

the topical statement. This, however, is not in keeping with the original question of the interviewer and would result in further problems: The statement, "I feeling like cashing my welfare check now," would need to assume a subordinate placement with respect to the saving/keeping money statement. This placement is blocked (i.e., the presupposition relationship is not fulfilled); this is because the two statements express contrary intentions. Therefore this reinterpretation of the communicative intention of the speaker still does not permit a complete partial ordering of the statements of this text.

8. A reinterpretation can be suggested that reorganizes the text into a single hierarchy. This can be accomplished by assuming that the accidental cutting occurred *because* the speaker was so nervous and upset by David's rejection. However, this violates the context of the entire statement, where the speaker is responding to questions about prior suicidal behavior. This compels the listener to look for suicidal references or an explicit remark that changes the topic, such as, "No I never *tried* to hurt myself but I once accidentally . . ."

9. This is obviously not always the case. Some schizophrenics, particularly those who are chronically isolated from others, will report that they "enjoy" their hallucinatory experiences.

10. This mapping of densely linked data sets in association memory into hierarchically organized data sets in working memory was suggested to me by Daniela Ioan.

11. The possible relationship between excessively opportunistic planning and attentional defects in schizophrenia was first suggested to me by Larry Birnbaum.

Open Peer Commentary

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Who may I say is calling?

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The other day I was reading a rough draft of a paper when I came to an underlined section of the text. Now (in my mind's ear) the author's familiar voice changed, giving careful emphasis to this passage. Strangely, the point was not particularly illuminating but the underlining continued on and on, and I soon realized that this was surely the result of a print command error. Only the first sentence should have been italicized. But even seeing this (and much against my will), his voice continued – 'emphasis added' and in a rising, near-maniac pitch – on to the end of the page. Here was the voice of the ignored academic shouting into the intellectual void.

A. Tenlake, personal correspondence

For the normal subject, the phenomena of "talking to oneself" are indeed a wide variety of complex events. Above, the auditory image "heard" by the subject occurs in the course of a difficult cognitive task, matches the perceptions of another speaker's voice, and (irritatingly) does not seem subject to voluntary extinction. But it is no hallucination. The elegance of Hoffman's suggestion is that, amidst the jumble of strange but non-

pathological phenomena, he offers a unitary explanation of several sorts of schizophrenic hallucinations and behavior. These pathologies can be blamed on a single sort of malfunction relatively deep within the organization of the cognitive system – an action – production disorder that is magnified into a cognitive illusion by the default assumptions of normal perception. Alas, such unity also proves the theory's undoing, for in order to say exactly where and how this disorder occurs, Hoffman must locate it within an elaborate and detailed story about all the *normal* phenomena, too tall an order at this time. Hoffman's sketchy story leaves enticing loose ends to lure our attention. What is Hoffman's understanding of "presupposition," "abstract representation," the difference between *involuntary* and *unintended* acts, *accessible* versus *inaccessible* goals? Instead of yielding to temptation, however, we choose to concentrate on what we take to be the central (good) idea of the paper and a relatively minor, simplifying variation on it that might save Hoffman from many of these perplexities, at least for the time being.

Hoffman's account is threatened by (inter alia) an infinite regress: If we identify "slips of the tongue" as misexecutions of communicative intentions, relative to what could there be "slips of thought"? Wittgenstein (1982) thought that "slips of thought" were impossible because a mistake presupposes an intention. Although we can intend to reach a particular (cognitive) conclusion – say, discovering a new way to drive from home to office – we cannot intend each of the individual thoughts that constitute our attempted derivation or discovery, on pain of generating a never-beginning regress of ulterior intentions to form thoughts. Some thoughts must just "come to mind," however apt, well-ordered, and useful they prove to be in the larger project.

If what Hoffman offers us is in effect the sketch of a theory of slips of thought, he takes on the burden of straightening out all these problems about goals and their relations to intentions, and the question of when, if ever, our thoughts are intended. All this is worth doing, but an easier path is missed when he dismisses the suggestion that verbal imagery (as distinct from "thoughts") is always the execution or misexecution of communicative intentions: intentions to communicate with oneself. "Goals concurrent with verbal imagery do not seem to be communication goals (unless we must for some reason communicate with ourselves); instead they are . . . frequently referable to manifest tasks and problem solving" (sect. 4, para. 13).

There is in fact a lot to be said for the hypothesis that much of what is called thinking is a sort of verbal communicating to oneself, or, more provocatively, a form of communicating within oneself. Rather than argue for this view here, we will just point out that the assumption that all "verbal thought" has an internal communicative function allows a simplification of Hoffman's view, to wit:

When *normal* people have verbal imagery, they form (self-)communicative goals, which yield speech-act planning, which yields inwardly directed speech, and this speech is thereupon recognized as intended or at least not unintended in virtue of its lack of dissonance with those very communicative goals. The result: the familiar phenomenology of "talking to oneself." In particular, it is quite possible to make middle-level production errors – of word choice, for instance – and recognize and correct them. (Can one "mispronounce" a word in verbal thought? Yes – think of reading the surnames in Russian novels.)

When schizophrenics attempt to engage in this familiar practice, they form (self-)communicative goals, which yield disrupted speech-act planning (or perhaps performance), which yields inwardly directed speech that is dissonant or discordant; it fails to execute well the communicative goals just set. And if the discrepancy involves a high-level communicative goal, the verbal imagery is perceived as unintended-by-me, and subsequently as "other-produced." Although Hoffman does not say this, one way to think of this "inference to otherness" is as follows. Because the discordance is so gross, it cannot be

interpreted away as an accident or a slip, a low-level malfunction such as a mispronunciation or a spoonerism. Indeed, because the images are voices, they are interpreted as speech acts; they are irresistibly interpreted as intended. And if I don't intend to say these things, then someone else must. The result: one "hears voices." (Compare: If I discover my hand drumming on the table, it is easy enough to interpret as mere fiddling – a nervous habit: if I discover my hand signing a contract or writing a death threat, I cannot interpret that as a mere verbal slip, but as some speech act or other gone awry.)

Postulating (only) self-communicative goals enables one to circumvent an infinite regress while eliminating some puzzling aspects of the original theory (Do dreams really occur in goalless states? Is the general nature of thought goal-directed?). Still, the above suggestions are made with trepidation; they can be regarded as just one more speculative gesture toward a complex story that Hoffman has begun trying to tell.

A three-component analysis of Hoffman's model of verbal hallucinations

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Hoffman's target article is interesting and welcome because it attempts to provide a detailed analysis of verbal hallucinations (VH) within a recently developed framework of language processing. However, the explanations offered by the model are problematic, as can be demonstrated by examining each of the three main components of VH:

(1) They are cognitions, presented as images by virtue of having acoustic properties for the subject.

(2) They are unintended cognitions in that they are not under the subject's conscious voluntary control at either the production or the removal level.

(3) They differ from other types of unintended cognitions in that they are disowned.

Hoffman's model addresses these components, but, taking each in turn, consider:

(1) The model takes it for granted that certain unintended cognitions should be presented as auditory images. They are, he asserts, a common occurrence. Yet auditory images are not presented as a common experience in the research concerning (a) the occurrence of unintended cognitions in normals (Neisser 1967; Underwood 1979), in obsessions (Rachman 1981), and in depression and anxiety states (Beck 1976), and (b) subvocal "self-talk" (which Hoffman equates with auditory images) in children and adults (Meichenbaum 1974). It seems, therefore, that the frequent occurrence of auditory imagery is rather specific to schizophrenia. This cannot be taken for granted but needs to be addressed.

(2) The unintended aspect of VH is seen as an epiphenomenon of a defect in discourse planning. The defect is inferred from discourse that consists of thematically unrelated ideas. Thus the validity of this hypothesis rests on the co-occurrence of speech marked by thematically unrelated ideas and VH. This, however, is contradicted by findings that (a) speech-disordered schizophrenics are able to produce thematically coherent discourse (Allen 1984) and (b) there is no necessary relationship between speech disorder and VH (for example only 4 out of 10 schizophrenics were found to have both; Allen & Allen 1985). Also, since it is presumed that VHs are the unintended byproduct of a discourse planning defect, it seems likely that they would vary randomly. This is not the case, however, for they tend to remain constant over time and across different situations, and to be restricted to a limited number of topics, usually of a punitive nature.

(3) The disowning feature of VH is presumed to derive from

the experiential aspect of the occurrence of unintended images which are nonconcordant with currently operative cognitive goals. In contrast, auditory images are not disowned (except fleetingly, perhaps) when they occur in passive, goalless states of consciousness. In support of this hypothesis Hoffman argues that increases in goalless states would decrease the frequency of disowned auditory images (i.e., VH). This, however, is contrary to findings that goal-oriented task engagement reduces the frequency of VH (Kazdin 1977; Allen, Halperin & Friend 1985). The hypothesis is also inconsistent with the finding that VH can be deliberately produced and removed (Allen, Halperin & Friend 1985), thus violating Hoffman's necessary nonconcordance postulate, because there is in this case no nonconcordance between the current operative cognitive goal and the presence of VH.

To conclude, although the model does not adequately explain VH in schizophrenia, it does provide food for thought and should stimulate new approaches in this area.

Language process and hallucination phenomenology

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Hoffman shifts the locus of the VH from the stimulus error originally proposed by Esquirol (Kolb 1973) to a response error. However, except for the study with Andreasen and Grove (1984), Hoffman provides little empirical data for these suggestions. His discussion is based, largely, on reasoning and analogy. In the study with Andreasen and Grove a correlation between the tendency to hallucinate and the severity of disturbance in discourse planning was found in a group of 35 schizophrenics. Depending on sample characteristics, productive symptoms may intercorrelate, and it seems premature to develop a theory of hallucinogenesis based on such a scant data base. The suggested site for hallucinogenesis, in a discourse planning stage, seems unfortunate and likely to misdirect empirical work. These stages are best thought of as intervening variables, conceptual aides to help consider the flow of a cognitive process. This theory reifies them as hypothetical constructs and even locates the function in specific brain nuclei.

An argument is made based on the observation that normals feel that recordings of their own voice sound alien; and Hoffman seems to be suggesting that schizophrenics may fail to recognize their self-generated verbal imagery in a manner similar to the way that normals fail to recognize their own voice. Normals may fail to recognize their own voice for a number of reasons. What they hear of their voice while speaking has a large bone conduction component which has a low frequency bias. The recording is, in fact, very different spectrally from what they might hear while speaking. In addition, as Hoffman remarks regarding efferent copy, alluding to the large differences between exafferent and reafferent stimulation, the task for the nervous system while speaking is to *not* hear oneself (Alpert 1965). If we did hear, we would be shouting into our own ear as we talked to someone some distance away. The argument need not be labored except to point out the danger of reasoning from an analogy between nonself recognition of voice and nonself recognition of imagery. [*Ed. note:* This point was made by several other commentators but removed elsewhere in the interest of space.]

The failure of hallucinators to recognize the source of their VHs in their own imagery is crucial to the theory and, as we have indicated, the arguments offered to explain this failure are not compelling. Hoffman posits a disturbance in a discourse-planning stage but retains an important role for verbal imagery. He