Audience design as expert performance

Dale J. Barr
University of Glasgow
Timothy M. Gann
University of California, Riverside

In conversation, speakers face the recurring problem of designing references that are interpretable by an audience whose perspective might differ from that of the speaker. Any given object can be referred to in an indeterminate number of ways, and speakers must search this space of possibilities for a description that satisfies their audience's informational needs as well as their current communicative goals. Despite decades of research on language production, the cognitive mechanisms involved in this critical task of *audience design* (Clark & Murphy, 1982) are still poorly understood.

One of the key challenges in developing a comprehensive theory of audience design is that speakers are neither absolutely attuned to their audience's needs, nor are they perfectly egocentric. Still, there are some fairly robust patterns in the literature, such as speakers being more likely to overdescribe than to underdescribe a referent (Engelhardt, Bailey, & Ferreira, 2006; Ferreira, Slevc, & Rogers, 2005), speakers showing poorer perspective taking when under cognitive load or time pressure (Horton & Keysar, 1996; Rossnagel, 2000); and speakers adapting to feedback from an interloctuor (Brennan & Clark, 1996; Lockridge & Brennan, 2002). It is also known that speakers are more likely to adapt their speech at certain levels of language processing (e.g., in the selection of a topic or language register) than at others (e.g., in phonological encoding or in avoiding syntactic ambiguity; see Barr & Keysar, 2006 for review).

Several proposals have emerged in the literature, but none is fleshed out well-enough to explain the full body of research findings. Memory-based models (Horton & Gerrig, 2002, 2005; Gerrig & McKoon, 1998) suggest that appropriately specified descriptions "emerge" as a by-product of normal memory processes, and reject the idea that speakers actively track what others know in what Clark and Marshall (1981) termed "reference diaries." Although attractive in their simplicity, these models fail to explain how memory systems become appropriately structured so that the "right" description becomes available at the very moment it is needed, and ignore clear evidence for the role of controlled, delibrative processing in reference generation. In contrast, *perspective adjustment* models place great emphasis on the role of self-monitoring in generating partner-adapted speech, assuming that such processes carry the main burden of audience design. However, these models are vague on why certain information becomes "egocentrically available" at early stages of processing.

Finally, dual-process models suggest that various stages of language production are more or less susceptible to audience design effects, as a function of their automaticity.

In many respects, these different approaches are complementary, emphasizing different aspects of a complex process involving many different components. We propose that a unifying framework for models of audience design can be found in cognitive theories of expert performance (e.g., Anderson, 1996; Simon, 1996). One such framework is Logan's theory of skill acquisition, the *instance theory of automaticity* (ITA) (Logan, 1988), which we find attractive because it characterizes the interplay of attention and memory in problem solving. ITA views problem solving as involving "processing episodes" that are stored as instances in memory. On one's first encounter with a problem, the problem is solved algorithmically, in a manner that draws upon high-level reasoning and problem solving processes. In the case of audience design, one's first encounter with a referent is likely to involve all manner of reasoning of a Gricean type, as one searches for a way to linguistically categorize a referent that distinguishes it from viable alternatives in the physical or mentally represented discourse context. The resulting description becomes associated with the antecedent cognitive conditions that instantiated the process (i.e., attending to the referent with the intent to produce a definite description), and this "processing episode" is stored in memory. Reinstantiating the same antecedent conditions elicits the retrieval of previous descriptions from memory, which, in Logan's framework, is an obligatory consequence of attention.

To find evidence for such a framework, we conducted a referential communication experiment in which speakers built up experience describing referents during a "training" phase and then were required to describe these same referents again in a "test" phase to either the same or a different listener, and either with or without feedback. To explore the interplay of memory and attention, we looked not only at the information content of the speech, but also at planning and self-monitoring processes using eyetracking and speech latency measurements. Our findings suggest that speakers generated referring expressions incrementally, building off of a rapidly-accessible base of processing episodes and invoking deliberative processes to expand upon remembered descriptions as needed to meet listeners' informational needs.

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