a question rather than a statement, their obvious intent is to claim that John knows not the question as such but its answer.) The second usage instantiates $d$ in

$$s \text{ knows how to } d$$

by description of an ability, achievement, or complex act. And the third, of form

$$s \text{ knows (it)}$$

and illustrated by examples (6)–(9), is a wildly promiscuous context in which '(it)' can be virtually any noun or noun phrase. The first two of these forms make the by-now familiar distinction between the "knowing-that" of propositional (factual) knowledge and the "knowing-how" of skills, while the third may be thought of as "knowledge by acquaintance" insomuch as '$s$ knows (it)' usually paraphrases well as some version of '$s$ is acquainted with (it)'.

To be sure, though ordinary language provides separate grammatical forms to discriminate among the knowings of propositions, of skills, and of things, it often botches their applications. For example, while

    10) John knows that silence is golden,

    11) John knows how to program a computer,

    12) John knows the price of gold,

are grammatically tokened to be a knowing-that, a knowing-how, and a knowing-(it), respectively, analysis of what John would normally have to be like for us to say these things about him reveals that (12) and for the most part (11) comprise knowledge of facts, whereas (10) is largely an aspect of adroit social behavior involving little if any propositional knowledge. This sloppiness of ordinary language is why study of a concept's commonsense usage only roughs in the surface contours of its referent, so that once our linguistic intuitions have been skimmed of this initial determination they may properly be ignored with brash and cheerful irreverence as technical penetration into that referent's deeper nature begins to expose inconsistencies, ignorance, and false suppositions in everyday discourse about it. In particular, for our case at hand, it remains an open question whether one or more of the three grammatically distinct forms of knowledge may not comprise only commonsensically confused instances of the remainder. No such reductions will be insisted upon here, however. Rather, I shall be fairly articulate about problems of knowing-that, much less so about knowing-how and knowing-(it), and though I will not try to conceal my opinions about the interrelations of these I see no point to arguing their precise overlap until we learn a great deal more about the detailed mechanisms involved.

## Knowledge of Skills and Knowledge by Acquaintance

On the face of it, paradigm cases of knowing-how are so totally dissimilar to those of knowing-that—for skills have none of the primary logical features, truth, belief, and rationality (see below), of propositional knowledge—that the greatest mystery here is why the English language should ever have come to subsume both sorts under the same verb. Separate verbs do, in fact, generally distinguish them in

other languages.[2] Even so, regardless of its ultimate relevance to epistemological theory, knowing-how raises a pair of issues worth at least passing mention.

For one, while '$s$ knows how to $d$' is usually felt in everyday usage to be synonymous with '$s$ is able (has the ability) to $d$', where '$d$' describes some activity or achievement, the equivalence is not perfect. Thus 'John has the ability to do 50 push-ups in one minute' and 'John is able to recall the names of all his grade-school teachers' do not graciously accept paraphrase as 'John knows how to do 50 push-ups in one minute' and 'John knows how to recall the names of all his grade-school teachers', respectively. And we might put down an uncreative teacher of English composition by saying "He knows how to write a best-seller, but can't actually *do* it". Why this occasional failure of the *know-how = ability* equation? Each of the examples just given suggests part of an answer. First, wherever common sense intuits a sharp distinction between "mental" and "physical" abilities, knowing-how cleaves to the former. Moreover, not even a mental ability counts as know-how if it is too simple. (Whether or not being able to recall a list of names is know-how depends on whether this is done by some special trick or is just dogged rote memory.) And finally, being able to produce a conceptual description of the operations which in aggregate make up a complex achievement—an engineer's knowing-that—also counts after a fashion as know-how even for someone who can't convert these words into deeds. It would appear, then, that paradigmatically someone "knows how" to $d$ when his $d$-ing is a complex action synthesized out of elementary operations by a recipe which he should be able to verbalize. Could it be that ordinary language's treating some abilities as a form of knowing is simply a naive (and in most instances surely false) presupposition that such conceptual formulas do in fact guide the performance?

Actually it is a moot question whether the science of psychology has any use for ability concepts at all, any more than advanced chemistry (unlike applied geology) needs to talk about minerals. Certainly commonsense abilities are so inadequately conceptualized-for describing an ability or know-how *only* in terms of a gross performance or summary achievement, as in knowing how "to swim," "to speak Russian," "to do long division," "to treat frostbite," etc. recognizes neither the multidimensional composition of the behavior involved nor in general the stimulus conditions on which the ability-definitive behavior is dependent[3]—that

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[2]Thus in German, knowing-that, knowing-how, and knowing-(it) are *wissen*, *können*, and *kennen*, respectively.

[3]Since abilities are not themselves behavior but potentials or dispositions thereto, their proper conceptualization, like that of all dispositions, also requires reference to the circumstances which actualize that potential. (As evinced by the difference between solubility in water and solubility in alcohol, the distinction between two dispositions may well lie not in the behavior they potentiate but only in their conditions of activation.) To be sure, commonsense conceptions of an ability's output often includes vague reference to its input requirement (e.g., one can't do long division or treat frostbite without having a long-division problem or frostbite case to work on), but this

even preliminary research on abilities requires a wholesale reworking of how we characterize them. It is very possible that problems of know-how will eventually see resolution in much the same fashion as have past problems in the theory of demonic possession, namely, by our becoming sufficiently sophisticated in alternative interpretations of the phenomena at issue that older conceptions thereof simply fade into the myths of our prescientific past.

Even so, heightened technical understanding of what is probably the most distinctive feature of those traits we intuitively label "skills," differentiating them from lower grades of performance dispositions, should also prove valuable for penetrating the mysteries of cognition proper. I refer, of course, to the *integrated complexity* of skills. To perform proficiently at a task, one must do just the right thing at the right time, often at a speed precluding deliberation and where the "right thing" varies from instant to instant as a complex function both of intricate momentary conditions and of what has gone before. It is relatively easy to analyze a skill as an aggregate of micro-functions, but as Lashley (1951) observed in one of his most provocative essays, the mechanisms by which these are orchestrated into a smoothly efficient molar performance are still largely a mystery. (See also Fitts, 1964.) Problems of organization, or "structure," are likewise central to the psychology of propositional knowledge; and while the kinds of structure involved in knowing-how may not be entirely the same as in knowing-that, there is reason to suspect significant overlap. In any event, our present ability even to *think* straight about problems of structure is still so rudimentary that technical progress on any one aspect of this cannot help but benefit the rest.

Apart from the generic issue of "structure," and except insofar as analysis of special cases discloses ingredients of the knowing-that sort, I am prepared to dismiss knowings-how as having no more inherent relevance for epistemology than do any other psychological functions not alleged by ordinary language to be a form a knowing. (This of course still leaves open the possibility that any or all of the latter may prove to be important ingredients of knowing-that.) I would like to say the same about knowing-(it), but this is more slippery than the other and refuses to relinquish its claim to knowledge stature without a fight.

To be sure, there are many ordinary-language knowings-(it) which seem clearly to be nothing more than loosely conceived versions of knowing-that or knowing-how. Consider, for example,

    12) John knows the price of gold,
    13) John knows the value of silence,

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backdoor admission of stimulus conditions into our response concepts hardly counts as an official acknowledgement of their inherent relevance. For examples of the conceptual problems which arise from even the most superficial probing of commonsense ability concepts, see Rozeboom, 1966, pp. 197ff

14) John knows Russian,

15) John knows Russia,

16) John knows the premier of Russia,

17) John knows the Siberian winter.

In its most obvious interpretation, (12) is synonymous with

12a) John knows what the price of gold is,

a case of knowing-that; and while (12) might alternatively be intended to imply that John understands the factors which control the price of gold, the latter too can plausibly be construed as propositional knowledge. Again, (13) seems to be very much the same as (10), which is a knowing-that phrasing for what is most fundamentally a knowing-how if knowledge at all. And (14) differs from

14a) John can speak Russian

only in that the latter focuses upon John's ability to make Russian utterances, whereas (14) equally subsumes John's distinct though related abilities to speak, to understand, and to think in Russian by making explicit none of them.

But what about (15)–(17)? We might admit under pressure that a person can know Russia without ever having been there just by learning enough textbook facts and travelers' stories about the place, yet somehow that doesn't quite seem like enough. And is to know another person *merely* to possess sufficient propositional knowledge about him? Unlike (12)–(14), examples (15)–(17) press close to the core of this form's distinctive meaning, namely, as a deep version of *acquaintance-with*—"deep" in that everyday usage often distinguishes "is acquainted with" from "knows" as a contrast between "superficial" and "profound." (E.g., "I'm acquainted with Jim but I don't really know him.") To know something in this sense is to have intimate first-hand familiarity with it, an existential apprehending which mere words can never adequately convey. Thus for (17), no one truly knows the Siberian winter if he has never endured one, never felt the unrelenting cold ice the marrow of his bones, never heard the black wind hiss unceasingly of dead dreams and barren struggles, etc., etc. This is a knowing which not only can epistemological theory not afford to ignore, it is what many poets and some philosophers[4] have extolled as ultimate awareness, the blazing ineffable glory to which propositional knowledge is but warmthless moon-glow.

Seeking to reduce knowing-as-deep-acquaintance to knowing-that is a thankless task, and I shall not attempt it. But I will still submit that only one form of

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[4]E.g., Bergson, 1903; MacLeish, 1956.

knowing is needed to define epistemology's scope. The argument is simply that knowing-as-deep-acquaintance is not an *alternative* to propositional knowledge but an inseparable and indeed fundamental *aspect* of it. Specifically, it is the essence of the "intentionality" or "meaningfulness" of concepts. Although my brief for this will not be presented until later (p. 320), I can easily forecast the outraged protest it will evoke from existentialist/humanist quarters, namely, that existentialistic apprehension is an unmediated *oneness* of knower with the known, the very sort of intimacy which interposition of a concept between them would destroy. And as I am sympathetic to the intuition which motivates this protest even when it is vocalized in ways that seem bootless to me, I will simply leave it as a still-open question whether knowing-(it) may not after all contain a residual beyond its contribution to knowing-that, i.e. whether there is more to deep acquaintance with something than can ever be equated with a sufficiently rich conception of it.

## The Components of Propositional Knowledge

Even if I have erred in suggesting that propositional knowledge exhausts the domain of epistemological theory, this is clearly its heartland. From here on, my concern will be specifically for what is involved in a person's knowing that something is the case.

To begin, there is a standard decomposition of knowing-that into its logically necessary and sufficient conditions which is so universally agreed to by philosophers—well, not exactly *universal*, but still acceded to in most respects by a remarkably high proportion—that I shall adopt it here without argument. (Some of the argument and further references can be found in Rozeboom, 1967b.) This is the analysis which equates propositional knowledge with justified true belief; specifically, that

> $s$ knows that $p$ is the case

if and only if

      (a)   $s$ believes that $p$ is the case,

      (b)   $p$ is the case, and

      (c)   $s$ is justified (warranted, rational) in believing $p$.

For example, suppose that we are trying to decide whether John knows that he failed the examination. We certainly wouldn't consider it possible that he *knows* this if he doesn't even believe that he has failed. (*Not believing* here covers both the case where John actively disbelieves that he failed and where he doesn't have any opinion on the matter at all.) Neither can he know that he failed if in fact

he didn't fail—a person can't know falsely, i.e. know something which isn't true. (A person can *believe* falsely, of course, but there is more to knowing than just believing.) And if John *irrationally* believes that he failed the exam—e.g., if he always leaves an examination feeling despondently sure that he blew it even though he has never in fact come close to failing before—then his failure for real on this occasion does not suffice to make his belief a case of *knowledge* until he acquires good grounds for his conviction, such as hearing the sad news directly from his examiner. Finally, if John does believe, truly and with good reason, that he failed, then nothing more seems needed for us to conclude that he knows this.

Before the justified-true-belief analysis of propositional knowledge can lay claim to technical adequacy, a number of fine points usually slighted in the philosophic literature (e.g., how strong a belief is required for knowing?) need to be worked out. When this is done, we find that *knowing* in the strict sense of the concept, like a geometrically perfect circle or a completely honest man, is so idealized that only imperfect approximations to it occur in reality (Rozeboom, 1967b; Unger, 1971). But that is of no consequence here. The important thing is that insofar as the commonsense notion of "knowledge" holds interest for advanced psychology and philosophy, it does so by way of the concepts which appear in its analysis. Accordingly, our first big step in getting on with the psycho-philosophy of knowledge is to redefine this as the psycho-philosophy of *belief*, *truth*, and *rationality*. This is, to be sure, a considerable broadening of our inquiry's scope; for I have now characterized this as the union of three topics when "knowledge" strictly lies only at their intersection. But that is precisely the aim of this essay—to dismantle the concept of knowing and see where its pieces lie within the broader framework of things. (Were we to achieve a comprehensive understanding of belief, truth, and rationality, the only epistemological problems still remaining would be linguistic nitpicking at the exact definition of 'knowledge' and its cognates in these terms.) In what follows, I shall shake down in its turn each of these three components of knowing to see what subordinate issues it comprises. In so doing we shall finally reach, or at least get near, the real frontiers of professional research in epistemology. Do not, however, expect a luxury-class excursion through this terrain. Frontiers are rough, buggy, primitive sorts of places, and the problems to be scouted will appear less often in tidily labeled specimen jars than in evocations of uneasy confusion as poorly broken trails end in brambles and mire.

## Problems in the Psycho-Logical Character of Belief

Of knowing's three primary constituents, *belief* lies closest to pure psychology, unintimidated by normative issues. This is probably why belief processes have been the only objects of epistemic concern to receive more than token recognition

in the modern psychological literature. Even here, use of the term 'belief' and its cognates is usually shunned at the technical level; instead, one talks grandly of "cognitive processes" or "information processing" while allowing these labels to subsume virtually anything conjectured to transpire within the organism. But the literal meaning of 'cognitive' is, after all, *pertaining to knowledge*; so any version of "cognitive" psychology with a legitimate claim to this title must significantly address something which differentiates believings from infracognitive events. Much of the research so labeled has, in fact, begun to focus down upon cognition in the strict sense. But that focus is still desperately blurred, due at least in part to loss of the conceptual resources once available in classical psychology for distinguishing the specifically cognitive aspects of internal events from those which are paradigmatically *non*cognitive. An important preliminary task for technical research and theory on cognition, then, is to say in overview what there is about belief which is importantly more than—i.e. cannot satisfactorily be reduced to—the mechanisms and regularities already familiar to modern psychology in noncognitive terms.

**Cognitive structure**

Whatever the details, beliefs have two especially prominent features which set them apart at the outset from noncognitive psychological attributes: *intentionality* and *compositional complexity*. Classically, the intentionality of (some) mental states—i.e. their representing, signifying, or being *about* something else—is above all the essence of cognition, and I shall dwell upon this later. But perhaps even more significant for the role of beliefs and their cognitive kin in the organism's behavioral economy is their internal articulation. For the content of a belief—i.e. what distinguishes one belief from another—is a *proposition*; and propositions are well-structured concept complexes whose linguistic counterparts, *sentences*, consist of terms embedded at distinctive positions within a grammatical frame. Roughly speaking, *terms* are what express concepts, the problems of which I will get to in due course; right now I want to emphasize that there is critically more to a proposition (sentence) than just a list of concepts (terms). Thus believing that *John loves Mary* has very different behavioral import for someone who interacts with John and Mary than does believing that *Mary loves John*, while observing (perceptually believing) that *the traffic light is red and the policeman's uniform is blue* is not just a simultaneous but otherwise disjoint perceiving of *traffic light*, *policeman's uniform*, *red*, and *blue*. Philosophically elementary as this point may seem, it defines a major target for advanced psychological research insomuch as we have yet to make technically explicit any psychological mechanisms wherein a cognition's structure makes a specifiable difference for its behavioral consequences. Although some contemporary developments, notably, psycholinguistics and information-processing models, have pushed extremely close to an overt acknowledgment of propositional structure (see also Dulany, 1968 and Underwood,

1969 for important verbal-learning shifts in this direction), the basic conceptual framework and habits of theory construction developed to date by our tougher-minded research traditions do not provide the formal resources needed for this (cf. Rozeboom, 1960a, 1961a), and my own recommendation is that we first of all educate ourselves in how to think effectively about the psychological function of compositional structure by concentrated study of this at the lowest levels of psychological complexity (cf. Rozeboom, 1967a, 1969a) on which it contributes appreciably to the data variance.

Moreover, while cognitive psychology has scarcely begun to search out the principles by which a particular belief's causal dynamics—i.e. how it comes about and its effect on other processes—are determined jointly by its constituent concepts and propositional structure, we must further recognize that the latter is only part of a belief's full logical complexity. For the family of cognitive attributes exemplified by

_____ believes that John loves Mary

is much, much larger than the array generated by letting free variable '$p$' range over all propositions in predicate schema

_____ believes that $p$.

*Believing* is just one of many ways in which a person can entertain a given cognitive content, such as

_____ believes that $p$.
_____ suspects that John loves Mary
_____ doubts that John loves Mary
_____ disbelieves that John loves Mary
_____ desires that John love Mary
_____ fears that John may love Mary
_____ is contemplating the possibility that John loves Mary
_____ wonders whether John loves Mary
_____ is trying to make John love Mary
_____ is dreaming that John loves Mary
_____ is hypothesizing that John loves Mary
_____ is imagining (as fiction) that John loves Mary
_____ is pretending that John loves Mary
_____ perceives that John loves Mary
_____ remembers that John loves Mary

_____ knows that John loves Mary

All of these and many others are subsumed by the schema

$$\text{_____ } \phi\text{s that } p,$$

where '$p$' is some declarative sentence and '$\phi$' is a verb describing what is variously known as a "propositional attitude," "mental act," or "intentional mode."[5] Some mental acts, like perceiving (cf. Armstrong, 1965), remembering (c.f. Rozeboom, 1965), and knowing (cf. p. 3ff above), analyze as believing in a certain way or with other conditions added; others, like suspecting, doubting, and disbelieving, are alternatives to believing along a continuum of belief strengths; and still others, like hoping, dreading, imagining, and hypothesizing, do not involve any particular degree of belief at all. Modern psychology has paid some attention to variation in belief strength, notably, in work on subjective probability, cognitive dissonance and attitude change (cf. Edwards, Lindman, & Phillips, 1965; Feldman, 1966; Rokeach, 1968) while accounts of goal-directed behavior and personality-theoretic approaches to motivation cannot totally suppress their latent concern for evaluative intentions; but that these need to be assimilated into a comprehensive theory of mental acts—a theory wherein the fuzzy act-verbs of ordinary language are refined into a multidimensional space of ways to entertain a proposition[6] and which can specify in quantitative detail the causes and consequences of shifts in a cognition's mode vector—still lies beyond the horizon of our present vision.[7]

The contrast between momentary process stages and enduring state properties (Rozeboom, 1965, p. 339ff) adds still another layer of complexity to the composition of cognitions. Is knowing/believing an intermittent or an essentially sustained act? Right this moment, for example, I find myself recalling that 2 plus 3 equals 5—but did I also know/believe this ten minutes ago when I wasn't thinking about numbers at all? The commonsense answer is Yes and No, depending on whether

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[5]Of these three equivalent expressions, the first two are well established in the philosophic vernacular. Despite its relative unfamiliarity, however, I am coming to prefer the third for the tidiness with which it allows the three primary facets of an intentional act to be identified as (*i*) a *content*, (*ii*) in general (though not always) an *object*, and (*iii*) a *mode*. Content vs. object is the meaning/referent distinction aired later, while an intention's mode is the *way* in which its content is brought to bear on other psychological processes under its influence.

[6]The most important of these dimensions will undoubtedly be (*i*) degree of belief-commitment, (*ii*) valuational tone, (*iii*) intensity of arousal or awareness, and (*iv*) a passivity/activity dimension which might be called "engagement" or "salience, " as in wishing for $p$ vs. wanting $p$ vs. striving for $p$, and in feeling unsure of $p$ vs. wondering whether $p$ vs. trying to determine whether $p$.

[7]Recent exegeses on the work of Husserl (Smith & McIntyre, 1971; Willard, 1972) exhibit his theory of intentionality as strikingly similar to the one for which I have argued here, including in particular the partition of mental acts into mode, content, and (occasionally) object, with the latter two comprising the relata of aboutness. Note added in proof.

by "belief" is meant an active awareness or merely the ready availability of this. Strictly speaking, a person can't believe that $p$ unless he is actually thinking $p$; yet ordinary language seldom hesitates to presume stable versions of believing and certain other mental acts (e.g., remembering and wanting but not perceiving or imagining) whereby a person latently continues to $\phi$ that $p$ even while the conscious intensity of his $\phi$ing that $p$ episodically ebbs and flows. Cognitions in this extended sense are dispositional attributes which potentiate activation of their process counterparts, and to be sure, a prissy insistence that only the latter properly count as cognitive would in no way absolve the psychology of cognition from its research responsibility for the internal states which underlie arousal of cognitive activity. But dispositions are characterized not merely by the results they potentiate but also by the particular input conditions which actualize this potential (see footnote 3). Commonsense predicates of form '_____ latently $\phi$s that $p$', '_____ is disposed to $\phi$ that $p$' and the like are thus truncated; to be technically efficacious they need a force something like '_____ is in a state such that exposure to condition $C$ will result in his $\phi$ing that $p$'.[8] The main point here is not to legislate the logic of state (latent) cognitions, but to recognize that these play a very different role in the organism's psychological economy than do the process cognitions whose activation they dispose, and that how state cognitions originate, evolve, and interact with input to evoke process cognitions is logically independent of what the latter do once aroused. State changes and their process consequences have long been at issue in research on conditioning and verbal learning, with, however, dubious relevance to cognitive psychology insomuch as the output processes so studied have been exclusively overt responses or elemental ideas lacking even propositional structure much less intentional mode. Moreover, the current travail in verbal learning—nothing less than the throes of a full-scale Kuhnian revolution—inspires little confidence that its traditional doctrines deeply illuminate the mechanics of cognitive arousal.

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[8]Under very special nomic circumstances—for example in the case of memory acts, if for any proposition $p$ the only input which evokes remembering-that-$p$ were to be activation of some sensation or idea resembling a component of $p$—description of a disposition's actualizer is redundant with description of its output and hence need not be made explicit in the disposition's identification. In learning theory, the interpretation of recall as a redintegration of memory traces (cf. Rozeboom, 1969a), unlike association-theoretic views of memory, has so far been primarily of this sort. Even if recall is basically a redintegrative phenomenon, however, it is likely that items of "stored information" differ not merely in what they store but also in their manner of storage, i.e. in how they can be "retrieved," and hence cannot be characterized merely in terms of their content.

**The psychology of language**

My intent for this section has been to cite research concerns linked directly to the psychologically distinctive features of cognitive acts. There is one more issue of this sort whose peripheral position in the logic of cognition has not diminished its empirical centrality in cognitive studies: How does cognition relate to *language* utilization? (Considering how profoundly we depend on verbal communication with subjects to study their "higher mental processes," it is no accident that those areas of psychology for which animal research has been most paradigmatic have also been the ones least disposed to interpret their data in cognitive terms.) In particular, is language a logical prerequisite for cognition, or can the latter occur without any linguistic concomitants at all and if so, how might language nonetheless affect the style and effectiveness of a person's cognitive functioning?

Despite the enormous literature, psychological and otherwise, which has accumulated on the theme of language, our knowledge of this extraordinary phenomenon's fundamental nature is still shockingly primitive; and one of the toughest problems in deciphering its relation to cognition is simply to say with some technical precision what a language *is*, as distinguished from nonlinguistic systems of stimulus/response interplay. It is much harder to isolate features essential to language than to dismiss ones which are not, and the latter unfortunately include most of those usually presumed to be definitive. To begin, while a language presumably requires a set of stimulus patterns such as acoustic and graphic designs to be its "expressions" or verbal "vehicles," these clearly do not by themselves constitute a language; at most they are only a language *for* someone, while reference to that person's transactions with those stimuli is needed to complete the definition. It is *not*, however, necessary for a language to be shared—it is entirely possible for a person to have a language known only to himself, as might be contrived e.g. by an institutionalized paranoiac to safeguard the privacy of his soliloquies. Thus interpersonal communication is not definitive of language but is merely an important by-product of it.[9] Neither is it mandatory that a person himself be able to produce those stimuli which are language vehicles for him—the hypothesis that God counsels a select group of his northern faithful through texture changes in the

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[9]Influenced by certain dubious arguments of the later Wittgenstein, Terwilliger (1968, p. 20) has recently contended with some vehemence, contrary to my present claim, that communication is definitionally essential to language; specifically, that "[a] there are no private meanings for words, for if [language] were not [social], it would not and could not be a language." However, Terwilliger also observes (1968, p. 18n) that "[b] adults can, of course, invent languages which no one else can understand, [c] But in all cases these languages are derivatives of existing languages." Even were the universality of claim [c] to go unchallenged, it is wholly obscure to me how this would prevent fact [b] from demolishing thesis [a]. The only way that [a] can be made compatible with [b] even given [c], it seems to me, is to argue that a "language" is not just defined functionally in terms of what it does, but that languages must also originate in a special way which disqualifies those which are "derivatives of existing languages" from being real languages.

aurora borealis is not logically absurd, just empirically implausible. And the fact that all acknowledged languages are *learned* is irrelevant to their nature: What disqualifies e.g. the so-called "language of the bees" from being a true language is not its innateness but (presumably) the *way* in which a bee's dance affects its audience; nor is it impossible that through some spectacular mutation a newborn infant could understand his mother tongue upon first hearing. All that is logically necessary (with a further important restriction to be added later) is for the stimuli comprised by an organism's " language " to be elicitors of cognitions in him. What language vehicles *must* do is to convey cognitive *meaning*.

That language is necessarily meaningful is not a strikingly original observation, but taken seriously it has major implications. First all, since the "meanings" words convey are some still-obscure aspect of the central processes they arouse,[10] it locates the essence of language functioning in reception events rather than in the performance phenomena which have been the near-exclusive study of recent psycholinguistics. (This in no way denigrates the value of research on verbal production, it merely emphasizes, that this not basically what language *is*.) Secondly, it protests against an overly facile equating of meanings (i.e. cognitions) with internalized verbal vehicles. Obviously the meaning of a linguistic expression cannot be the same thing as its overt vehicle, but we are long accustomed to conjecturing the existence of central counterparts to external stimuli (traditionally sensations, percepts, ideas, or reafferent feedback from implicit responses), and it *could* be that meanings are nothing more than verbal images or words-in-thought.[11] Such a notion is implicit in many standard treatments of cognition, as when e.g. a "concept" is held to be a verbal label or mediation response conditioned to a variety of stimuli. Moreover, the most evident objections to verbal-image theories of meaning—that the meaning of a given vehicle can change, that the same word may have more than one meaning (ambiguity and homonymity) while the meanings of grossly dissimilar vehicles in different languages and sense modalities may be the same (synonymity), and still other phenomena showing beyond question

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[10]Although the term 'meaning' has a long and desperate history of ambiguity (see pp. *299ff* below), I shall here consistently use it in what I would argue is by far its most common as well as most epistemically basic sense. Pressed for clarification, I would offer the following statements as partial definitions of this sense: (1) "Meanings" are the contents of mental acts. (2) Roughly speaking, the "meanings" of words and sentences are concepts and propositions, respectively. (3) An expression's "meaning" is what is sometimes also called its "sense," in contradistinction to its referent or designatum (cf. Frege, 1952). Thus, the two phrases 'southernmost land mass' and 'coldest continent on Earth' have different meanings (senses) even though they both refer to the same place.

[11]The notion of internal counterparts for overt stimuli is, as I shall point out later, considerably more problematic than we customarily recognize. At present, when I speak of words-in-thought, I mean whatever sorts of central processes are responsible for such phenomena as generalization across homonyms, and for our construing *as* homonymous visual symbols so physically different as 'THREW' and 'through'.

that an external word-vehicle's internal sensory correlate is not the same thing as its meaning—are not nearly so conclusive as they might at first seem, for it can be argued that an overt expression's meaning is not its own central counterpart but some or all of the other verbal images or implicit word responses evoked by it. According to this view, the "same meaning" shared by synonymous expressions is not an extralinguistic entity but some word-associative equivalence between them, so that e.g. two terms are synonymous to the extent that they evoke the same verbal responses. Similarly, lexicographic characterizations of an expression's meaning in terms of phrases to which it is more or less equivalent (paraphrase theories), as typified by recent psycholinguistic incursions into semantics (e.g. Katz & Fodor, 1963), remain in effect versions of the meaning-as-internalized-language thesis unless they derive their paraphrasings from deeper nonverbal communalities among expressions.

We cannot, however, happily define cognitive meaning in terms of language if in turn the latter, as an importantly *restricted* set of stimuli, is defined in terms of meaning evocation. To bring this off credibly, it needs to be shown why a person's "language" should not then logically include *all* stimuli which for him arouse the central correlates of other stimuli. Though totally ignored in the literature, how to distinguish linguistic from nonlinguistic stimuli is one of psycholinguistics' most profound problems. Just how profound I will show in a moment, after I first submit with inconclusive argument but strong intuitive conviction that cognitive meanings—i.e., the contents of mental acts—are *not* essentially linguistic.

The strongest objective evidence that meaning is not inherently tied to verbal imagery probably lies in clinical data on the aphasias (see especially Jones & Wepman, 1961). However, what I personally find most persuasive—over and above certain semantic-theoretical considerations to be aired later (p. 300ff))—is the introspectively evident gulf between word-thoughts and meanings. For example, as I find myself achieving increased clarity or deeper understanding of an issue, this does *not* consist in my becoming more verbally fluent about it; rather, the words at my command (and the things said by others) seem increasingly inadequate to express my grasp of the matter. When writing I often have to spend long minutes or hours crafting phrases which convey (to me) even approximately the particular multifaceted complexity of meaning I have in mind at the search's outset. And not infrequently I find myself developing new concepts which initially have no linguistic vehicle for me at all. Working out verbalizations for these is often highly instructive, but the concept is available to me in at least rudimentary form before I code it linguistically. More generally, it is hard to see how a culture or society could ever expand its cognitive horizons if experience and contemplation could not transcend the limited linguistic resources available to it at any given period. Finally, it is important to note that we can perceive, remember, and imagine the details of events—shapes, textures, colors, odors, rhythms, etc.—in far richer

preciseness than we can verbalize, though we can create and train ourselves to understand verbal labels for any of these if it becomes worth our while to do so. Similarly, anyone who wishes to ascribe mental acts to at least some infrahuman organisms (e.g., who suspects that monkeys and dogs can perceive and remember to at least a modest degree) while also maintaining that only humans have genuine language is thereby committed to accept that meanings can be nonlinguistic.

If it be agreed at least provisionally that the contents of mental acts such as perceiving and remembering are nonverbal central conditions arousable by varied sensory and ideational antecedents, then it is perfectly natural to suppose further that these very same cognitive contents can also be evoked by language vehicles and that this is, in fact, what happens when the latter "convey" meanings to their recipients. So viewed, a linguistic "ex-pression" is an overt or covert verbal stimulus which "presses out"—i.e., calls forth, brings out, or otherwise activates— its meaning. This is so commonsensical a notion of language function that it would scarcely need mention had it not recently fallen into low esteem in many psychological and most philosophic circles; for psychologists through long established though rapidly waning S-R customs requiring all mediational processes to be peripheral even if covert responses, and for philosophers because the nature of meaning as something which intervenes between language and reality has remained so obdurately obscure that the preferred tactic of late has been to analyze it out of existence. I shall return to problems of meaning later. Right now, it still remains to clarify how linguistic expressions are definitively different from other stimuli.

We have already noted that for a stimulus $S$ to qualify as a language vehicle for an organism $o$ at time $t$, it must elicit a cognition (cognitive meaning, intentional content) in $o$ at $t$. (To say that $S$ elicits, evokes, or arouses effect $e$ in $o$ at $t$ here means not that $S$ is necessarily in fact doing this, but only that $o$'s state at $t$ is such that stimulation by $S$ *would* elicit $e$ in $o$.) Implied by this is an important formal requirement which stimuli must satisfy if they are to qualify as language. For insomuch as the full content of an intentional act is a *proposition*, stimulus $S$ is not cognitively meaningful to $o$ at $t$ unless $S$ contributes to evocation in $o$ at $t$ of some central process which has this degree of structural complexity. The primary linguistic stimulus is thus a sentence (cf. Quine, 1960, Ch. 1), which qualifies as such regardless of its grammatical orthodoxy precisely by virtue of conveying a proposition. Relative to this sentential basis, the concept of linguistic "expression" may then also be generalized to include strings of sentences (e.g. paragraphs) as well as the subsentential units—words—which concatenate into sentences.[12] To

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[12]Not all decompositions of a sentence into components—e.g., top half vs. bottom half— intuitively yield subsentential "expressions," however. The difference between those which do and those which don't presumably lies in the principles by which the proposition-electing force of a sentence is compounded out of the effects of its constituents. Were it not that in linguistic practice propositions are often conveyed by sentential fragments or even single words while, on the other

be sure, as we become more knowledgeable about the inner organism, we will surely find that full-blooded propositional status is but a limiting ideal on several dimensions along which central processes vary, so that where we draw the line between sentences which convey propositions and not-quite-sentences which convey not-quite-propositions will be to a large extent arbitrary. But qualms about the dichotomizing of continua is a luxury which we can ill afford until their extremes become well differentiated. The important point for now, made evident by placing the fulcrum of language theory on sentences/propositions rather than on single terms, is that for all practical purposes *we have never yet had even a rudimentary psychology of language.* The reason is very simple: Except for a handful of very recent harbingers of what is to come[13], *all* past psychological accounts have treated verbal processes as elemental reactions to isolated words. These reaction elements have been variously described as implicit responses, response dispositions, overt or covert verbal associates of the stimulus word, "pure stimulus acts" or $r_g - s_g$ processes, detachable components of the response elicited by another stimulus, or (in older accounts) ideas and images; but the crucial inadequacy common to all lies in their being construed as something appropriately represented by a single term or (when the eliciting stimulus has multiple effects) by a simple list of such terms. This failure to make explicit the propositional structure of internal reactions to linguistic output is not just notational carelessness; rather, it reflects modern psychology's blindness to the nomic significance of compositional structure. Whereas the natural course of psychological events is for unrestrictedly

hand nonlinguistically aroused cognitions are very likely evoked in general by stimulus complexes whose structural influences follow a grammar of their own, it could be convincingly argued that reference to such concatenation principles—i.e. syntax—must be included in the definition of "language." (Actually, I am willing to concede that "language" is perhaps best regarded as a cluster-concept in which not merely syntactical complexity but also communicativeness, self-producibility, and other features traditionally proposed as definitive of language have a weakly criterial status. But I would still insist that the most essential feature in this cluster is one not heretofore recognized, namely, the one described on p. *300f* below)

[13]The exceptions are (*i*) Mowrer's (1954) proposal—a decade ahead of its time—that sentences are conditioning devices by which the response to one term becomes attached to another; (*ii*) semantic extensions of formal linguistics which go beyond bare syntax in seeking to model reception resolution of ambiguities in word meanings and grammatical structure (notably, Katz & Fodor, 1963); and (*iii*) Osgood's (1963) attempt to assimilate the ideas of both (*i*) and (*ii*) into his own theory of meaning. (However, (*i*) still treats specific responses to single words as the basic language process, with sentence reception being just a way to modify single-word responses. And while I suspect that development (*ii*) may indeed have the potential to become a genuine theory of cognitive language, I am not clear whether it has so far gone beyond sentence → sentence transformations into sentence → proposition activations. That is, would (*ii*) have anything nontrivial to say about a language whose terms were completely unambiguous and whose surface structure always mirrored its deep structure?) Finally, (*iv*) work on how the psychological effects of compound phrases derive from the effects of their constituent terms (Cliff, 1959; Rokeach & Rothman, 1965; Howe, 1966) though still subpropositional in concern, is a significant step in the needed direction.

complex environmental *facts*—i.e. entities formally isomorphic to sentences—to elicit behavior whose patterning derives from that of its input antecedents, and where the propositional articulation of mediating cognitions is required to transmit this structural influence, behavior theory has so far made formal provision only for the degenerate case of this wherein bare occurrence of a stimulus element elicits a fixed response.[14] Only when we have learned how to think about the generic import of compositional structure will the conceptual framework needed for a genuine psychology of cognition be available.

Evocation of propositional processes is the most visible watershed partitioning linguistic from nonlinguistic stimuli, but it is not the ultimate divide. For we have yet to say why *all* stimuli which evoke cognitions in a person should not count equally as linguistic expressions for him. Thus if the sight of moisture on the window, drumming on the roof and the sound of thunder, and the words 'It's raining' spoken or written by a friend in an appropriate context all induce me to believe *that it is raining*, on what grounds do these last stimuli qualify for me as language vehicles while those of the first two cases fail? (Note that even were acquisition-by-learning and self-producibility essential to language, coming to interpret wet windows and percussive noises as indices of rain is also a matter of learning, while watering windows and production of rainy sounds lies well within the range of instrumented human capability.) I shall propose a tentative solution to this problem which should not be passed over lightly despite the overidealized brevity to which I must here restrict my presentation. It is, in fact, one of the three pivotal insights into the specific behavior-theoretic character of language which I have managed to wrest from nearly a quarter century of struggle with this matter.[15] Even in rudimentary form it has no competition, for the simple

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[14]See Rozeboom (1961a), and especially Rozeboom (1960a). A previously unpublished section of the latter, observing how the factual nature of elicitors establishes sentences rather than terms as the behavior-disposing units of language, is contained in the pre-publication version of the latter that is contained on this site.

[15]Although I have so far published very little explicitly on the psychology of language, it has been a central concern for me ever since the earliest days of my intellectual awakening; in fact, I first encountered hard-core behavior theory while preparing an undergraduate term paper for Charles Morris' course in semiotics, wherein I brashly undertook to set aright his theory of signification (Morris, 1946—still the most comprehensive work on the psychology of language despite its behavior-theoretic obsolescence). Then and for years thereafter, I was groping to replace the near-universal doctrine that a word arouses the same response, or propensity thereto, as the entity for which it stands—an untenable view insomuch as individual words just don't evoke specific response propensities (cf. Brown, 1958, Ch. 3)—with an account recognizing that the psychological effects of both words and their referents are in some fundamental sense "context dependent." Realization that the linguistic/nonlinguistic determinants of specific behaviors are sentences/facts, rather than words/things (see Rozeboom, 1960a, 1961a), finally illuminated this darkness for me. My second insight, a belated outgrowth of my work on the logic of theoretical concepts (Rozeboom, 1962b), was that contrary to virtually all previous views on the matter including my own, symbolic representation cannot be analyzed as the symbol's acquiring an

reason that previous theories of language have to my knowledge never seriously addressed this issue beyond an occasional abortive[16] attempt to distinguish "signs" or "signals" from "symbols." (Cf. "Thunder is a sign of rain, 'rain' is a symbol of it.")

To begin, consider how the argument that signs (signals) are *symptoms* which produce *anticipation* of what they signify whereas symbols *represent* them (Langer, 1942; Werner & Kaplan, 1963) entirely misses the point despite its intuitive appeal. It overlooks that the anticipation of an event *e* evoked by a sign of it is an intentional act whose content represents *e*, while a symbol represents e only mediately by likewise evoking an intentional content—meaning—which is what most directly signifies *e*. The problem is to distinguish sign from symbol in terms of *how* they bring about central representation of the external event. A simple answer would prima facie be at hand if cognitive meaning were merely covert verbalizations. For then, presuming that symbols are essentially language vehicles[17] while signs are nonlinguistic, one might argue that when verbal expressions convey meanings, both cause and effect in this arousal sequence belong to the family of linguistic events, whereas when beliefs are aroused by nonverbal stimuli only the effect is linguistic, i.e., the sequence is a "language-entry transition" (Sellars, 1954). Denial of an inherent connection between language vehicles and meaning, however, thwarts this sortie. More generally, I submit— programmatically, since there are too many possible variants on this argument to refute one by one—that meanings are sufficiently detachable, logically and causally, from all classes of their afferent antecedents to dangle any hope that linguistic expressions differ from nonlinguistic elicitors of meaning by virtue of stimuli of the one kind evoking directly (or by an inherently shorter causal route) what the other evokes only through mediation by the former's central correlates.

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effect on the organism akin to that of its referent. (Something like this undoubtedly happens in some phases of language learning, but it is irrelevant to the nature of aboutness—see next section.) And the revelation now to be aired became accessible to me only after I began to make explicit, rather than grudgingly parenthetical, provision in my thinking for the intentional-mode component of cognition. All of this leaves past orthodoxies far, far behind, and the distance yet to be travelled only emphasizes further the desperate inadequacy of standard views on the psychology of language.

[16]Abortive in that they either emphasize the distinction without clarifying its nature (e.g., Langer, 1942; Werner & Kaplan, 1963), or tie it to some incidental feature such as the artificiality (e.g., Stebbings, 1931; Bertalanffy, 1965) or self-producibility (Morris, 1946) of linguistic symbols.

[17]Clearly ordinary language does not construe "symbols" and "verbal expressions" to be entirely the same thing. (E.g., the crucifix is a Christian symbol but not, prima facie, a verbal expression.) But a strong possibility remains that when the definitive properties of language are laid bare, symbols which are not recognized words in official languages such as English will nevertheless prove to be linguistic in function, or at least to differ from true words only modestly. In any event, regardless of what "symbols" may be in an extended sense, only semantic symbols—i.e., paradigmatically language—are at issue in the "signal/symbol" contrast.

But what, then, *is* the language-definitive distinction between arousal of rain-belief by the sound 'It's raining' and the sound of thunder, respectively? The essence lies, I suggest, in how the cognition's *mode* is determined. In both examples, the elicited event is occurrence (in organism $o$ at time $t$) of believing-that-it-is-raining, while the eliciting event is occurrence (just before $t$ near $o$) of a complex stimulus configuration whose components include thunderous vibration in the one case and the acoustic pattern 'It's raining' in the other. But nonlinguistic occurrence of thunderous vibration not merely brings the it-is-raining proposition to mind but also causes it to be *believed*, rather than doubted, conjectured, hoped, or otherwise moded. In linguistic contrast, bare occurrence of the sentence 'It's raining' activates the proposition *without* determining its mode of entertainment. That the cognitive resultant is a *believing*, rather than a doubting, conjecturing, etc., is due entirely to other features of the total eliciting event such as the utterance's intonation (e.g.,' It's raining!' vs. 'It's raining?'), choice of phrasing (e.g., 'It's raining!' vs. 'Oh, for it to rain!'), and the broader context of delivery (e.g. recalling that the speaker is a notorious practical joker). Of course, the broader context also affects nonlinguistic arousal, as when the degree of rain-belief evoked by occurrence of thunderous vibration is enhanced or diminished by additional concurrent input such as the sight of lightning or heavy construction work nearby. The critical distinction here is that in nonlinguistic elicitation of an intentional act, the same stimulus configuration whose occurrence determines the intention's content *also* has a primary effect, by virtue of its occurrence, on the intention's mode. In contrast, content and mode effects are causally de-coupled in linguistic arousal through their respective control by cleanly separable components of the eliciting complex. In this way, language is able to present (convey, evoke in thought) a proposition without prejudicing any particular valuation of it, while persistence of the vehicle which accomplishes this presentation insures persistence of propositional content in the teeth of modal drift. This, I propose, is the technical reality behind the often-voiced intuition that language frees our thinking from the here-and-now, or (cf. above) that signs are symptoms of events while symbols represent them. It is not that propositions with distant reference cannot be thought without words, but that when unverbalized they are likely to be evoked only by stimuli which also control the degree to which they are believed. Language is what makes *contemplative* thought a practical possibility.[18]

Fragmentary as they are, my remarks on the psychology of language already transgress seemly proportions for this survey, and I can only hint at further issues which spark through the gap between language and cognition.

While I have protested the assumption that meanings are word bound, one need not be a dedicated Whorfian to recognize that a person's language importantly

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[18]My distinction between signals and symbols has been anticipated by Ducasse (1939). Note added in proof.

influences the character of his thinking. Detailing the specific ways in which this is so should prove highly educational not merely to cognitive theory but for cognitive engineering as well. Some of the more prominent of such influences:

1) That language facilitates subjunctive thought has already been noted; but detaching consideration from conviction is not its only contribution to this. Words are able to evoke abstract concepts free of the inessential, distracting, and quite possibly misleading specifics which inevitably accompany the concept's arousal by nonverbal input. Thus to redeploy a traditional example, sentences containing the word 'triangle' can sustain thought about abstract triangularity without restricting this to a particular size and angularity (e.g., right-isosceles with a 3-inch hypotenuse) as perception or visual imaging of a triangle would do.

2) The "sustaining" action just mentioned should not go underappreciated. Whereas nonverbally aroused thinking about the not-here-and-now is an ephemeral, shimmery sort of thing in which one fragmentarily activated idea flickers into another and yet another too fleetingly for effective feedback control by monitoring reactions, verbal self-stimulation prolonged indefinitely by such simple techniques as recycling through covert vocalization or repeated sensing of an enduring (e.g. printed) symbol display greatly enhances the focus and stability of thought. To be sure, evocation of meanings is no less chancy by verbal vehicles than by other forms of stimulation—the strength (probability, intensity, completeness) with which a symbol $S$ conveys its meaning on a particular occasion depends greatly on the recipient's past training and present receptivity parameters. But this side of semantic satiation, persistent input accessibility of $S$ optimizes the quality with which $S$'s meaning is available when needed.

3) For reasons well worth probing in detail, we can usually perform transformations with greater ease and reliability upon external stimulus arrays than upon meanings. Symbolic transformations which correspond to significant meaning relations (e.g. valid inference) can thus enormously enhance a person's reasoning effectiveness through symbol-symbol sequencing in which meanings need be considered only for set-up of starting configurations and interpretation of results. Much of the potency of mathematics and other formal disciplines may be attributed to this capacity for trade-off between understanding and algorithmic efficiency. To be sure, the yield of meaning-free verbal thinking under less than algorithmically optimal circumstances tends toward flatulent absurdities and rote clichés. But that is another matter, albeit unhappily a familiar one.

4) While the virtues of language for interpersonal communication are too obvious for mention, what is perhaps not quite so transparently evident is that exposure to the verbal output of others also educates a person in concepts which he would acquire only much more slowly if at all from strictly nonverbal experience. Two comments on this must suffice pending some later remarks on concept

formation. One is that the deeper we contemplate how a person might learn word meanings which are not already preformed in his central reactions to nonverbal stimuli, the more profoundly enigmatic this phenomenon becomes. The other is that enrichment of a person's concept repertoire through language learning may not be restricted only to concepts expressible in this language. It could be, for example, that a child whose first awareness of shape comes through his parents' use of the labels 'circle' and 'square' thereby also acquires additional shape concepts (demonstrated, say, by his ability to make form discriminations previously beyond him) for which he has no verbal expression. The extent to which this does, in fact, occur remains for future research based on theories of discrimination learning far more sophisticated than those now available.

Finally, it should be acknowledged that modern psycholinguistics, though peripheral to cognition proper, has brought to the fore some closely allied problems of considerable significance. Specifically, the syntax of a language such as English reflects a remarkable intricacy of constraints on the verbal productions of its more fluent speakers. To construct theories of the organism which countenance behavior patterning so complex as this is a very nice problem indeed, especially insomuch as a formal grammar which generates the language's syntactically *permissible* verbal strings tells little if anything about why—or how—a person emits the particular string he does on a given occasion. The needed explanation is framed by the theory of intentional acts, since presumably a person's utterance of expression $E$ is due primarily to his $\phi$ing that $p$, where in the simplest cases $E$ expresses $p$ while the utterance's phrasing or intonation signals mode $\phi$. But as the extant abundance of grammatically distinct languages makes evident, a cognition's content determines only weakly the fine structure of its verbal coding. Unlike conscious thought, to which classical psychology has devoted much attention, the processes which discharge a preverbal cognition into phoneme-by-phoneme serial emission of a syntactically well-structured utterance have remained far beyond the ken of traditional psychologies. That they have now become appreciated—in fact revelled in—for what they are speaks well of modern psychology's readiness, at long last, to have it out with inner complexity.

## Problems Concerning Truth

Although "intentional acts" have already figured prominently in this survey, we have scarcely begun to sound their psycho-philosophical depths. The full, awesome murkiness of these is visible only from the epistemic crags of "truth."

## Semantic veridicality

It is simple to agree that a person cannot *know* that something is the case unless what he so believes is true (veridical, correct, accurate). Less simple is to make this provision perspicuous. Dropping the first veil is easy enough—with possible degenerate exceptions (e.g., tautologies), a proposition's truth derives from its relation to something else. To say just what this " something else" is, however, and precisely how it determines a proposition's truth value, requires sorting out one of the nastiest tangles of the significantly trivial with the obscurely unresolved ever to befuddle generations of philosophers. What is "significantly trivial" here is the correspondence principle of truth. Properly understood, this is so incontestable as to be almost vacuous, yet it must be respected with great sensitivity if one's truth theory is not to blunder into absurdity.

The correspondence principle of truth is that a proposition is true if and only if reality is as it represents; more precisely, that what a sentence '$p$' expresses is true iff (if and only if) $p$.[19] (E.g., 'John loves Mary' is true iff John loves Mary.) Such simpleminded reference to objective reality often disconcerts weekend epistemologists who have never recovered from the shock of philosophic scepticism. "Aren't you naive to assume that there is any external world at all?" the objection is likely to go. "Perhaps it's all in our minds, with truth being whatever we think it is. In any case, how could truth ever be a comparison between our thoughts and absolute objectivity when the latter is basically unknowable?" Such arguments are simply confusion compounded. In the first place, belief in external reality is not a grand metaphysical commitment, but merely some degree of confidence in one or more everyday propositions, such as 'John loves Mary', 'The traffic light is red', and 'You're standing on my foot', of form *other* than a nonrelational first-person claim. So long as I do not construe these to be shorthand for solely-first-person attributions such as 'I believe that John loves Mary', 'I'm having a red-traffic-lightish experience', and 'It seems to me that you are standing on my foot'—and to insist that a statement '$p$' is always elliptical for something like 'I think that $p$' precipitates a vicious regress[20]—I have admitted all the outside world needed for a realist ontology and correspondence analysis of truth. The latter especially does not presume that I *know* or even feel very sure that John loves Mary, that the traffic light is red, etc. It suffices to respect these propositions and their negations as genuine alternative *possibilities* on which conditional conclusions can

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[19]This principle has a long history reaching back at least to Aristotle (Metaphysics, 1110b 26–28: "To say of what is that it is not, or of what is not that it is, is false; while to say of what is that it is, or of what is not that it is not, is true"). Its most advanced modern expressions are found in the Tarski-Carnap formalization of semantics, where it is sometimes known as the "semantic conception of truth" (Tarski, 1944).

[20]If the logical form of every statement '$p$' is really '$x$ $\phi$s that $p$' then the latter analyzes as '$x$ $\phi$s that $x$ $\phi$s that $p$' which in turn really means '$x$ $\phi$s that $x$ $\phi$s that $x$ $\phi$s that $p$', *ad infinitum*.

be grounded.

Specifically, whenever I believe/am uncertain/disbelieve that $p$ and am also aware that I believe/am uncertain/disbelieve that $p$—i.e. whenever my conceptual resources allow me not merely to *use* (have as content of an intentional act) the proposition that-$p$ but also to *refer* to it—I find myself entertaining not only the proposition that-$p$ itself but propositions *about* that-$p$ as well.[21] It would be most surprising if the paired propositions of these two types were not analytically connected somehow, and the correspondence principle, that that-$p$ is true if $p$ and false if not $p$, acknowledges one such relation. To verify this principle I need not aspire to transcend my egocentric predicament and compare subjective beliefs with naked objectivity; it suffices merely to observe that the propositions e.g. *that John loves Mary* and *that that-John-loves-Mary is true* are so interrelated that any grounds for believing that John loves Mary are also grounds for believing that that-John-loves-Mary is true, and conversely. (How these two propositions can be analytically equivalent, or almost so, without being identical is a nice technical question, but not one which requires attention here.)

Although the correspondence principle of truth is not seriously disputable, it merely raises, not solves, the significant problems of semantics. For why should that-John-loves-Mary depend for its truth on John's loving Mary rather than on, say, ice's being cold. Clearly the proposition that-John-loves-Mary must relate to something in John's feelings for Mary which it does not find in the thermal facts of ice. But what is this relationship and to what, specifically, does the proposition bear it? The correspondence principle is totally uninformative about this—the grammatical operators which transform use into mention *presuppose* some such relation without at all illuminating its nature. The deep problem here is to formulate principles of veridicality which do not require that a problematic proposition or some paraphrase thereof be used to express its own truth conditions. Without such principles we cannot analyze truth for languages not synonymously translatable into our own.

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[21]The English cues for distinguishing between use and mention of an expression are subtle, varied, and far from consistent. Most reliable of these is usage of form 'that $p$' to designate the proposition expressed by sentence '$p$', while occurrence of '$p$'without a 'that'-prefix signals use (e.g., assertion) rather than mention of this proposition. (Important exceptions to this rule, however, are such contexts as 'the fact that $p$' and 'in the event that $p$') I have not previously followed this convention rigorously but will now do so in passages wherein the distinction is especially critical.

## Meaning and reference

For the most part, survey of epistemology's semantic sector is not feasible here, for the issues are all highly technical and unforgiving even of small missteps.[22] In particular, semantical theories find it especially hard to evade premature commitment to a specific and inevitably dubious ontology. (E.g., do negative and disjunctive facts exist? Are there properties which have no exemplars? For every simple or complex predicate, does there exist a property which is had, or class which is belonged to, by exactly those entities which satisfy that predicate?) Whatever it allows to be the targets of semantic relatedness, a theory of semantics must on the psychological side admit at least (1) a class of meaning elements—"descriptive concepts"—which in general *designate*, *signify*, *represent*, *refer to*, *name* or *are about* certain other entities, and (2) well-structured complexes of descriptive concepts—descriptive phrases, complex predicates, and above all propositions—which signify corresponding complexes of their elements' referents if in fact the latter combine as represented. It may then be held that a proposition $p$ is true iff there exists a fact (state of affairs) in which entities named by the descriptive concepts in $p$ are united by the same structure that integrates their names in $p$ (cf. Rozeboom, 1962a, 1962b). That is, if the concepts *John*, *Mary*, and *loves* respectively designate the objects John, Mary, and the asymmetric dyadic relation of loving, then the proposition *John-loves-Mary* is true if there exists a state of affairs in which John and Mary respectively occupy the first and second pole of loving, i.e. if it is a fact that John loves Mary, and is false if no fact answers to this description. But I cannot claim even this much without entering disputed ground, so I shall turn from the semantics of intact propositions to their roots in the nature of concepts.

Although what passes for the psychology of "concepts" has recently advanced beyond simple discrimination theory towards something more genuinely cognitive, research psychology has yet to acknowledge the great functional diversities which partition the concepts we exploit in everyday life. Just how varied these are becomes evident if we assume that each word or syntactic unit in a sentence contributes a particular meaning ingredient to what the sentence expresses, and that all such word-controlled propositional components are "concepts" of one kind or another. (I would not care to argue that the combinatorial units of language and meaning, respectively, correspond quite this tidily, but something like it must surely be roughly correct.) At least four broad categories of concepts need prima ' facie distinguishing. Foremost on anyone's list would be the *descriptive concepts* expressed by terms such as 'John', 'Seattle', 'blue', 'hard', 'triangular', 'loves',

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[22]Philosophical semantics' profound methodological problems have never, to my knowledge, been seriously examined in the literature. For intimations and fragments, however, see (Rozeboom, 1962b, 1971)

'hit', 'grow', 'seven', 'butter', 'tree', etc., whose semantic function is to designate objects, attributes, relations, and other (?) subfactual furnishings of the world. (Whether predicate terms—verbs, adjectives, common nouns—designate in at all the same way as do proper nouns is controversial; but then so is everything else in philosophical semantics. Any reader appalled at the crudity of my simplifications here may find consolation in the fact that they pain me too.) Secondly, there are the *logical connectives and quantifiers*, expressed by 'and', 'or', 'not', 'some', 'every', 'is', etc. Presumably these have no referents in their own right but are structural auxiliaries which combine with descriptive concepts to generate propositions and other descriptive compounds. Thirdly, syntactically inseparable from descriptive predicates though intuitively distinct from them in their semantic character, are *evaluative concepts* expressed by such terms as 'delicious', 'nasty', 'beautiful', 'petty', 'awesome', etc. A common view (e.g. (Stevenson, 1944, Ch. 3)), though one I no longer find attractive (see p. *309* below), is that these are "emotive" terms which, unlike descriptive predicates, have no objective referents and merely reflect attitudes toward the objects to which they are ascribed. Finally, concepts holding special philosophic fascination are the *modal operators* expressed by 'probable', 'possible', 'should', 'must', 'because', 'necessary', and the like. Syntactically these behave like logical connectives, converting propositions into other propositions. A good proportion (all?) of the modal operators reflect intentional modes in that to modal operator $M$ there corresponds an intentional mode $\phi_M$ such that if $Mp$ is the proposition into which $M$ transforms another proposition $p$, believing $Mp$ has much the same psychological force as entertaining $p$ in mode $\phi_M$, while asserting $Mp$ is communicatively equivalent to uttering $p$ with context signals for mode $M$. Thus instead of a moderately confident but slightly hesitant pronouncement of 'It will rain tonight', or a pleading/demanding utterance of 'you will pay back the money you owe me', it is much easier to assert firmly 'It will probably rain tonight', or 'you ought to pay back the money you owe me'.[23] Even so, there is an important logical difference between $\phi_M$ing that $p$ and believing that $Mp$; for what proposition $Mp$ purports to be about is not any actual $\phi_M$ing that $p$, but some state of affairs which *justifies* $\phi_M$ing that $p$. (Why should I feel considerable but not complete confidence that it will rain tonight? Because the probability of rain tonight is high but not certain. And what justifies demanding that you repay your debt to me? Because you ought to.)

Commonsensical semantic distinctions such as these challenge the psycho-philosophy of knowledge to clarify in depth and functional detail what they are all about, to dispel the mists of mystery from meaning by identifying within the

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[23]For steps toward a similar treatment of 'because', see Rozeboom, 1968. This case is especially interesting for the theory of mental acts in that the intention's mode has a relational form embracing two or more propositions as content, which is greater logical complexity than found in the acts traditionally recognized by the philosophic literature.

fine-grained inner workings of cognizant organisms those features which show the combinatorial properties and empirical/logical outreachings already honored by the idealized abstracta of philosophical semantics. Union of the finest technical proficiencies on both sides of the psycho-philosophical hyphen is essential to this effort, for philosophically untutored psychologists are demonstrably tone-deaf to even the simplest of semantic themes while few philosophers untrained in experimental psychology seem able to comprehend either the aims, methods, or results of scientific research analyzing psychological events as natural phenomena. We may call this still-virtually-nonexistent interdisciplinary specialty "psychosemantics" to emphasize its advance beyond past psychologies of meaning in seeking to exploit, substantiate, refine, emend, and amplify the full range of distinctions and complexities recognized by philosophical semantics. I conclude this section with sketches of what I see as the main axes of its orientation.

### The analysis of aboutness

In any semantic investigation, the standard query "What do we mean by 'meaning'?" will do for openers. Even though by now something of a cliche, the question is still cogent for the very good reason that the term 'meaning' has a multiplicity of ordinary-language senses which need sorting out. Previous inventories of this stock (most notably Ogden & Richards, 1923, Ch. 7, Frankena, 1958; Black, 1968, Ch. 7) have pushed the alleged count well into the dozens. To be sure, these have run up the score by conflating ambiguities in the meaning of 'meaning' with different varieties or theories of 'meaning' in a given sense; but even so, there exist at least four distinguishable usages whose confounding creates no end of mischief: (1) Most broadly, the "meaning" of a stimulus is any or all of the central reactions it elicits, especially ideational associates. (E.g., 'That column of smoke means that something's on fire over there.' In a variant of this sense, the "meaning" is what the associated ideas are ideas of, e.g., not the thought of fire but the fire itself.) An expression's "connotation" is meaning in this sense.[24] (2) Statements such as 'John had a meaningful discussion with his boss yesterday' and 'My life seems empty of meaning', in which 'meaningful' is synonymous with 'significant', 'pregnant', or 'portentful', exhibit concern for deep affective tones demarking basic values—not passive enjoyments of good-feeling but experiences of importance, pleasurable or otherwise. Meaning in this sense, which might be called "humanistic" meaning, is akin to the meanings expressed by evaluative predicates except for feeling too rich, too full, too ineffably personal to put into words. Finally, as illustrated by "In German 'oder' means *or*" and "The phrases '34th U.S. President'

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[24]That is, in the popular sense of "connotation." Philosophically, "connotation" has meant something importantly different from this, namely, a concept's analytic entailments (cf. Ryle, 1957).

and 'Supreme W. W. II Allied Expeditionary Commander' have different meanings even though they both designate D. D. Eisenhower," in contrast to "By 'Old Bulge-bottom' Herbert means his dog," both (3) the contents and (4) the objects of mental acts are commonly said to be "meanings," i.e., not only what words express but also what they are *about.* Of these assorted usages, only the third—"cognitive" meaning—is what semantical theory intends by this term. But unlike (1) and (2), (4) is semantically central even when it is not confused with cognitive meaning. It is, in fact, definitive to the latter; for no expression has meaning in the semantic sense unless it or some expression which includes it potentially represents something. In large measure, the theory of aboutness *is* semantics.

Historically, it has proved extremely hard for philosophers to appreciate how important it is, or psychologists how difficult, to make scientifically explicit the natural basis of the aboutness relationship. It is all very well for a philosophically "pure" semantics (Carnap, 1942, §5) to build axiomatically upon unanalyzed reference concepts, but we still need grounds superior to naked intuition on which to judge whether the chosen axioms and their consequences are all that they should be. Once a discipline has salvaged what it can from philosophic folklore and the wisdom of ordinary language its growth must be sustained by technically refined data sources if its formal models are not to be reactionary exercises in futility; and only the advanced study of behavior mechanisms can be expected to tell what axioms correctly describe those complexities of semantic reality which exceed the grasp of traditional idealizations (see p. 72ff. below). As it is, some of our most important philosophers (e.g., Quine, 1960) have already begun to infuse philosophical semantics with do-it-yourself behavior theory. Most conspicuously, this has been true of "linguistic" philosophers beguiled by the Wittgensteinian meaning-is-use slogan. However, arguments that meanings are neither the physical objects which some words name nor ghostly inhabitants of a "third realm of nonphysical, nonpsychological entities" (Ryle, 1957) turn enlightenment into obfuscation when by sleight-of-tongue they intimate that once an expression's meaning is traced to its linguistic role or rules of employment (Sellars, 1954; Ryle, 1957) all puzzles of aboutness simply evaporate.[25]   To distinguish—correctly and importantly—between meaning and reference does not do away with the latter but shows rather that we need theories of each. Moreover, to ask for the "use," "rules of employment," or "role" of an expression is to grope for what ordinary language lacks

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[25]In his recent important excursion into the philosophy of cognition, a work whose outlook is in almost all major respects highly similar to my own despite certain devious turns of argument which spin out in directions which I find distressing, Sellars (1968) gives a virtuoso demonstration of how adroitly a brilliant philosopher can dodge and weave all around the issue of aboutness without ever coming to analytic grips with it. (Sellars makes one close pass in his notion of a "correct picture" of an external object; however, he says nothing about what determines which particular object a given picture is a picture *of*, nor by virtue of what it is "correct," beyond a brief, cryptic allusion in Chapt. V, §30, to the causal origins of perceptual pictures.)

resources to conceive and only psychological science will someday provide, namely, a functionally detailed account of the events which transpire during a person's interactions with cognitively meaningful stimuli.

Meanwhile, psychology's own troubles in keeping hand and eye on the psycho-semantical ball are manifest in its feckless fumblings at linguistic reference. If $E$ is a verbal stimulus, say the visual shape $RED$, which designates an entity $e$, say the color red, for organism $o$ at time $t$, what is the psychological nature of this semantic relationship? Clearly, since $E$'s designative potential for $o$ at $t$ is determined by how it affects $o$ then, there must be some alteration, adjustment, or reaction $m$ (not necessarily response-like) produced by $E$ in $o$ at $t$ which mediates $E$'s reference to $e$ for $o$ at $t$,[26] while any other stimulus which also arouses $m$ in $o$ at $t$—i.e. any synonym for $E$—likewise designates $e$ for $o$ at $t$. That is, presentation of $E$ (to $o$ at $t$) initiates a sequence $E \rightarrow a \rightarrow b \rightarrow \ldots \rightarrow m \rightarrow \ldots$ of events[27] in $o$, some stage $m$ of which "directly" designates $e$ in the sense that (1) each stage of the sequence prior to $m$ designates $e$ mediately by virtue of its evoking a process which designates $e$, and (2) $m$ designates $e$ on grounds other than evoking a designator of $e$. The point of distinguishing $m$ from $E$ and the intervening precursors of $m$, is that while the semantic properties of verbal afferent processes are indeed to be analyzed—as the psychology of meaning has traditionally assumed—in terms of their causal effects, this is but incidental to the main problem: Since the causal sequence does *not* usually eventuate in production of the input expression's referent, we must ultimately recognize a semantically basic stage of internal arousal whose aboutness resides in something other than what it in turn elicits.

If stimulus $E$ designates entity $e$ (for $o$ at $t$) by virtue of arousing a central process $m$ whose own reference to $e$ is unmediated by $m$'s causal *consequences*, might this basic reference of $m$ to $e$ perhaps be explained in terms of $m$'s causal *antecedents*? I.e. could $m$ designate $e$ by virtue of there existing a $c$ such that $c$ elicits $m$ while $c$ stands in some reference-criterial relation to $e$? Not by any antecedent of $m$ in the arousal sequence initiated by $E$; for by a modest extension of the argument just offered we may stipulate that the cognitive meaning $m$ of $E$ is whatever event in this sequence is the one semantically closest to $e$. That is, construing some stages in $E \rightarrow a \rightarrow b \rightarrow \ldots \rightarrow m \rightarrow \ldots$ to designate e by virtue of arousing, or being aroused by, some other designator of $e$ in this sequence is a

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[26]It may or may not be necessary, when $E$ designates $e$, for $E$ to occur in a special context (e.g., an asserted sentence) which evokes a reaction (e.g. a believed proposition) of which $m$ is merely one constituent. This and similar qualifications may be appended to the present discussion wherever they feel needed.

[27]More precisely, $E, a, b, \ldots, m, \ldots$ are event types (i.e. features of particular events) such that occurrence of $E$ in a suitable context brings about an occurrence of $a$, which in turn brings about an occurrence of $b$, etc.

recursive analysis of reference which requires one stage—call it $m$, or "meaning"—to form the base of the recursion and whose semantic coupling with $e$ must hence be traced to something other than $m$'s role in the causal sequence beginning with $E$. However, $E$ is not in principle the only elicitor of $m$, and it is not implausible that $m$'s reference to $e$ (for $o$ at $t$) may consist partly in $m$'s being also a stage in the sequence of internal events initiated in $o$ at $t$ by an occurrence of $e$ in some suitable context near $o$ at $t$. Two versions of this approach—one major and one minor—in fact subsume essentially all psychological theories of reference proposed to date.

The minor version is the covert-speech interpretation of meaning. While views in this category seldom explicitly address the problem of reference, it is sometimes claimed (notably Skinner, 1957, Ch. 5) that the referent of an expression $E$ is the nonlinguistic entity to which $E$ or its central correlate has become attached as a labeling reaction. In contrast, the major version honors our intuition that symbols are surrogates for what they signify by construing $E$'s meaning to be some aspect of the nonlinguistic reaction produced by $E$'s referent. So viewed, $RED$ designates redness for $o$ at $t$ if this trigram has become conditioned (in $o$ at $t$) to some detachable component of the unconditioned reaction elicited (in $o$ at $t$) by the color red. (See Osgood, 1952, 1963, for the most behavior-theoretically sophisticated variant of this approach, and Morris, 1946, Appendix, for a synopsis of its history.) Covert-speech and fractional-surrogate theories of meaning agree that when verbal stimulus $E$ designates nonlinguistic stimulus $e$, both $E$ and $e$ evoke inter alia a shared effect $m$ which is a primary reaction to one of these and a secondary reaction to the other; they differ in which stimulus—symbol or referent—they take to be $m$'s primary elicitor. I say "primary" and "secondary" here, rather than "unconditioned" and "conditioned," to avoid premature commitment to the assumed distinction's nature; for this seemingly straightforward matter in fact hooks into psychosemantics' most vital nerve.

Consider the conjecture that for some psychological effect $m$, a stimulus $S_1$ designates (represents, signifies, stands for, symbolizes, refers to, but *not* means) another stimulus $S_2$ for $o$ at $t$ when both $S_1$ and $S_2$ evoke $m$ (i.e. if presented *would* evoke $m$) in $o$ at $t$. This is clearly untenable as proposed, for the interchangeability of $S_1$ and $S_2$ in the analysans would make designation a symmetric relation whereby, e.g., if $RED$ stands for redness, then the color also stands for the word. To achieve symbol/referent asymmetry, a common-effect theory of reference must also stipulate suitably different *ways* in which stimuli evocative of $m$ relate to the latter. Specifically, some notion of "primary" arousal is needed to qualify a stimulus as, say, referent but not symbol, another—"secondary" arousal—to qualify it as symbol but not referent, while it must also be allowed that some conditions of arousal permit two stimuli to share an effect without either thereby signifying the other. The last case, in fact, must be the overwhelmingly prevalent one, for an

organism's reactions to any two stimuli which affect him at all will always have *something* in common.

Are these rather modest requirements realizable? Perhaps—but if so, not by any approach to the psychology of language yet published. The simplest way to thwart excessive promiscuity in one's proposed reference relation is to restrict the common effects allowed to mediate it, i.e., to hold that $S_1$ designates $S_2$ iff there exists a reaction $m$ of some special kind $K$ such that $m$ is a primary effect of $S_2$ and a secondary effect of $S_1$. For this restriction to be helpful, however, it must yield that two stimuli such that neither refers to the other do *not* usually have a common effect of kind $K$. Unlike the fractional-surrogate view of meaning, the covert-speech position at least suggests how the class of reference mediators might be limited (namely, to whatever counts as internalized language), but this and indeed any plausible suggestion for $K$ is ineffectual for explaining the lack of referential coupling in such stimulus pairs as *RED*-blood, redness-blood, and knife-sharpness. For these and any other pair of stimuli $S_1 - S_2$ whose central correlates are bidirectionally associated, $S_1$ and $S_2$ should have common effects of kind $K$ no matter how brutally $K$ is restricted.[28] The problem here is that if $S_1$ and $S_2$ (say redness and blood) both elicit an $m$ of kind $K$, and if primary/secondary are the only alternatives for such arousal, it follows that either (1) $S1$ designates $S_2$ or conversely (clearly inacceptable for redness-blood, since presumably neither of these stimuli is semantically *about* anything), (2) $S_1$ and $S_2$ both designate all primary elicitors of $m$ (inacceptable for redness-blood for the reason already noted), or (3) $S_1$ and $S_2$ are both designated by any secondary elicitor of $m$ (again objectionable for redness-blood, since according to standard semantic theories a word which designates one of these should not also designate the other). To escape this dilemma we need a semantically neutral way to arouse $m$, so that even if, e.g., blood evokes a primary effect $m$ of redness, it does so in a tertiary manner under which blood neither designates redness nor is in turn designated by *RED* through the latter's secondary elicitation of $m$. But that requires what the psychology of language has not yet tried to conceive, namely, a distinction between primary and secondary meaning arousal which does not exhaust the logical possibilities, as does e.g. conditioned vs. unconditioned.

Even without tertiary complications, moreover, neither of the two interpretations of primary vs. secondary meaning arousal suggested in the literature seems at all semantically viable. Treating it as a difference in acquisition, notably as

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[28]If $x$ and $y$ are bidirectionally associated, so that $x$ elicits $y$ and $y$ elicits $x$, then any effect of $y$ is also aroused by $x$ through the mediation of $y$, and conversely. Moreover, this difficulty cannot be avoided by stipulating that the $K$-kind effects of a stimulus include only those which are unmediated, for unmediated effects probably do not exist—i.e. if causal propagation is continuous, then for any $S$ and $m$ such that $S$ elicits $m$, there always exists some intervening process $h$ such that $S$ elicits $h$ and $h$ elicits $m$.

conditioned vs. unconditioned (learned vs. unlearned), will not do at all; for not only is it logically possible even if wildly contrary to fact for the effects of all semantically related stimuli, symbols and their referents alike, to be innate, we have good reason to think that virtually all effects of all external stimuli on cognitively advanced organisms are to an important degree learned. An alternative hope gleams within the notion of "fractional anticipatory response" or "detachable component" of a reaction, the thought being that $m$'s elicitation by $S_1$ is secondary relative to its primary arousal by $S_2$ if $m$ is the whole of $S$'s $K$-kind effect but only a part of $S_2$'s. This approach is in deep trouble from the outset, however, unless $K$ is carefully restricted, because if $S_1$ and $S_2$ are discriminable (by $o$ at $t$) at all, then each has some effect (on $o$ at $t$) not shared by the other. Also jeopardous to it are conceptual puzzles over what is and what is not a stimulus "effect"; for if $S_2$ evokes reaction component $r$ while $S_1$ does not, it can also be claimed that $S_1$, unlike $S_2$, has *not*-r as an effect[29]—whence it would follow, were *not*-r to be of kind $K$ iff $r$ is, that the $K$-kind effects of one stimulus (on $o$ at $t$) can never be a proper subset of those of another. Worst of all, the part/whole treatment of primary vs. secondary meaning arousal has the semantic-theoretically deplorable consequence that if the $K$-kind effects of $S_1$ are a proper subset of those of $S_2$ while the latter are a proper subset of those of $S_3$, then $S_2$ designates $S_2$ while $S_1$ designates both $S_2$ and $S_3$, thus making semantic reference a transitive relation.

Finally, an especially ugly complication for any attempt to analyze reference in terms of shared reactions is the following: If $S$ is a stimulus which evokes reaction $m$ (in $o$ at $t$) while for another stimulus $S^*$ either (1) $S^*$ is a compound stimulus which includes $S$ (e.g., $S$ is redness while $S^*$ is redheadedness), (2) $S$ is a causal consequence of $S^*$ (e.g., $S$ is redness while $S^*$ is closure of certain traffic-light relays), or (3) $S^*$ is an effect of $S$ which causally mediates the latter's evocation of $m$ (e.g., $S$ is redness while $S^*$ is the pattern of retinal firing produced by light from red surfaces), then $m$ is also generally included in the effects of $S^*$ on $o$ at $t$. (Various qualifications such as arise from the problem of *not*-r effects complicate this argument but in no way undermine its basic cogency.) Consequently, if one stimulus were to designate another whenever the $K$-kind effects of the first are included in those of the second, any stimulus $S$ would as a rule simultaneously designate (for $o$ at $t$) all stimulus compounds of which $S$ is a part, as well as all events before and after $S$ in the causal sequence by which $S$,

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[29]Psychological phenomena do indeed exist (e.g., passive avoidance, DRL response rates, go/no-go discriminations, and others traditionally explained in terms of "inhibition") wherein the withholding of action appears genuinely to be a form of behavior. In fact, there is a fairly orthodox behavior-theoretical test for distinguishing the doing of *not*-r from merely not doing $r$, namely, determining whether the alleged effect impedes arousal of $r$ by other stimuli. However, I for one would not like to be stuck with responsibility for a comprehensive theory of not doing vs. *not*-doing. E.g., what are we to say about the differences among doing $r$, not doing *not*-r, and doing *not*-(*not*-r)?

or some more distal stimulus whose behavioral import is mediated by $S$, produces its effects on $o$ at $t$. More generally, it is extraordinarily difficult to prevent any nontrivial interpretation of "primary" arousal (nontrivial in that it does not employ an aboutness concept in the definiens) from counting as a primary elicitor of $m$ any stimulus $S^*$ related to another primary elicitor $S$ of $m$ in one of the three ways just listed, and hence from implying that any symbol which designates $S$ also designates $S^*$.[30]

The present arguments are schematically abstract, and neither space allocations nor tedium tolerances approve retracing them here within the flesh of extant theories of reference.[31] Whoever carries through the application on his own, however, will soon discover not merely that these accounts are profoundly inarticulate at all the critical points but also that their unhesitant presumptions concerning which stimulus elicits $m$ "primarily" and which "secondarily" rest upon an exceedingly common intuition which, made explicit, would nicely yield symbol/referent asymmetry did it not simply beg the question. I have already exploited this intuition in speaking about "central counterparts" for overt words, and it obtrudes whenever a sensation, or perception, or image, or memory, or idea, or thought, or anticipation, or (in recent jargon) coding is said to be a sensation (etc.) *of* something. It intuits a noncausal relation between internal and external events by virtue of which, e.g., the "idea" or "implicit verbal response" primarily evoked in a paired-associates experiment by nonsense syllable $BIQ$ is still an idea or verbalization of the external pattern $BIQ$, rather than of the trigram $CEP$ with which $BIQ$ has been paired, even on trials when by learned association it is the overt stimulus $CEP$ which evokes the $BIQ$-idea. Given this notion, it is straightforward to stipulate that if stimulus $S$ elicits reaction $m$, the arousal is "primary" if $m$ is *of* $S$, "secondary" if $m$ is *of* something else, and neither of these if $m$ is not *of* anything at all. From there it's downhill all the way home for a theory of reference—except that how to reach this *of*ness pinnacle is just the aboutness question all over again.

The ultimate heretical implication of these considerations is that language, as

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[30]Fodor, 1965 has similarly questioned shared-effect accounts of reference on grounds of the plurality of stimuli sharing these reaction components. While it is perhaps excessive to demand that a given $m$ have only one referent (see the section on *Concept Formation* below), Fodor's implied accusation that contemporary mediational theories of meaning importantly fail to capture the specificity of reference is lethally on target.

[31]The weakness of limiting criticism to specific theories as received is that the proffered objections, no matter how devastating, may perhaps be evaded by only minor revisions in the positions criticized. On the other hand, refutation *en masse* of all possible variants of a given approach is generally possible only in highly formalized disciplines. What I have presented here is the schema of a critique which, with high but not certain probability, will show any given common-effect theory of reference to be laughably inadequate. But psychosemanticists with an instinct for lost causes are welcome to receive it as an inventory of obstacles for their own effect-mediated theory of reference to overcome.

a distinctive system for meaning evocation, has no special psychosemantic importance. The key issues of aboutness show forth most nakedly in non-linguistic cognitions (or at least where verbalization is not essential), notably, perception, memory, and ideation, and most specifically from the content/object polarity found therein.

What, logically, is involved in perceiving, or remembering, or thinking about something, say the first man on the moon?[32] Manifest grammar alleges these to be relations between an agent (a doer of deeds) and an object upon which the agent commits his act; yet perplexities quickly arise from so simplistic a treatment. For example, perceiving, remembering, or thinking about Neil Armstrong (say as done by his wife) does not seem to be quite the same as perceiving, remembering, or thinking about the first man on the moon, even though Neil Armstrong and the first man on the moon are the very same individual. And though we hesitate to allow that one might perceive or remember something which does not exist, no such inhibition applies to thinking about—e.g., you are now thinking about the first whale on the moon (because I have just given you the idea) even though there never has been and probably never will be any such creature. An epistemological/ontological cess-pile of truly awesome grandeur has accrued from imperfect philosophic digestion of this situation, about which I shall here say only (1) that the root error has been to construe intentional acts as grasping with the mind's hand—more technically, taking persons *qua* logical particulars, rather than their attributes, to be what stand directly in aboutness relations to other entities—and (2) that virtually all traditional befuddlements vanish when the content/object distinction is drawn clearly. For a person to perceive, remember, or think about this rather than that, his internal psychological condition obviously must be thus rather than so—which is to say that *perceiving* (*remembering, thinking about*) x analyzes as having a *percept* (*memory, thought*) of x. The percept (memory, thought) which a person *has*, i.e. some aspect of the way he is, is the content of his intention, while its object is what that content is *about*. What distinguishes one percept, etc. from others is not primarily its object (which can be the same for many different contents) but its character as a psychological attribute, even though—like being able to identify Jon Smyth only as "resident of Peoria," and perhaps the content/object confusion's main source—ordinary language has virtually no resources for describing an intention's content except relationally in terms of its object. Moreover, evocation of a given content does not analytically entail

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[32]Unlike some intentional-act verbs, 'perceives', 'remembers', and 'thinks about' accept noun phrases as well as sentences for their grammatical objects. It can be argued—for the most part correctly, I think, though the analysis falters in certain marginal but psychosemantically significant cases—that o at t perceives (remembers, thinks about) x iff for some predicate concept P, o at t perceives (remembers, thinks) that Px. The points to be made here apply equally to intentional objects of both forms, but can be stated most compactly in terms of the noun-phrase ellipsis.

the existence of a corresponding object—it is perfectly possible for a man to be cognitively identical in every way to how he would be were he perceiving, or remembering, or thinking about, say, his mistress except that in fact he has never had one. (Object-free contents are hopefully infrequent, and perceptual misfires in particular may signal psychopathology; but the exceptions make clear that an intention's object is only an empirical correlate of its content.) Intentional content is thus best described as an aboutness *potential*—it is what, subjunctively, *would* have a corresponding object were external reality to be suitably cooperative. As a result, intentional predicates such as 'perceives $x$', 'remembers $x$', or 'thinks about $x$' can be interpreted to address either (1) the diadic relation which holds between a person $o$ and an extant object $x$ when $o$ has an appropriately moded content which is about $x$, or (2) the non-relational property by virtue of which $o$ *would* be perceiving (or etc.) another entity were one with the right qualifications to exist. In practice, 'perceives' and 'remembers' are usually understood in the stronger sense, and 'thinks about' in the weaker. In addition, both senses (1) and (2) are sometimes—but only sometimes—construed to imply that the intention to which we refer has roughly the same content as the one by which we are contemplating its object, i. e. that '$o$ perceives $x$' is true only if $o$'s intentional content incorporates the concept expressed by '$x$'—which is why either assertion or denial that perceiving Neil Armstrong is the same as perceiving the first man on the moon can set off a first-class philosophic brawl.

This sketch of intentional aboutness largely reviews my previous remarks on the character of concepts, but tries to clarify the content/object distinction a bit more fully, especially the point that cognitive reference is not even remotely a matter of one stimulus assuming some of the psychological functions of another. An intention's content does not act as surrogate for its object, for nowhere in the causal dynamics of a behavior system can one replace the other—the content is within, the object is (generally) without and requires the former to be the *means* by which it has cognitive import.

So once again we run head-on into the fundamental problem of semantics: What in an intention's content makes it potentially *of* something else, and what are the factors which determine, for any intentional content $c$ and additional entity $e$, whether or not $c$ is about $e$? The answers will not be forthcoming here, for I do not have them—though I will, shortly, indicate the direction wherein I think they lie. It is, however, instructive to note why traditional philosophic solutions don't work. These have been strongly colored by preoccupation with perceptual aboutness, and for this it is tempting first of all to seek a causal analysis, namely, that $m$ is a percept of $x$ if $x$ is the cause of $m$'s arousal. The causal approach's allure dims, however, when extended to reactivated memories (for why then should not these be about their present recall cues just as much as about their temporally distant origins), and glows so feebly for imaginative thinking (e.g., about Pegasus, or Sa-

tan, or the first whale on the moon) that only the positivistic extremity of denying that we can literally conceive of anything we have never observed will preserve a flicker of life in it. Worse, "the" cause of a percept is hopelessly nonunique—to revive a previous example, when my percept of redness is caused by the state of a traffic light, it is also caused by a relay closure, by a retinal excitation, by a city engineer's past decision about traffic signal placement, by the turning of my head in a certain direction, and by many, many other aspects of this multiply branched and multiply mediated causal webwork. About the only hope for salvaging the causal analysis is that a percept's object might be its *immediate* (unmediated) cause. But even that doesn't achieve sufficient uniqueness of reference; for in the first place causal propagation may well be continuous (i.e., whenever $c$ causes $e$ there exists an $m$ such that $c$ causes $m$ and $m$ causes $e$), and even were causality to be discrete probably few if any events would have but a single immediate cause. What a theory of aboutness mainly gets from looking to immediate causes is a phenomenalistic squint.

Phenomenalism, or more precisely phenomenalistic positivism, holds that only ingredients *in* experience can be objects of intentional acts, i.e. that when you perceive, remember, or think about, say, your mother you are really perceiving, remembering, or thinking about something in your brain/mind, probably some activity in your sensory or post-sensory nervous system. Phenomenalism has been often discredited, but like crabgrass it sprouts forth anew wherever philosophic groundskeeping becomes lax. Its chief nutrient is a confounding of what is *in* experience with what experience is *of*[33]—i.e. the content/object confusion again— even though it takes little critical reflection to see, e.g., that your mother is not the same as any experience, or set of experiences, you have ever had. (Mothers bear children; experiences bear repeating.) Even when an object of experience really is itself part of experience, as presumably holds for introspection, the logical gap between content and object still persists unless it were to be convincingly argued (as it cannot be) that, one can't be elated, or hungry, or enjoying a sunset, or engrossed in lustful reverie without being aware of his elation, hunger, sunset enjoyment, or lustful thoughts; that in fact his elation etc. *is* his awareness thereof. Once it is clear that an object of perception (or etc.), whatever it may be, is not the same thing as the percept itself, no evident semantic motive remains to stuff all such objects inside one's head. Introspective awareness may indeed be an importantly special kind of intentionality (see p. 48f. below), but it is a sporadic companion to normal exterospection rather than a substitute for it.

Similar in spirit to phenomenalism but with longer referential reach is the "conceptualist" view that the meaning of a descriptive term is some set of its

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[33]This is phenomenalism's semantic source. A second, equally important origin is the epistemic supposition that cognition must be grounded in certainty and that we can be certain only of our own experience.

referent's properties, e.g., that if you are perceiving or remembering or thinking about your mother, the content of your percept/memory/thought is a collection of such properties as *grey-haired*, *kindly-expression*, *mediocre-cook*, *has-arthritic-hip*, etc. ("Appearance" theories of perception often suggest this interpretation.) Its fatal flaw is that properties are just as objective as the individuals which possess them (cf. Rozeboom, 1962b; Bennett, 1965). E.g., grey-hairedness and arthritic-hiphood are no more literally *in* your percept/memory/thought of your mother than she herself is. The conceptualist's half-truth is that a concept of $x$ is often compounded out of concepts of $x$'s properties; but even if one were to argue, like Russell (1905), that complex descriptive phrases do not really designate, it would still remain to explain how concepts which are *of* properties manage to bring off this referential achievement.

Finally, an extremely ancient and historically persistent approach to aboutness (see Brett, 1965 consists of iconic or "copy" theories which suppose that a percept/memory/thought of $x$ must itself be rather $x$ish, i.e. that an intension's content has pretty much the same properties as its object except perhaps for such difficult-to-reproduce qualities as the object's substance, size, and location. That such a view should arise when we cannot say what a concept of $x$ is like beyond its being *of* $x$ is perhaps understandable, since then our description of the concept differs by only one insubstantial element (the operator "of") from our description of its object. It is nonetheless logically gratuitous, akin to supposing that when all we know of Jon Smyth is that he lives in Peoria he must somehow look a little like Peoria, and almost certainly false if—as today we have every reason to believe— mental events are features of neural activity. Even so, the copy theory of aboutness has a certain backhanded heuristic value; for once it becomes robustly clear that there need not be any resemblance whatsoever between the content and the object of an intention—e.g. that in all likelihood a percept of triangularity has itself no more geometric shape than does sourness or the Hammerklavier Sonata—then no evident restrictions remain to curtail either what in external reality is conceivable or, more psychosemantically important, what aspects of a person's inner workings can constitute his conception of a given entity.

Just how liberating this *habeas corpus* may be for semantic theory can best be appreciated by contrasting the vista of possibilities it opens upon the psychological nature of meanings with the tunnel vision of philosophic tradition. Specifically, the classic paradigm for percepts, memories, and ideas is the *sensory image*, of which modern treatments of meaning as a stimulus-producing response (see Goss, 1961) are a peripheralist echo. To be sure, this model has shown little stamina under fire, and introspective psychology's failure to field an alternative has spurred both the behaviorist revolution in psychology (wherein the imageless-thought controversy was allegedly the final intolerable ignominy to fledgling empiricists) and philosophy's latter-day reluctance to countenance meanings as natural occurrents

of any sort. Yet introspection and neurophysiological psychology both testify that sensory events, whether externally or internally aroused, are just the animal acts in the circus of the mind. Passion (affect) and conation (effort) also received star billing in classical psychology; recent innovations in self-awareness training may well gain introspective access to exotic experiential flora wholly alien to past mentalistic taxonomies (Murphy, 1969); and in any event psychosemantic data of the quality provided by introspection will become increasingly unhelpful as we begin to dissect the organism's deeper functionings with the same experimental delicacy now emerging in research on the initial stages of input processing (see e.g. Aaronson, 1967).

What I am getting at here can perhaps best be grasped through a brief return to the nature of evaluative concepts. What gives plausibility to the "emotive" interpretation of such predicates as 'pleasant', 'nasty', 'gorgeous', and 'blah' is that affect is so conspicuously a part of what these terms convey. Insofar as they convey nothing but affect, it is inevitable to conclude—*under the supposition that cognitive meaning cannot be constructed out of emotive elements*—that they have no referents at all. But if aboutness potential is not confined to internal processes just of a sensoid character, then we have no ground on which to dispute that suitably constituted complexes of affective elements may semantically *refer* to entities fully as real as and in fact perhaps identical with those designated by sensoid concepts. Thus pleasantness and blahhood *could* be perfectly good objective attributes of external things, attributes which (say) produce certain distinctive affective reactions in most persons who encounter them and which can also in principle be designated by expressions of technical physics.[34] I would not deny that the *de facto* semantic character of predicates such as 'pleasant' and 'blah' leaves much to be desired, but the same is often true of everyday sensoid concepts, e.g., 'bald', 'fat', 'smelly', 'hot', 'white', 'sticky', etc., which are quickly abandoned by any discipline attempting to deal precisely with their domain of application. I conclude, then, that contrasting "evaluative" with "descriptive" terms may well be an error. Instead, *within* the descriptive category, the meanings of some terms seem predominantly sensoid, some predominantly affectoid, some, like 'abrasive', 'bitter', and 'shrill', as much one as the other, and some which primarily mobilize internal processes of still other kinds, notably terms such as 'seat', 'handle', 'hammer', 'pliable', 'beckoning', and 'roomy', whose meanings have a strongly conative or motor character. It is no longer very original to suggest that cognitions involve motor

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[34]Similarities to Locke's doctrine of "secondary qualities" will be evident here, except that I find merit neither in his primary/secondary distinction nor in his phenomenalist view of awareness. On the other hand, my proposal that evaluative terms may have external referents should not be confused with orthodox intentional treatments of feeling and emotion. In statements such as 'I feel sad about Peter's death' and 'Jimmy just loves peanut butter', the affective element is placed in the intention's *mode*, while its content (here a conception of Peter's death and of peanut butter, respectively), is essentially free of affect.

(and motivational) functions as well as afference—one thinks especially of Piaget in this regard. (Cf. also Bruner et al., 1966, on "enactive" concepts.) But even Piaget and his followers apparently allow that only sensoid images can *represent* external reality (see Furth, 1969, Chs. 4, 5). My emphasis here is that we have no reason to think that afferent events are any more intrinsically *of* something else than are inter alia affective and motor processes. For a semantic theory to suppose otherwise without argument is to signal that it has simply begged the question of aboutness.


**Concept formation**

What is it to "have" a particular concept? We have already noted that the focus of commonsense cognition talk wavers ambiguously between activated processes and the state properties which dispose the former's arousal. According to my own English sensitivities, "use" of a concept $c$ is primarily an actual $\phi$ing $P(c)$ for some intentional mode $\phi$ and content $P(c)$ of which $c$ is a constituent, while the "having" of concept $c$ is primarily a state which disposes $\phi$ing $P(c)$ for some $\phi$ and $P$. Since many functionally distinguishable states can dispose $\phi$ing $P(c)$, there are correspondingly many different ways to "have" concept $c$; but I have spoken earlier of that in general terms and need not elaborate here. Right now I want to consider the acquiring of (state) concepts.

For brevity, I would prefer just to acknowledge how people come to have the concepts they do have (especially logical concepts and the modal operators, which have received virtually no acquisition study at all) is a question well worth attention, and let it go at that. But mainstream psychology has been cheerfully researching what it has called "concept formation" for half a century, with results to show that the enterprise could well stand some sharpening of its logic. Which is not to say that philosophers have been any more astute about this. Quite the opposite: The rationalist/empiricist quarrel over concept origins has supposed that having a mindful of concepts is like having a houseful of furniture, with empiricists holding that all this furniture has been delivered by van to an originally empty house (i.e. by sensory channels transmitting miniatures of external objects into the mind) while rationalists protest that some pieces aren't of the sort that vans deliver. This stone-age view of concept formation[35] is totally obviated by two slightly more sophisticated reflections: (1) Once the copy theory of perception is dismissed, how sensory input manages to activate central percepts which are *of* a particular external entity is just as much an unsettled (and unsettling) scientific problem as is the arousal of intentional contents by nonsensory precursors. Perceptual abilities, too, generally have to be learned, and it is silly to adopt strong

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[35]Not, to be sure, held by *all* philosophers. Broad (1933, p. 28ff.), for example, has already raised the second point that I am about to make here.

postures regarding which concepts can and which cannot be developed through sensory input until the machinery of perception becomes a little less mysterious. (2) It is reasonably safe to assume that cognitions can no more be activated in newly fertilized human ova than in such lowly lifeforms as beetles and potatoes. Trite as it may seem, this observation points up that you and I began life entirely devoid of conceptual resources, yet possessed from the outset a potential for developing these which seems largely unique to our particular species. At the level of slogans, therefore, rationalists and empiricists are both correct—a person's concepts all develop through his interactions with his environment, yet innate factors importantly direct the outcomes of such interactions. To explain an aspect of cognition not obviously accounted for by 1930-1950 vintage learning theory by saying only that it must therefore be innate (e.g., Chomsky, 1965, 1967) is simply to demonstrate ignorance of what a significant hypothesis in technical psychology is like. When we have some detailed dynamic models of cognitive growth, then and only then we will be in position to work out what we want to *mean* by applications of the labels 'learned' and 'innate' to this situation.

Psychology's own affair with concept formation, on the other hand, has suffered from insensitivity to essentials, like making love to one's girl friend, her mother, her brother, and her dog, and not noticing a difference. The basic concept-formative research paradigm trains subjects to discriminate one set of complex stimulus displays from another in response to some feature shared by just the concept-positive displays. It is easy to interpret such experiments as a discriminative conditioning of labeling responses to abstract stimulus elements, and until quite recently this has been the standard theoretic model—which, unhappily, is tantamount to arguing that having a concept *is* simply being disposed to make a consistent labeling response to some feature of complex stimulation. Not only does this further confuse the already obscure differences between concept-mediated responding and subcognitive discriminative behavior, neither does it distinguish concept formation as such from learning the payoff correlates in a new situation of concepts acquired previously.

A significant lurch forward, however, has recently come with awakening recognition that concepts have something intimately to do with hypotheses or "rules." Thus if the subject's task is learning to identify as "positive" or "negative" each of a number of designs differing in color, shape, and size, he is said to have acquired "the concept" when he learns (say) that a design is positive if and only if it is either red or circular. (Usually the subject is credited with attainment of the rule/concept when his behavior becomes consistent with it, though some recent studies have also required him to verbalize the rule.) Learning such a "rule" or adopting such a "hypothesis" is, with one important qualification which need not

detain us,[36] genuinely a cognitive acquisition by the subject, namely of *belief* to some degree in a lawlike proposition of form $(x)(Cx \supset Px \equiv Qx)$ (e.g. the generalization that any design in this experiment $[C]$ is what the experimenter calls "positive" $[P]$ iff it has disjunctive property of being either red or circular $[Q]$). Unfortunately, with few exceptions (notably Gagné, 1966), these studies have so confounded the learning of concepts with learning of the generalizations ("principles") which utilize them that some writers (e.g., Hunt, 1962, p. 29f., explicitly claim that concepts *are* rules. Actually it is doubtful whether the new wave of concept research has been knowingly witness to any concept *acquisition* at all. A person who can already perceive redness and circularity, for example, and who also has the elementary logical operators at his avail (innately?), is thereby also capable of discerning the property of being-either-red-or-circular. (To be sure, changes in a subject's conception of being-either-red-or-circular, notably, its becoming 'more "integrated" or perceptually immediate, may well also occur through his exercising of it; but this possibility—a genuine and important case of concept learning—has to my knowledge not been explored in the concept-formation literature albeit work on perceptual "coding" comes close.) What these experiments have primarily addressed is not concept formation itself, but something even more richly cognitive, namely, the development of generalized beliefs by inference from observed particulars and even, where "strategies" of observation have been studied (Bruner, Goodnow, and Austin, 1956), some aspects of metabeliefs. Were this work to be explicitly recognized for what it is—the psychology of inductive reasoning—we would be immensely better positioned to appraise not merely its past accomplishments but also which directions are most significant for its future thrust.

The one sector of modern psychology wherein concept formation or something much like it really has been at issue is in work on perceptual learning, i.e. phenomena where an organism's experiences apparently alter not merely his motor habits but his afferent receptivity to certain features of the environment regardless of that input's fate in postperceptual processing (see Gibson, 1969). Perceptual learning is as much a theoretical viewpoint as it is a distinctive empirical domain, for its operational proving grounds are the principles of generalization and discrimination on which old-fashioned peripheralistic behavior theory has also fielded a considerable body of S-R speculations in which perceptual changes are not envisioned at all. It can be shown (e.g. Rozeboom, 1970, p. 123 ff.) that the empirical facts of generalization and discrimination greatly exceed the explanatory reach of S-R orthodoxies unless the latter are enriched by some nonassociative principles of perceptual differentiation or (what is nearly the same) selective attention. To date, however,

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[36]Namely, that an organism's responses to input can be consistent with a rule $p$, say through a constellation of independently conditioned S-R couplings, without necessarily being mediated by a cognitive $\phi$ing that $p$.

perceptual differention theory's farthest advance has been its bare insistence that there is something importantly more to perceptual learning than mediation responses becoming attached to innately and unmodifiably discriminable sensory units. We still lack even the roughest conception of *mechanisms* controlling the articulation of experience. My own feeble efforts in this direction allow me to venture only (1) that unlike most of cognitive psychology, perceptual differentiation theory has nothing at all to learn from commonsense mentalism; (2) that the explanatory model which should eventually emerge here will be quite unlike past behavior-theoretic mechanisms, exploiting instead such notions as "resonance," "cancellation," and others indebted to wave physics; and (3) that this model will readily ingest, omnivorously, without strain or indigestion, all known behavioral phenomena; not merely generalization and discrimination but principles of action and reinforcement as well. Psychology may yet get its Newton. It remains only for the apple to strike.

While research on perceptual learning is psychology's only present hand-hold on concept formation, it is by no means true (unless positivism is right after all) that acquired concepts originate in perception alone. The main case in point is that of *theoretical* concepts, whose cognitive status has been perhaps the most intensely discussed issue in all of philosophy of science—and rightly so, since herein lies the ultimate confrontation between phenomenalistic and realistic epistemologies. I can speak to this best in the context of *language learning*, or more precisely the acquisition of word meanings since I shall say nothing about syntax development.

Generically, the processes by which the terms of a language become cognitively meaningful are known as "definition." While philosophers have seen fit to distinguish a rather large number of species under this genus (cf. Robinson, 1954; Leonard, 1957; Pap, 1964), the major psychosemantically distinctive types— idealized, since in practice most words enter language by multiple routes—seem to me to me to be threefold: *ostensive*, *explicit*, and *theoretic* (*implicit*). Of these, explicit definition is the least problematic, involving only a synonymous transfer of meaning from one expression to another. Thus if I stipulate that 'farble' is to mean "sing in a quavery voice," 'farble' becomes a vehicle for the same concept expressed by the grammatically complex predicate 'sing in a quavery voice'—including synonymy with respect to whatever vagueness and ambiguity may reside in the latter. Terms already meaningful can also be revised by explicit definition, usually towards greater precision as when e.g. we stipulate that 'boy' is to mean "a human male under 18 years of age."

Even so seemingly innocent a process as explicit definition raises challenging psychological questions, however. For mere stipulation that a word $A$ is to mean the same as expression $B$ is quite insufficient to make $A$ *in fact* synonymous with $B$ for a given person $o$ at time $t$. At the very least, $o$ must have heard or himself

issued this resolve, and even that is not enough—I could repeatedly proclaim that 'boy' is to mean "a mammal less than 65 inches tall" without this at all changing the meaning this word in fact has for me. For a definitional proposal to become a definitional accomplishment, learning must occur—just *how* being the psychological puzzle here. Orthodox associative principles are on several grounds grossly insufficient to account for it: (1) If hearing '$A$ is to mean $B$' (or words to that effect) conditions the meaning of '$B$' to verbal stimulus '$A$', why doesn't the meaning of '$A$' also become conditioned to '$B$', ultimately resulting in a common meaning which is roughly a sum or average of the two original meanings? (As seen e.g. by considering '$B$ is what $A$ is to mean', the temporal asymmetry of terms in a definition does not adequately explain this, though the time relation may not be entirely irrelevant.) (2) Why does '$A$ is to mean $B$' endow '$A$' with the meaning of just '$B$' rather than of the entire verbal complex with which '$A$' is paired, namely, '*is to mean $B$*'? (3) If hearing/uttering '$A$ is to mean $B$' gives '$A$' the meaning of '$B$', why doesn't hearing/ uttering '$A$ does mean $B$' generally have this same effect? (It doesn't, of course, if '$A$' and '$B$' aren't synonymous at the outset; instead, it just makes a false assertion.) Apparently, explicit definition is accomplished through a special intentional mode such that when a suitably structured content is activated in this mode, the meaning component in a certain position of that structure is copied into another wherein it becomes responsive to the stimulus component which, in non-definitional mode, would evocatively control that position.

Though superficially remote from explicit definition, ostensive definition is probably much the same in underlying mechanism. Ostensive definition is the acquisition of word meanings by having referents for them pointed out in one's non-verbal experience—e.g., hearing 'This is Jon Smyth' while being introduced to him. To philosophic empiricists, ostensive definition has seemed to be the one secure base on which an epistemically creditable theory of semantics can be erected, though a common protest is that it leaves unexplained how the trainee can tell which particular prospective referent is being pointed out. (E.g., if I gesticulate in the direction of Smyth, am I pointing to him, to his shirt color, to his racial heritage, or to the wall behind him?) The objection is on target, but misses the bulls-eye unless it draws bead on the phenomenalistic supposition usually latent in the thinking of those to whom ostensive definition seems unproblematic, namely, that the things we "experience" are themselves *in* experience. Although the verb 'experience' is ambiguous and *sometimes* means "to have as experiential content," ostensive definition concerns the sense wherein 'to experience $e$' means "to have an experience containing a meaning component which is *about $e$*." To originate linguistic reference to an entity $e$, ostensive definition must attach an experiential content which is *of $e$* to the selected verbal vehicle. Physical pointing may be efficacious for this, but only when the learner can exploit a perceptual structure

in which a relational concept of pointing supplemented by selective predication is coupled with a concept of $e$. Thus a hearer of 'Jon Smyth is the man arguing with the policeman over there' is positioned to equate the meaning of 'Jon Smyth' with whatever component of his present experience has argumentative-manhood-over-there perceptually predicated of it. The procedure here seems to be that a verbally aroused meaning complex containing, as it were, a gap corresponding to the to-be-defined term is matched against concurrent experience; and if, under definitional mode, a match is found wherein the former is congruent with a portion of the latter, then the component of the latter which fills the gap in the former under that alignment becomes the meaning of the term evocatively tied to that gap.

Up to a point, theoretic (implicit) definition is much like explicit and ostensive definition in that the to-be-defined term '$t$' is introduced via a semantic context idealizable as a more or less complex predicate '$P(\ )$' ascribed to '$t$'. But whereas explicit and ostensive definitions assign to '$t$' a pre-formed meaning which has already been activated under belief mode in this context, theoretic definitions *create* concepts rather than copy them. According to the most advanced judgment on this difficult and much discussed matter,[37] a theoretical term '$t$' introduced by the theory ("nomological net") '$P(t)$' derives its meaning from predicate '$P(\ )$' but *designates* something which satisfies the latter so long as there is any such entity. Thus if Hullian theory were correct, '$_SH_R$' would refer to whatever state of the organism grows as a function of reinforcement for doing $R$ in the presence of $S$ and interacts with deprivation conditions to determine the probability of $R$-responding to $S$. Similarly, when the *Random House Dictionary of the English Language* informs me that manganese is "a hard, brittle, greyish-white metallic element, an oxide of which, $MnO_2$, is a valuable oxidizing agent; used chiefly as an alloying agent in steel to give it toughness; symbol, Mn; atomic weight, 54.938; atomic number, 25; specific gravity, 7.2 at 20C", then until such time as I acquire a superior definition of 'manganese', say through first-hand metallurgical experience, this is for me a theoretical term whose referent is, of definitional necessity, a hard, brittle, greyish-white metallic element, etc. What is most semantically remarkable about theoretical terms—a character unimaginable in traditional epistemology and still largely unassimilated by philosophical semantics—is that a theory which "implicitly defines" some of its constituent terms is *analytically* true *if* true at all (see

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[37]The position described here is the analysis of theoretical concepts evolved by logical empiricism (see Feigl, 1950; Cronbach & Meehl, 1955; Carnap, 1956; Nagel, 1961; Rozeboom, 1962b, 1971) as the inadequacies of logical positivism became increasingly evident. Theoretic definitions have also been recognized under other names in older philosophic traditions (cf. Robinson, 1954, on "synthetic" and "denotative" definition). The logical empiricist account of theoretical terms has no present competitor for the simple reason that philosophies which seem to reject it—most recently, what I have elsewhere called the "omnitheoretic" movement (Rozeboom, 1970)—have proposed no serious alternative analysis.

Rozeboom, 1962b, p. 347ff.). That is, contrary to the semantic orthodoxy that a logically contingent statement '$Q(t)$' is true if entity $t$ happens to have property $Q$ and false if $t$ does not—an account which presumes the existence of a referent for '$t$' in either case—a theoretical definition '$P(t)$' of '$t$' is true or false according to whether or not '$t$' *has* a referent, while to assume that $t$ exists and yet be in doubt whether it has property $P$ is like being uncertain about the marital status of bachelors.

If theoretical terms really do have the semantic traits here claimed for them, they may well be our Rosetta stone to intentionality's ultimate twin mysteries, the functional character of meanings and the nature of aboutness. The former glimmers tantalizingly within the strange quasi-analyticity of theoretic definitions. If '$t$' is defined by theory '$P(t)$' so that $t$ *must*, analytically, have property $P$, then in some sense the meaning of '$P$' has been converted into what is expressed by '$t$'. Yet '$P$' and '$t$' are far from synonymous, for they differ in logical type—'$P$' is predicated of '$t$', not equated with it. Apparently at work here is a mechanism for transforming one conceptual structure into another whose referential reach exceeds that of the first. How the propositional juxtaposition of these (i.e. in present notation the proposition expressed by '$P(t)$') manages to be epistemically nontrivial, how the propositions respectively expressed by concept-definitive statement '$P(t)$' and another sentence '$Q(t)$' attributing to $t$ some property $Q$ not entailed by $P$ semantically differ in kind, and what changes occur in the meaning of '$Q(t)$' if the latter is elevated to co-definitional status in this theory (i.e. if '$t$' is now defined by the enriched theory '$P(t) \cdot Q(t)$'), are matters on which even dim illumination at some technical depth should explain much about the understructure of meaning processes.

Moreover, the bootstraps logic by which theory formation expands a language's referential scope may be nearly the whole story of external reference. Stripped to impoverished essentials, what I have in mind is the following: Given concepts of entities $\{e_i\}$ and relations $\{R_j\}$, theoretic definition allows us to generate concepts which designate entities related by one or more of the $R_j$ to one or more of the $e_i$. If, moreover, the $e_i$ and the $R_j$ are phenomenal objects, i.e. ingredients in one's experience, we see how a phenomenalistically ideal cognizer beginning only with concepts about his own experience can rework these into theoretical concepts providing referential access to the external world. (No high degree of intelligence or studied contemplation is requisite to the theorizing which performs this conceptual alchemy. The most basic moves in theory construction tend to occur compulsively at an essentially preconscious level of cognition (see Rozeboom, 1961b, p. 368f.). Finally, if the phenomenalistic phase of the analysis can be modified just enough to make phenomenal referents a dispensable luxury by showing how the components from which exterospective meanings are assembled can be recruited directly from nonconceptual experience (i.e. by shorting out the intermediate step of the two-

stage model wherein sub-intentional experience elements are first compounded into phenomenal concepts and the latter then reprocessed into concepts with external referents), the result will be a realist theory of aboutness in which an intention's content is built out of meaning ingredients to which its object is coupled through the logical nexus of exemplification. The phenomenal scaffolding of this analysis is urged by intuition that an introspective concept of an experiential condition $C$ is probably not much different, psychologically, from $C$ itself—it may, for example, consist of $C$ elaborated upon in a certain way. (I.e., introspective awareness of $C$ may be a structure $\alpha(C)$ comprising $C$ imbedded in a special concept schema $\alpha(\ )$.) If so, an account of external reference as mediated by phenomenal concepts should closely resemble the wanted account directly in terms of nonconceptual experience. Be this as it may, the suspicion remains that while the logic of theoretical concepts may well be the lever to pry open the secrets of distal reference, the fulcrum on which it must turn is a detailed analysis of introspective content/object relations.

**Liberalization of classical semantics**

From the problems of meaning and reference reviewed here so far, it might appear that for philosophers, psychosemantics is mainly a spectator sport. The wreckage of that complacency litters still another axis of psychosemantic inquiry, namely, semantic realities which will no longer tolerate the constrictive simplicities of their traditional idealizations. "Pure" semantics is overdue for a basic axiomatic overhaul.

As a preliminary, it is worth noting that conventional views on synonymy are surely wrong to construe '$X$ means the same as $Y$' or '$x$ is the same concept as $j$' as an identity equation. This is the supposition which has led some important philosophers of language (e.g., Frege, 1952, p. 59f.) to deny the psychological nature of cognitive ("logical") meaning on grounds that the mental reactions evoked by a given expression are far too inconsistent, even in the same person on different occasions much less from one person to another, for any such reaction to qualify as the common meaning conveyed by that expression to the assorted members of a given language community. Although such arguments generally presume that "psychological" (*contra* "logical") meanings are restricted to sensory images, their minor premise is undoubtedly correct—it is most unlikely that the cognitive meaning conveyed to me e.g. by the word 'red' is identical with the meaning it conveys to you, especially if one of us has color-anomolous vision. Yet in ordinary usage, 'same as' probably means "identical with" less often than it does "alike in all (or most) respects relevant to the matter at hand," as when we agree that you-today are the same person as you-yesterday, or say that sugar and salt both have the same disposition of water-solubility even though the molecu-

lar properties respectively responsible for their dissolutions in water presumably differ in some respects. For interpersonal communication, literal between-person identity of word meanings is wholly irrelevant so long as the within-person pattern of semantic *relations*—i.e. which expressions are equivalent, which sentences entail which others, which terms designate what objects—is shared by all. This is the only interpersonal "sameness" of meaning which we can operationally affirm or deny in ordinary life, and while it, too, is an ideal which linguistic reality approximates only imperfectly, the approximation seems often good enough to make this sense of interpersonal synonymy a useful notion. In any event, whatever we may ultimately choose to count as meaning-sameness, the technically important relations for interlinguistic[38] semantic comparisons are not simple identities or (vis-à-vis analytic entailment) part-inclusions but communalities of designative potential, i.e. meaning relations which compare not what their relata intrinsically *are* but what they *do*.

That synonymy's psychological nature may be more abstractly complex than traditionally assumed does not in itself much matter for axiomatically "pure" semantics. Threats to the scope of the use/mention reciprocity underlying the correspondence principle of truth, however, are quite another matter. And regardless of any impression I may have left earlier, the correspondence principle's semantic utility is very limited indeed, for its applicability to particular cases strictly depends upon one's willingness to concede first-class cognitive status to the expression at issue. Consider, for example, the claims that

1) That-John-is-76-inches-in-height is true iff John is 76 inches in height.

2) That-John-is-tall is true iff John is tall,

3) That-John-is-zutish is true iff John is zutish.

Whereas (1) is presumably a blue-ribbon semantic verity, (3) is literally nonsense insomuch as the visual shape 'zutish' expresses no concept at all—asserting as a principle that "that-$p$ is true iff $p$" is not intended to imply that this formula yields a true instantiation for any arbitrary substitution of graphic squiggles for free variable '$p$'. But what about (2)? The statement 'John is tall' is certainly not meaningless, and had we no conceptual resources superior to 'tall', 'middling', and 'short' or the like for describing height we would have no grounds on which

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[38]Interpreting one person's words in terms of the meaning repertoire available to another is essentially the same problem when these persons employ the same overt system of language vehicles ("Does he mean what I would mean by that?") as when they speak officially different languages. The equivocation which Quine (1960) observes in translating one language into another is at bottom a problem in translating between speakers of the "same" language—otherwise, questions about interlinguistic synonymy could be unequivocally settled by bilingually reared speakers of those languages.

to balk at (2). But once we decide that the predicate 'tall' is *vague* with respect to more precise predicates at our command, so that we no longer care to regard sentences of form '_____ is (is not) tall' as describing possible states of reality logically independent of the facts described by quantitative height statements e.g. of form '_____ is (is not) $x$ inches in height',[39] we are confronted with a semantic dilemma: ($i$) For every positive real number $x$, deleting one of the bracketed terms in

That-John-is-tall is {true, false} if John is $x$ inches in height

should yield an analytically true semantic conditional. However, ($ii$) in view of the meaning that 'tall' *in fact* conveys (not what it could be revised to mean), ($i$) actually holds for few if any values of $x$. Classical semantic dichotomies rooted in the correspondence principle just don't fit the semantic reality of vagueness; rather, this calls for a theory of *graded* aboutness which can make semantic sense out of statements of form

'Tall' refers in degree $d$ to the property of being $x$ inches in height,

and

That-John-is-tall is true to extent $d$ if John is $x$ inches in height,

in which $d$ varies on a continuum which may well be multidimensional.

To be sure, classical semantics has long managed to endure the phenomenon of vagueness by the imperialist expedient of treating our *de facto* concepts as flawed, subcognitive approximations to the Platonic perfections which alone are the business of philosophy.[40] But problems of vagueness merely symptomatize a much deeper foundational challenge to semantics: If for a given semantic analysis it cannot usefully be assumed at the outset (say because this would beg the question at issue) that the object language synonymously translates into our metalanguage, then only the inertia of tradition requires that designation be formalized as a single-valued function mapping descriptive terms of the object language into the domain(s) of metalanguage variables. Since vagueness is not intellectually respectable, the graded multiple reference of terms which are vague relative to the

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[39]I ignore the relational overtones by virtue of which e.g. a tall child may be shorter than a short adult. Making this explicit only compounds the vagueness of 'tall' rather than alleviating it.

[40]Though a few—*very* few—serious attempts have been made to bring vagueness into the philosophic pale (e.g., Körner, 1966), they have done so only by admitting sharply bounded classes of individuals to which the application of vague predicates is still "open." This trichotomous extension of classically dichotomous *denotation* (i.e. the relation of a predicate to an object which satisfies it) is perhaps a useful preliminary probe, but it neither does justice to the essentially continuous grading of a vague predicate's applicability nor confronts the deeper problem of vague *designation*.

metalanguage might not in itself seem sufficient reason to abandon this tradition. However, I have elsewhere argued at length (Rozeboom, 1960b, and 1962b, 1964, 1971) that an empiricist interpretation of theoretical concepts also requires admission that descriptive terms generally have multiple referents even in an ideally vagueness-free language; specifically, that if term 't' is defined by theory $P(t)$, then 't' designates every entity $e$ such that $P(e)$.[41] To date, the published philosophic reaction to this thesis has been a total, repressive silence. But neither has anyone deigned to point out any flaws in my argument; and if it is indeed correct that no single-reference semantic model can touch the epistemic essence of theoretical concepts, the new "pure" semantics (and perhaps even a revised logic) which will emerge from the necessary rewriting of first principles will be as profound an advance over its classical precursor as was relativity over Newtonian physics.

Finally, recognition that the relation between intentional contents and objects is not of uniform semantic quality positions formal semantics to assimilate the existentialist dimension of cognition. It is a common subjective phenomenon that one's understanding of a concept often undergoes profound changes with increased experience and maturity.[42] Few if any concepts are exempt from this effect, not just notoriously slippery notions like "love," "justice," and "freedom," but concepts of ordinary things, places, persons ("iron," "Russia," "Mother"), and even qualities familiar since infancy (e.g., "round," and "red", which are far from indifferent to education in geometry and color theory). The trend of such change is almost always towards greater precision, greater clarity, and—what is not wholly the same as clarity—an increased "depth," "fullness," or "richness" of conception. Though this last has much concerned me in my own intellectual life, there is little I can usefully say about its nature here except, to illustrate, that it is what is most lacking in the verbally fluent, overeducated student who knows all the right things to say about a thing without really understanding any of it, and reaches its highest fulfillment through intimate encounters with the concept's referent, the sort of experience which leads one to exult "Now I *really* know $x$!" in the deep-acquaintance sense of "know." I suspect that this is quite literally a difference in the quantity and diversity of meaning elements compounded into the concept in question. But it is enough here to acknowledge simply that it *is* an intrinsic facet of semantics that concepts having the same referent can nonetheless vary from lean to rich, and that other things equal, the richer are a proposition's concepts the choicer is its epistemic quality.

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[41]Note that such multiplicity of *reference* has an entirely different semantic character from the "multiple denotation" relation (Martin, 1958) in which a predicate stands to the various entities which *satisfy* (i.e. have the property designated by) this predicate.

[42]Strictly speaking, of course, it is the concept itself which evolves for the person, not his understanding or "grasp" of it. How broad a spectrum of changes a concept can undergo and still remain abstractly the "same" is a nice question of no particular importance here.

Once it is granted that richness (depth, fullness) is a factor pervading *all* of conceptual knowing—that a proposition of zero depth would be no more a proposition than a man of zero height would still be a man, and that enriching a proposition's meaning enhances rather than diminishes its status as a conceptual structure— there remains little basis for arguing that existential awareness (cf. p. 9ff above) differs in kind from conceptual aboutness. Knowing-(it) is not, after all, the same as having-(it) *in* one's experience, at least not for most (it)s which ordinary language allows to be known, nor is knowing-(it) an all-or-none affair: Of my various acquaintances, for example, I know some much better (more thoroughly, more deeply) than I do others. If there is anything more to knowing-(it) than having a conception of (it) well advanced along the richness dimension, I for one cannot imagine what it might be. And to protest that the knowing which comes of existential involvement, the "I/thou" intimacy, is just too close, too total, too much a fusion of identities, to be strained through such coldly abstract mediaries as concepts, my reply is that were concepts only what is expressed by words now actually at our common avail, why, then I would wholeheartedly agree. But surely I have argued enough by now that meanings are basically independent of the verbal vehicles we may contrive for some of them (which is not to say that a stock of meanings once verbally domesticated cannot be evolved into a superior breed by linguistic husbandry), and that an awareness-of, no matter how existentially immediate, is just one of diverse ways for a concept to be active in one's experience. I have little doubt that limits short of perfection impair the effective transfer of nonverbally evoked meanings to language vehicles, but neither do I suspect that we often approach the asymptote of possibility in this regard. Rather than abetting anti-rational mystiques through fraudulent claims of proprietary right to the richness of immediate experience, the sincere humanist/existentialist could better seek to inject more of his most cherished meaning components into the public domain of verbalized concepts.

## Problems in the Justification of Belief

Due to length restrictions agreed upon by this volume's participants, ruthlessly enforced by its editors, and already exceeded by this essay, I shall be unable to say much about issues of belief justification. I can only hint, with even greater brevity than before, at those to which I attach the highest psycho-philosophical research priority.

To an epistemic traditionalist, suggesting that psychology might make any contribution at all to the theory of rationality sounds like the most flagrant confusion between the *is* and the *ought* of belief. Even so, normative belief theory needs an assist from empirical psychology in at least three ways:

1) In the first place, since few if any circumstances warrant unconditional acceptance of a given proposition, the theory of rationality is technically concerned with assertions of form, "Under circumstances $C$, proposition $p$ ought to be believed in degree $d$." Just what alternatives there *are* for qualified belief, however, is a question in descriptive psychology. Currently popular formalizations of belief strength as subjective probability are, I would agree, useful models for this at our present stage of development; but not merely shall we eventually need to distinguish believing that-$p$ in degree $d$ from any degree of confidence in the proposition that that-$p$-has-probability-$d$, it is doubtful that the belief-strength metric is really one-dimensional. (E.g., the grades of uncertainty which a cosmologist attaches to various theories of the universe's origin don't seem to contrast in quite the same way as do the credences he invests in the possibilities for what his wife may serve for supper tonight.) As the semantic valuation of propositions becomes recognizably more complex than a dichotomous true/false, so does the complexity of the belief-act continuum.

2) Secondly, what are the "circumstances" which determine how much belief is merited by a given proposition? Clearly this is not just the proposition's content in itself, but aspects of a particular occasion on which that content is contemplated. But which "aspects" of such occasions? The traditional philosophic paradigm for rational belief assumes that the belief in question has been inferred by the believer from other propositions which he accepts, in which case the belief strength so warranted resides in the quality of the evidence for this conclusion. But justification by inference alone must ultimately trace back to an uninferred beginning, and how are such *basic*—i.e., uninferred—beliefs then to be justified? The wistful desire of traditional epistemology, for each person to have a set of normatively *certain* beliefs (e.g. the experiential "given") which are the sole source of justification in his belief system, is hopelessly counterfactual; and we cannot effectively appraise the epistemic status of rationally uncertain basic beliefs until descriptive psychology has inventoried how, beyond inference, beliefs originate.

3) It appears moreover, that how strongly basic beliefs arising from sources of a given kind *should* be held is importantly a function of their truth likelihood (cf. Rozeboom, 1967b);[43] and estimation of these probabilities is again an empirical enterprise. I should add that while I mistrust the cogency of any normative

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[43]Had space permitted I would have developed this point in some detail, for it is an extremely important one. Epistemically appropriate answers to the normative question "How strongly should $p$ be believed under circumstances $C$?" must ultimately be grounded on judgments about how accurate beliefs arrived at under such circumstances tend in fact to be. (This holds as much for inferred beliefs as it does for basic ones.) How we can rationally arrive at such metabeliefs is perhaps the fundamental problem of normative epistemology, even though the philosophical literature has as yet recorded no thought on this matter beyond some heated but none-too-perspicacious controversy over the justification of statistical induction.

epistemology not grounded on the *de facto* accuracy of basic beliefs under various conditions of their production, the obstacles to coherent development of such an approach are so horrendous that we may eventually have to settle for consistency as the only rationality requirement on basic beliefs. Even in that event, however, psychological categories of belief sources and their presumed reliabilities will retain normative relevance under the egis of metabeliefs (see below).

For reasons mentioned later, the outline I would follow in a synoptic treatment of belief sources is

1. Inference
    a. deductive
    b. ampliative.
2. Observation
    a. exterospective
    b. introspective.
3. Memory.
4. Analyticity.
5. Hearsay.
6. Familiarity.
7. Desire.
8. Intuition.
9. Metabeliefs.

Though present commentary will be largely restricted to the last one of these, certain points regarding inference and observation also deserve special attention.

Concerning inference, far less is known about this than the smugness of orthodox epistemology would ever suggest. It is not even very clear what inference *is*. For example, if by *Rule Application* we mean the inference pattern

$$(R.A.) \qquad \text{All } P\text{s are } Q,$$
$$\frac{x \text{ is a } P,}{x \text{ is } Q,}$$

what must occur in order for a person $o$ at time $t$ to deduce his belief $(q)$ that John is quirky by *Rule Application* from his beliefs $(p_1)$ that John is a poet and $(p_2)$ that all poets are quirky? If the inference is really by $R.A.$, rather than by some other valid or invalid schema which subsumes this triplet of propositions such as

$$\frac{\text{All poets are } Q,}{x \text{ is a poet,}} \qquad \text{or} \qquad \frac{\text{All } P\text{s are } Q,}{x \text{ is } Q,}$$

or perhaps by no inference pattern at all, it must be that in some fashion schema $R.A.$ is instrumental in $o$'s coming to accept $q$ on grounds $p_1$ and $p_2$. But instrumental how? Not by virtue of meta belief in $R.A.$'s validity being included as an additional premise in the derivation; for while this could indeed occur were $o$ to be sufficiently knowledgeable about formal logic, the inference's *pattern* would then be not $R.A.$ but a more elaborate schema. (More generally, construing an inference's pattern to be one of its premises precipitates an infinite regress—cf. Carroll, 1895.) Neither is it by virtue of $o$'s having at $t$ the property that if he believes the first two of any three $R.A.$-related propositions then he also believes the third; for not only would this bypass the intuitive requirement that the conclusion of an inference be believed *because* the premises are believed, neither is it true that in order to infer one proposition by a given pattern a person must simultaneously infer *all* conclusions which so follow from premises he believes. The correct analysis seems to me to be roughly as follows: $o$ infers $q$ from $p_1$ and $p_2$ at $t$ by $R.A.$ (and similarly for any other inference pattern) iff he becomes aware at $t$ that this triplet of propositions has the $R.A.$ structure and this structural awareness together with the strengths of his beliefs in $p_1$ and $p_2$ jointly cause an increment in the strength of his belief in $q$.

Even if correct in principle, however, this sketch of inference's nature is but prologue to deeper problems. What is it, for example, to be "aware" of logical structure in an inferentially effective sense? (E.g., how does this differ from simply having in mind an activated $n$-tuple of propositions which embodies this structure, and how reflectively self-conscious must the awareness be?) What are the causal dynamics of valid inference? (E.g., does "awareness" of a valid argument's structure suffice by itself to convert belief in the premises into belief in the conclusion, or is this so dependent on the person's state parameters that in principle he can be trained to reason by any arbitrary schema?) And what degree of belief is/should be conferred upon the conclusion of (*inter alia*) an $R.A.$-patterned inference by less-than-complete belief in its premises?

Insight into the generic nature of inference is a luxury which normative epistemology can perhaps afford to develop at leisure. Very much another matter is describing the specific inference patterns which in fact govern human reason. For while our technical grasp of what is and what is not a logically valid argument has by now well surpassed most needs of practical deduction, we are still unbelievably ignorant about what patterns of *ampliative* (nondemonstrative) inference should/do direct our thinking. It is not that the theory of ampliative reasoning has suffered from neglect—a chapter or two on "scientific inference" is *de rigueur*

for any book on philosophy of science or research methodology. But the extant material on this divides rather cleanly into two classes; on the one hand assorted doctrines on the logic of statistical generalization which, though still disturbingly shaky at the deeper foundational levels, generally achieve considerable quantitative sophistication both at abstract theory and in practical research applications, and on the other hand a hash of tradition, mysticism, and double-talk servicing the rest of ampliative inference with little relevance to either the problems or more advanced practices of inferential reality. Since I have reviewed the latter's more damning inadequacies elsewhere (Rozeboom, 1970, 1972), I shall observe here only that (1) there is no epistemic need for rational inference to be logically valid (i.e., strictly deductive) so long as the transmission of belief from premises to conclusion is more restrained (hesitant, circumspect, reserved) than is proper for deduction; (2) the inference patterns by which men reason in situations with real-life repercussions are *not* in fact typically deductive; and (3) statistical generalization from sample frequency data is merely one of several distinct ampliative patterns fundamental to all grades of intelligent thought from primitive intuition to the most advanced craftwork in scientific data analysis. I have already described two others in rather specific detail (Rozeboom, 1961b, 1966, 1972), both of these being "ontological" or "explanatory" inductions which transform observed regularities into theories about their underlying sources, and the count may have just begun. Determinate patterns of nonstatistical induction are without acknowledged precedent in the annals of epistemology, and philosophers who would assume responsibility for their normative appraisal had best begin humbly. The first task is purely descriptive, namely, to detect and formalize those ampliative arguments which do, empirically, carry conviction for sophisticated thinkers in areas shaped by reality feedback. The habitat of these inference forms, moreover, is not primarily where philosophers most comfortably browse amid the theoretic deposits of history's Great Scientists, but in the stuff of lab reports and research strategies; not the grand syntheses which catch the imagination of an age but the technical arguments by which unromantic professionals persuade and criticize their colleagues. By no means will this inferential ore test out as uniformly high grade. The logic of scientific data analysis is still actively evolving, with good and bad theorizing closely intermingled without clear consensual standards for their separation, and its most powerful advances beyond commonsense intuition remain poorly formalized. Normative study of these arguments, if conducted with existential sensitivity to, their inductive force and fine logical structure, could greatly expedite the still-amoeboid progress of "scientific method." But regardless of epistemic engineering prospects, the psycho-philosophy of knowledge now stands upon a threshold to discoveries in inductive reasoning breathtakingly vast enough to put even the past century's advances in deductive logic to shame.

Concerning observation, it is noteworthy that despite the lavish attention

philosophers and psychologists have given this topic, the logical force of categorizing a given cognition as an "observation" ("percept") is still importantly obscure. For example, if I ask you why you think that John and Mary have made up their quarrel and you reply that you see (observe, perceive) them holding hands over there, just what are you asserting about your belief in their hand-holding which is distinct from asserting with equal conviction, say, that you remember or intuit this? Are you claiming that the *content* of your perceptual belief has a distinctive quality (e.g., a lively intensity) which memories and intuitions lack, so that observing that-$p$ and remembering or intuiting that-$p$ contain the same proposition only in an abstract (i.e. non-identitive) sense of "same"? Or do you allege a special origin for those beliefs you class as "observations," and if so, to what views on the nature of causality in general and pre-cognitive input processes in particular do you then subscribe? I would expect a person's reply to this to be importantly conditioned by his background in sensory psychology. But assuming that for most of us to "observe" is at least in part to have a belief which arises in a certain way, it remains to make explicit the mechanisms of percept production. Generically, this is of course a well known and much researched problem in mainstream psychology. Study of specifics, however, has looked to sense-mediated exterospection for its paradigms while totally neglecting *introspective* observation—not through any lack of interest in the latter but from failure to realize that anything about it needs explanation.[44] Yet once the phenomenalist confusion between having an experience and being aware that one has it is set straight, space reappears within which to puzzle over how internal realities sometimes produce beliefs about themselves. This is *not* a trivial question. It raises in pure form the fundamental cognitive problem which theories and data on the transducer functions of exterospective systems obscure to the point of irretrievability: When "information" in the modern noncognitive sense (i.e. realization by a variable of one of its possible values) arises within an organism, what else is needed to convert this into genuine cognitive information *about* its causal antecedents?

### Metabeliefs

Finally, we come to epistemology's *metabelief* frontier. Broadly construed, "metabeliefs" are propositions about other propositions, including in particular semantic and rationality claims such as the correspondence principle of truth. (An alternative but inconveniently narrow use of this term would be that a "metabelief" is an entire belief act—i.e. a particular intentional event with mode on the belief/disbelief continuum—whose object is another belief act.) Viewed abstractly, metabeliefs might seem relevant to the concerns only of philosophers and others given to cognitive navel scrutiny in recoil from the real world. In fact, their practi-

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[44]However, see Natsoulas, 1970.

cal importance is just the opposite: The more efficiently hard-headed is a person's reasoning, the more significant a role metabeliefs play in his thinking. This is because metabeliefs are the means by which normative epistemology exerts leverage on applied thinking, the machinery by which we monitor our own rationality. For example, if I am disposed to reason by an inference pattern $\rho$, but through study of logic I also come to believe that $\rho$-patterned arguments are deductively invalid, then when I become aware of having acquired my belief in proposition $q$ by $\rho$-patterned inference from premises $p_1, \ldots, p_n$, my metabelief about $\rho$-coupled propositions suppresses the conviction in $p$ which would otherwise be transmitted from my convictions in $p_1$ and ... and $p_n$. (This belief transmission will not be damped entirely, however, if $\rho$ is still acceptable to me as an inductive inference pattern.) Conversely, if I have come to think that pattern $\rho$ is valid, then even if I do not yet reason *by* $\rho$ I can nonetheless infer a conclusion $q$ from my beliefs in $p_1, \ldots, p_n$ together with my additional beliefs that $q$ is $\rho$-related to $p_1, \ldots, p_n$ and that any proposition so related to an $n$-tuple of premises is true if the latter are.

In like fashion, metabeliefs modulate the intensities with which I would otherwise hold my basic beliefs. Thus when I introspectively detect myself *perceiving that-p*, the certainty I am tempted to feel in $p$ is infused with a modicum of cautionary doubt by my recall of past perceivings which turned out to be not wholly veridical. Similarly, I have such modest assurance in the general accuracy of my memories that identifying a belief of mine as "memory" badly undermines my confidence in it. It is an error to suppose that when disciplined thinkers toughen the rationality of their judgments by critical self-scrutiny of form "What are my grounds for believing $p$?", they seek merely to review the *evidence* for $p$. Fully as important is to appraise the evidence itself by classifying one's basic beliefs according to their *non*evidential sources and reflecting upon the general epistemic quality of beliefs which so originate. As recognized by common sense, beliefs arise mainly in the ways listed on pp. 55 above, but professionalized inquiry exploits much more finely discriminated if poorly verbalized belief categories. The natural sciences, especially, make intensive efforts to search out the conditions under which their basic beliefs ("data") seem most trustworthy, and then require their technical conclusions to be inferred only from evidence of this elite kind. A discipline's intramural concern for the reliability of its data is perhaps the best single indicator of its status along the continuum from hard science to soft to pseudo.

Though normative epistemology has yet to make metabeliefs an explicit object (*contra* content) of its concern, these are far too important to leave uncultivated much longer. As I will try to show, however, any serious theory of belief/metabelief interplay must aspire to vastly higher orders of sophisticated complexity than previously ventured by the philosophy of knowledge. Let us assume as a first approximation that the normative force of metabeliefs may be expressed by principles roughly of the form

$\alpha$) If $o$ at $t$ believes that $f$ is the relative frequency (or statistical probability) of truth in his beliefs arising from sources of kind $K$, and also that his belief in proposition $p$ arises from a source of kind $K$, then $o$ at $t$ should believe in $p$ with strength (degree of credence) $\psi(f)$, where $\psi$ is a monotonic increasing function of truth rate $f$.

The "source" category $K$ of a given belief should be construed broadly to include any introspectively detectable, epistemically relevant feature of the circumstances attendant upon the belief act in question, including aspects of the belief's own content. (E.g., $o$ may be aware that his beliefs containing a certain concept or having a certain logical form are especially untrustworthy.) To assimilate $\alpha$ or its reconstructed essence into a technically coherent epistemology, however, requires attention to formidable problems on several levels of complexity.

The lowest difficulty stratum is one with which normative belief theory has already begun to skirmish in the context of statistical inference. Metabelief principle $\alpha$ clearly resembles the "straight rule" of instance induction widely presupposed by theories of probabilistic explanation and prediction, namely, that

$\beta$) If $o$ at $t$ believes that $f$ is the relative frequency (or statistical probability) of property $P$ among things of type $Q$, and also that entity $x$ is of type $Q$, then $o$ at $t$ should feel degree of confidence $\psi(f)$ in the proposition that $x$ has property $P$, where $\psi(f)$—the "subjective probability" of this proposition for $o$ at $t$—increases with $f$. (Under the usual scaling of subjective probability, $\psi(f)$ is numerically equal to $f$.)

In fact, only minor changes are needed to make $\alpha$ a special case of $\beta$, and any boundary restrictions required to keep $\beta$ plausible apply to $\alpha$ as well. In particular, this is true of the "total evidence" requirement that $\beta$ holds only when $x$'s $Q$-ness is the entirety of usable information about $x$. ($\beta$ is obviously untenable if $o$ at $t$ also knows e.g. that $x$ is an $R$ and that all $R$s are $P$s). Thus $\alpha$ must be conditional upon $K$'s being the narrowest (most restricted) metabelief category to which $o$ at $t$ assigns his $p$-belief. (E.g., my general perceptual accuracy is a poor standard for how much I should trust my percept that-John-is-approaching when I am further aware that the light is especially dim and that I frequently confuse John with his brother.)

However, the "total evidence" requirement suffers from serious technical difficulties (see e.g. Hempel, 1965; Massey, 1968) which ultimately unfold into the problems of ($i$) construing the "relative frequency (or statistical probability)" of a class $P$ relative to a class $Q$ in a way which allows this quantity to be well-defined and non-extreme (i.e. neither zero nor unity) even when $Q$ contains only one or

no members, and (*ii*) developing principles of statistical inference by which we can rationally estimate the relative frequency of $P$ in class $Q$ from information only about $P$'s incidence in a number of classes much broader than $Q$. (Problem (*i*) is mainly just a matter of distinguishing statistical probability from *de facto* relative frequency; but while statistical practices at estimating distribution parameters provide some preliminary intuitions about (*ii*), the deeper puzzles about this have scarcely been probed much less solved.) Moreover, even apart from problems of the total-evidence sort, straight rule $\beta$ and hence presumably $\alpha$ is demonstrably more questionable than commonsense is aware (Rozeboom, 1969b). Technical refinements regarding degrees of truth and belief create a second level of complexity for metabelief theory. Contrary to the present wording of $\alpha$, a belief category's epistemic merit cannot be determined strictly by the metabelieved incidence of truth therein if the correspondence of propositions to reality is not thought to be a simple true/false dichotomy. For example, it is obscure how truth frequency might be significantly predicated of a class of vague beliefs. It is probably not feasible for metabelief theory to attempt accommodation to polymorphic truth assessments until formal semantics has developed some theory of the latter. More immediately in need of remedy is the inconsistent treatment of graded belief in $\alpha$. Since a person's $K$-kind beliefs need not all sustain equal conviction, either the unqualified "belief" cited in $\alpha$'s antecedent must be clarified as any degree of belief exceeding some arbitrarily stipulated threshold, or, more satisfactorily, $\alpha$ must be revised to read something like

$\alpha$*) If $o$ at $t$ believes that $f$ is the incidence of truth in his beliefs arising in strength $s$ from sources of kind $K$, and also that his belief in proposition $p$ is of strength $S$ from a source of kind $K$, then $o$ at $t$ should believe in $p$ with strength $\psi(f)$, where $\psi$ is monotonic increasing in $f$.

But now a delicacy appears if we ask how $o$'s belief processes can *become* rational by metabelief standards—i.e., how they might comply with a prescription like $\alpha$*. To avoid even further complications, let us assume that $o$'s metabeliefs are all correct, so that the strength and source of his belief in a given proposition are just what he thinks they are. Also let the metabelief situation stipulated in $\alpha$*'s antecedent (i.e. the conjunction bracketed by 'if' and 'then' in $\alpha$*) be abbreviated as '$o$ at $t$ metabelieves that $MB(p, s, K, f)$'. Then given the antecedent of $\alpha$*, two possibilities arise: One is that the strength $s$ with which $o$ at $t$ in fact believes $p$ equals the strength $\psi(f)$ with which, under his metabelief $MB(p, s, K, f)$, he should believe it. This is the rational ideal which, however, is degenerate in that were it always to obtain there would be no intellectual work for metabeliefs to do. The alternative possibility is that $o$'s $p$-belief strength $s$ at $t$ is not equal to $\psi(f)$. In this event, rationality on $p$'s part would presumably be to change his $p$-belief strength from $s$ to $s'$, where $s'$ equals $\psi(f)$ or at least is closer to it than is $s$.

But then $o$ no longer has metabelief $MB(p, s, K, f)$ at this new time $t'$; instead, $o$ at $t'$ now believes $p$ with strength $s'$ on grounds which, insomuch as they include belief $MB(p, s, K, f)$, are hence no longer exclusively of kind $K$ but are rather of a metabelief-monitored kind $K'$ whose accuracy rate, $f'$, at belief level $s'$ is very unlikely to be the same as $f$. That is, at time $t'$, $o$ now believes $p$ in strength $s'$ while metabelieving that $MB(p, s', K', f')$—and $s'$ will in general not equal the belief strength $\psi(f')$ called for by $MB(p, s', K', f')$ even if it is what would have been rational under $MB(p, s, K, f)$. If $s' \neq \psi(f')$ then the normative force of $\alpha^*$ calls for still another shift in $o$'s $p$-belief to a strength $s''$ closer to $\psi(f')$, resulting in a metabelief change to $MB(p, s'', K'', f'')$ and so on for a recursive series which may or may not converge upon a rational ideal $MB(p, s^n, K^n, f^n)$ in which $s^n = \psi(f^n)$. If my argument here is too condensed for easy comprehension, no matter—the qualitative point is that insofar as human reason is actually guided by metabeliefs, the latter become part of the very sources whose accuracy they assess while the belief shifts they effect will be not single-stage adjustments but at best iterative approximations to an equilibrium. Whether any insurmountable difficulties lurk in this remains to be seen, but the prospect that metabelief theory may have problems of self-reference brings ominously to mind the paradoxes which are wont to gibber therein.

Still another important detail to which both $\alpha$ and $\alpha^*$ are inadequate as given is that metabeliefs themselves sustain less than perfect confidence. Even if $o$ at $t$ correctly feels no metabelief uncertainty about the strengths and sources of his beliefs, as for simplicity was assumed above, he will generally feel unsure of the precise incidence of truth in any one of his belief categories. Extension of $\alpha^*$ to cover metabelief uncertainty should be no great problem, since familiar theorems determining unconditional probabilities as a weighted mixture of conditional ones may suffice to handle this. But the issue of metabelief uncertainty also serves to introduce a still higher level of metabelief complexity, namely, how does a person *acquire* his metabeliefs and how strongly should he believe them? In particular, how can a person learn with some degree of accuracy what proportion of his $s$-strength beliefs of source kind $K$ are in fact true? To the extent that one needs to determine this empirically for himself—and while it may well be that some people get metabeliefs by hearsay, intuition, or the like, we have no reason to think that reliable appraisals of one's belief accuracies can be obtained in these ways—it would seem that this must primarily require a person to infer his truth rate for a given belief category by statistical induction from what he knows about the incidence of veridicality in a tested sample of his beliefs from this category. It is not clear, however, how one might acquire sample truth-rate data which project nontrivial metabelief generalizations. For suppose that $C$ is some sample of the propositions in a given source category believed by $o$ at $t$ with strength $s$. If $o$'s judgment regarding what proportion, $f$, of propositions in $C$ are true were

determined exclusively by his assessment of the individual propositions in $C$, it would be a useless analytic consequence of confidence level $s$: So long as $o$ believes each $p$ in $C$ with strength $s$, he would metabelieve e.g. that $f = 1.00$ (i.e. 100% true) if his confidence s is maximal, that $f = 0$ if $s$ is minimal (i.e. maximal disbelief), and more generally that $f$ has whatever value is needed for $s$ to be the belief strength $o$ considers appropriate for a proposition metabelieved to belong to a category whose truth rate is $f$. Were metabeliefs always so derived, then beliefs would always have essentially the strengths which, by principle $\alpha^*$, they should have. For epistemically significant tensions to arise between a person's beliefs and metabeliefs by virtue of which the latter can modulate the former, he must first acquire some $s$-strength beliefs from sources of kind $K$ and then somehow re-evaluate these propositions to obtain a corrected assessment of their truth.

There appear to be at least two ways in which such reappraisals might occur. One is that $o$ may remember at time $t$ that he previously believed proposition $p$ with strength $s$ on grounds $K$, even though he now has reason to believe $p$ with strength $s'$. (E.g., I recall feeling so sure yesterday that I saw John across the street, even though I now have hard evidence that he has been out of town all week.) The other is that $o$ at $t$ may be able to suppress some of the factors determining his $p$-belief long enough to assess how much confidence the reduced set would produce by itself, or to introspect how components of his total $p$-belief strength respectively trace to sources of different types, so that he can judge, in effect, "The kind-$K$ sources of my belief in $p$ would by themselves cause me to believe this in strength $s$, but due to additional influences I actually believe $p$ with strength $s'$." (Thus when I look at a half-submerged stick, past experience with things in water assures me that the stick isn't really bent even though it looks bent—i.e. I can discern that perception alone would produce in me a much stronger conviction that the stick is bent than I actually feel.) As shown by these examples, significant metabeliefs can thus arise from manifest disparity between the belief strengths generated in the same proposition by sources of different kinds, the operational force of which is to alter the belief-strength contribution of each source kind (or more precisely, perhaps, to introduce a corresponding compensatory bias) as a function of its deviancy from the intrapersonal consensus. Since these belief adjustments in turn affect the consensual norms on which they are based, this should be a recursive process tending toward but not necessarily reaching equilibrium.

If much in this discussion of metabelief mechanisms seems confused and obscure, it is because my understanding of them is confused and obscure. I suggest, however, that anyone who professes to know the score here is probably ignorant of what the game is. For in an epistemic economy wherein even basic beliefs are in principle uncertain, *no* belief remains entirely basic. Any belief in the system is susceptible to inferential support or disconfirmation by other beliefs for or against which it, in turn, may itself serve as evidence. Rationality in such cases is not a

linear progression from propositions with credibilities already established to others which these deductively or inductively imply, but a dynamic interplay within and across all layers of beliefs, metabeliefs, and meta-...-metabeliefs. Stated in such grandly qualitative terms, holistic epistemologies are by no means without precedent in modern philosophy. Serious normative study of belief systems which reorganize themselves holistically, however, has remained conspicuously nonexistent. If the present probes are not totally misdirected, the heights to be scaled, the chasms to be bridged, the depths to be plumbed, the enigmas to be unravelled, and the intricacies to be mastered have scarcely begun to impress their enormity upon our comprehension.

## Summary

The rock on which any sane account of cognition must rest is that a person's $\phi$ing that $p$ (or something rather like it, if empirical reality exemplifies this classical ideal only approximately) is a natural event with determinate locus in the world's causal order; in particular, that it is brought about by (*inter alia*) the peripheral stimulation which impinges upon the $\phi$er, and is in turn a part-cause of his subsequent movements. (We know this in the same commonsensical albeit imprecise way we know e.g. that the dryness of firewood affects how well it burns and is in turn influenced by aging, namely, by inductive extrapolation from extensive everyday experience.) Insomuch as intentional acts mediate (at times) between peripheral stimulation and overt actions, they are perforce something of which behavior theory (not just mentalistic psychology) needs to give an account, regardless of whether its assimilation of these inner events proceeds according to the constrictive model of science which some recent philosophers of mind have sought to inflict upon psychology.[45] To be sure, this still leaves some room for debate whether concepts, propositions, and other cognitive "meanings" are themselves ingredients of these internal mediators or instead inhabit some ghostly realm distinct from both the psychological attributes of cognizers and the objective referents of their cognitions. I have already (p. 37ff above) sketched why, like many philosophers, I consider the latter interpretation to be wholly gratuitous, akin to belief in a substantival soul. But I am willing to leave the issue open a little longer if someone really does seriously want to defend a nonpsychological ontology for

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[45]In brief, it has been argued that psychology proper (to be distinguished from physiology) cannot be a natural science because mentalistic concepts aren't amenable to treatment in terms of causal mechanism (cf. Melden, 1966; Peters, 1960; Taylor, 1966)—in particular, that it is logically impossible for intentions to be causally responsible for the actions to which they correspond because their relation to the latter is analytic. This view has already been shot down by, *inter alia*, Alston (1966) and Fodor (1968), so I need say no more about it here except to note that it is grounded on an astonishingly obsolete notion of causal relatedness and theoretical concepts in science.

concepts and propositions. Most fundamental for now is simply to appreciate that despite centuries of sustained concern for the nature of meaning, philosophical understanding of this remains confused and impoverished, an asymptotic insufficiency which can be alleviated only by new insights into the detailed psychonomic character of whatever it is in a person which grounds his epistemic relation to whatever may be the objects of his cognitions.

The real issue here, it seems to me, is not whether concepts and propositions have a major psychological aspect, but whether psychological science can learn enough about them to illuminate their philosophical darks. As is true for any discipline's knowledge of its subject matter, the questions psychology can answer about the inner organism will at any one time always be a proper subset of those which can be asked. But there are no more inherent limitations on what experimental psychology can learn about this than there are on what the physical sciences can learn about e.g. the molecular basis of life or the fine structure of matter. In all advanced natural sciences, the underlying sources and causal principles behind observed events are reclaimed with ever-greater intricacy and explanatory depth through ampliative interpretation of increasingly complex data regularities, while the more quantitatively precise, reliable, and systematically varied are the science's data the more powerfully detailed is its penetration into its subject's inner mysteries. For psychology, the technically efficacious data base is behavioral, i.e. the organism's outside-of-the-skin doings and history of environmental circumstances. (Introspective reports, though often heuristically valuable, are just not firm enough to support exact interpretations,[46] and in any event give access to only a limited sector of the organism's psychonomic machinery.[47]) The forthcoming psychology of cognition to which we must look for philosophic succor will thus have a very different conceptual constitution from those psychologies with which most philosophers have yet had any working acquaintance. The concepts through which the organism's interior is to be technically described will be primarily of the sort which philosophers of science nowadays call "theoretical" or "dispositional," namely, hypothetical constructs which refer to the unobserved entities responsible for the data patterns on which the theory rests yet which characterize these underlying entities only functionally in terms of their nomic relations to the data variables. The theory of meaning afforded by such an account is nonmentalistic in that it has no com-

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[46]Appeal to introspective data is for psychological science akin to ascertaining weight and temperature in physical research by heft and touch. Nothing is methodologically *illicit* about such observations, especially when they are the best we can do. But until we can do better than data this crude, our knowledge of what underlies them must inevitably remain primitive or conjectural.

[47]E.g., I can introspect whether ideas $A$ and $B$ are co-present in my thinking, but not whether I have an association between $A$ and $B$. The latter is a dispositional property which can only be inferred from my pattern of $A$ and $B$ thoughts or, more sensitively, from how I perform on certain technical tasks of the sort which verbal-learning research has proved ingenious at devising.

mitment to, and in fact attempts to avoid, the introspectively colored concepts on which commonsense mentalistic psychology is erected; hence it escapes the charges of mysticism and unscientificality with which many contemporary philosophers reject classical mentalistic interpretations of cognition (e.g. the doctrine of "ideas"). Yet neither does it generically repudiate the mentalistic outlook, any more than modern theoretical biology entails wholesale rejection of farmers' folklore on plant growth. Rather, to the extent that the behavioral and mentalistic accounts are both correct, they will manifest an approximate isomorphism by virtue of which we can establish that both are talking *about*, albeit through markedly nonsynonymous concepts differing both in precision and experiental-richness profiles, the very same internal entities and natural principles which, moreover, are prospective referents for theoretical expressions in the language of a suitably advanced neurophysiology as well.[48]

As I see it, therefore, psycho-philosophical research on cognition needs to move simultaneously on two fronts that seek ultimately to coalesce but which cannot profitably be forced into premature intimacy. On the one hand, it is important to persist at analysis of classic mental-act conceptions, both to lay bare the structure of the intuitive theories imbedded therein and to rough in at whatever level of accuracy is appropriate to these concepts the overt behavior patterns which they project.[49] Meanwhile, it remains for behavioral research to make known the technical reality of these purported cognitive manifestations at scientifically fruitful levels of experimental design and data analysis, to quantify the detailed hierarchical[50] structure of whatever demonstrable regularities in fact govern these phenomena, to partial out of these regularities whatever aspects are plausibly accounted for by classical behavior-theoretic mechanisms (e.g.. reinforcement of S-R bonds and primary stimulus generalization) of subcognitive complexity, to tease out the deeper theoretical implications of whatever residual data patterning cannot be so explained, to discern the respects in which the latter mechanisms still importantly fail to capture the distinctive logical features of mentalistically conceived

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[48]See Rozeboom (1962a, p. 344ff) on the logic of "identifying" theoretical entities. I speak of "profiles" of experiential richness here because behavioral and mentalistic conceptions of internal events differ not merely in overall existential depth (however that might be measured) but also in the dimensions of experience which they emphasize.

[49]With one emendation, I strongly endorse Peters' (1960, p. 50) claim that "We know *so much* about human beings, and our knowledge is incorporated implicitly in our language. Making it explicit could be a more fruitful preliminary to developing a theory than gaping at rats or grey geese." Beyond scowling at the gratuitously derogatory tone of the last phrase, I would replace "know" with "conjecture" here, since the wheat of commonsense psychology is well laced with chaff and other barnyard wastes.

[50]"Hierarchical" in that scientific knowledge about the explanatory sources of observed events derives primarily from interlocked data patterns of ascending logical type in which local parameters in lower-level regularities become the variables of higher-level laws (see Rozeboom, 1961b, 1972).

cognitive functions, to trace the specific import of these still-unreclaimed mental properties for behavioral indices not yet investigated, to carry through empirical studies which determine what the new phenomena so implicated are in fact technically like, and to persist in as many iterations of this cycle as may be required for the behavioral approach to extract from our mentalistic intuitions all that proves worthy of retention therein. It is easy to underestimate—perhaps by several orders of magnitude—how difficult it is to carry through with even modest success the research program I have just described,[51] or how wide a gap still remains between our commonsense notions of mental processes and those beliefs about what goes on inside for which we have hard evidential warrant. Yet this program *can* be made productive and with patience and effort the gap *can* be closed. I submit my own past contributions as a small testimonial to the viability of this prospect.

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[51]For a taste of the technical complexity of an even partial behavioristic reconstruction of expectations, ideational associations, and purposive acts, see Rozeboom, 1970, Part III.

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