Can information be de-cognitized?

It is a noble effort that Dretske has made here, and timely as well, considering the pretentious blather about "information" that too often substitutes for honest analysis of transduction mechanisms in those sectors of psychology, philosophy, and artificial intelligence now coalescing into cognitive science. And Dretske succeeds admirably in cutting to the bone on this concept's noncognitive side, even if his book works its way to this through a muchness of beguilement with Shannon statistics. (His probability-theoretic model of information can be reached far more deftly from a broader conception of statistical covariation.) But Dretske oddly slights the cognitive side of information—on purpose it is true, but impeachably nonetheless. There is rather more to information than Dretske lets on: and while it is never fair to chastise an author for not having said everything worth saying on his chosen topic, it needs be asked whether Dretske's partial account may not be a half-truth more deceptive than enlightening.

Ordinary language, to which Dretske surely acknowledges some obligation, endows us with the information concept as foremost a process verb in contexts such as

Mary		that his house was on fire.
The phone call	informed John	
Smoke over his roof		about the fire.

I make two presumptions about these variations, whose defense I must forego here but which are also implicit in Dretske's account. First, informational content is characterized primarily by a proposition and only derivatively by objectual reference. Thus, John is informed about the fire only by virtue of being informed that-p for some proposition that-p that makes reference to the fire. (This may not be quite what Dretske would say, but fine differences here will not matter.) And secondly, despite the grammatical diversity, which ordinary language accepts for the antecedent of an informing, this is always elliptical for a subject/predicate state of affairs, that is, something's having certain attributes. Thus it is Mary's displaying particular gestures or utterances, or the phone call's having a certain phonemic character, or the roofs billowing smoke that informs John of the fire. Accordingly, we may say that *informing* is basically a process of form

(1) r's being A informs s that-p

wherein r is paradigmatically a dated segment (temporal stage) of some transient

or enduring object of the sort to which we attribute stimulus properties, and s is a dated segment of some entity capable of mental acts.

From (1), we derive two fundamentally different notions of nominalized information states, on the one hand,

(2) s $\left\{\begin{array}{l}\text{possesses the information}\\[4pt]\text{is informed}\end{array}\right\}$ that-p

and, on the other, with an important forthcoming reservation,

(3) r's-being-A $\left\{\begin{array}{l}\text{carries}\\[4pt]\text{contains}\end{array}\right\}$ the information that-p

Although (2) and (3) are both intuitive consequences of (1), common sense allows (2) to hold even lacking (1) for any $\langle r, A\rangle$, and insists that (3) does not require r's-being-A in fact to inform any s that-p. Even so, just as we can explicate (1) by conjoining analyses of (2) and (3) with a suitable coupling of r to s, so should the components of (1)'s analysis include explications of (2) and (3) that allow the latter to hold even when (1) fails through lack of a suitable carrier/cognizer coupling.

Cognizer information state (2) evidently calls for an analysis of form "s ϕs that-p" for some, perhaps complex, propositional attitude ϕ, though eventually we would like to find a psychonomic reduction for this. There is much to debate over the proper choice of verb-phrase "ϕ" here; but for simplicity let us take ϕ to be *know, with the asterisk tokening some to-be-negotiated compromise between the loose, everyday sense of "know" and the classic philosophical conception of knowledge as justified true belief. Then when s's-*knowing-that-p is partialed out of our analysis of (1), it only remains to choose some fragment of this remainder for our explication of (3)—which, to be nontrivial, however, must include more of (1) than just conditions localized in $\langle r, A, \text{that-}p\rangle$. That is, like the incompleteness of "John is taller," schema (3) is best viewed as elliptic for some completion of

(3′) r's-being-A carries the information that-p relative to ____

whose blank must be filled before we have a proper target of analysis.

To me, it seems evident that (3′) is best completed by reference to particular cognizer-stages and commonsensically interpreted something like

(4) r's-being-A carries the information that-p relative to s iff s's reception of $r's$-being-A would cause s to *know that-p

The be-caused-to-*know disposition attributed to s in (4) cries for cashing out in terms of psychonomic mechanism, but that is exactly the directive that cognition

research needs. Dretske, on the other hand, reads into (3′) an epistemological extremity that cognitive science can ill afford to respect.

For philosophical reasons, Dretske wants being-informed-that-p to be a hard-core knowing, under which that-p is not merely true but in some sense *certain*. And for that-p to be certain in (2), it must also be certain given (2)'s source in (1). But that-p is never certain given just r's-being-A for commonsensical or cognitive-science instantiations of schema (1). So to fend off vacuity, Dretske fills the blank in (3′) by reference to some cognizer's background knowledge and explicates the result as

(5) r's-being-A carries the information that-p relative to [s's-knowing-that]-k iff the probability that-p is unity given r's-being-A-and-[s's knowing-that]-k, but is less than unity given only [s's-knowing-that]-k.

I write "s-knowing-that-k" where Dretske makes explicit just "k," only because the narrower reading seems truer to his intent. Deleting the bracketed quali-fier makes no difference here beyond exacerbating the question of precisely how (5)'s sentential clauses should be nominalized. Either way, (5) no more puts the information-that-p wholly *in* r's-being-A than the-taller-that-John-is-than-Mary is wholly in John, albeit (5)-sans-brackets does make carrier information independent of cognizers.

So what is wrong with (5)? Well, for one thing, everyday usage is far from adamant that information must be veridical. (When John is informed by Mary that his house is afire, common sense allows John not merely to retain some doubt about this but to be entirely justified in doing so.) I suggest that the *prima facie* truthfulness of "information" is best reconstructed in terms of context cues that urge belief upon the recipient (e.g., declarative rather than interrogative mood of a verbal message). But let that pass. Suppose that *authentic* information is by nature truthful, just as in some common sense (but *not* psychonomic) constru-als of perception, it is not logically possible for s erroneously to perceive that-p. If so, authentic information holds little interest, at least for the psychology of cognition and, I should think, for cognitive science more broadly. In part, this is because extant theories of cognition and information processing do not in fact concern themselves with veridicality of the signals transmitted in natural systems transactions. But neither is there any good psychonomic reason for such concern: Truthfulness of the "information" contained in various stages of a causal process plays no role in the laws that govern these events. Or, if that is too contentious for your taste, look at it this way: (1) is just one species of genus

(6) r's-being-A induces s to φ that-p

from which we derive

	carries	message	
r's being A	the		that-p ɸ-wise, relative to ____
	contains	idea	

by the same common sense intuition that pulls (3) out of (1). Cognitive science needs to study many ɸ-instances of (6), including, in particular, all degrees of belief/disbelief as well as varieties of desire, volition, and contemplative thought; and we expect many of these accounts to have much in common, especially for mental acts that stick close to psychology proper. The counterpart of (4) for other ɸ-verbs in (7) is obvious, including its directive to seek out the disposition's psychonomic nature. In contrast, (5) severs all conceptual ties between carrier information and the psychonomic production of mental acts, and has no instructive generalization to other ɸ-instances of (7).

There is indeed an important place for statistical dependencies in the story of real-world cognitive accuracy, but not one reserved for certainties. Meanwhile, it should not go unnoticed that major technical problems bedevil the explicans in (5) even if certitude is relaxed. Dretske understandably wants his conditional probability in (5) to be a *de re* nomic connection, not a *de dicto* credibility relation. But a strong argument can be made that if "$\Pr(x \mid y)$" denotes objective probabilities, "x" and "y" must be unsaturated *predicates*; that is, open sentences, not names of particular states of affairs as now schematized in (5). Dretske's passing remark that his theory of knowledge is restricted to *de re* perception suggests sensitivity to the issue here; yet I venture that he will not find it easy to open (5)'s closed sentential clauses in any way that can stand close inspection. Beyond that lies the question whether $\Pr(x \mid y)$ and $\Pr(y \mid x)$ can both exist *de re* and, if not, whether (5) isn't backing the loser. Underlying all of this is the need for an understanding of scientific lawfulness far more articulate about, inter alia, molar abstraction and locus structure than the philosophy of science has yet recognized. For an introduction to these complexities, see my article on the future of mental systems (Rozeboom, 1986).

References

Rozeboom, W. W. (1986). *Mentality and the deeper logic of lawfulness*
 Available at https://www.psych.ualberta.ca/~rozeboom/