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News From the Field

AUDITORY PERCEPTION

Sensitivity to Sarcasm

Voyer et al. (2008). On the perception of sarcasm in dichotic listening. *Neuropsychol*, **22**, 390.

Are you in your right mind with sarcastic friends? To investigate sarcasm perception, Voyer et al. used a dichotic listening strategy. They presented the same statement (such as "Nice outfit" or "Isn't she friendly?") simultaneously in one ear with a sarcastic tone and in the other with a sincere tone. The tone was manipulated mainly by changing the dominant frequency. The participants were asked to localize the sarcastic or the sincere tone in separate blocks of trials. A right ear advantage emerged for sincere statements and a left ear (i.e., right hemisphere) advantage for sarcastic statements. These findings might reflect the valence hypothesis of emotion lateralization (negative vs. positive), but they clearly reveal contributions of both cerebral hemispheres to language processing and comprehension. —S.G.

INFANT SPEECH PERCEPTON

Early Sensitivity to Structure in Speech

Gervain et al. (2008). The neonate brain detects speech structure. *PNAS*, **105**, 14222.

From the moment human infants are born, and even before, they are bombarded with a dizzying array of auditory experiences. Yet, over the first few years of life, infants readily learn the structure inherent in spoken language, ultimately acquiring the ability to recover the sound and syllable sequences specific to their native language. Gervain et al. found that sensitivity to certain structural relations in speech is present in infants just a few days old, reflecting a perceptual ability that appears to emerge very early in development. Across experiments, they presented newborns with sequences of synthesized syllables that either included adjacent repetitions (e.g., "mubaba"), nonadjacent repetitions ("bamuba"), or random control sequences ("mubage"). Neural activation in temporal and left frontal regions increased in response to sequences containing adjacent repetitions relative to the control sequences, but no increased activation was found for nonadjacent repetitions. This increase in activation indicates that newborn brains differentiate auditory patterns containing repeated components. Newborns' sensitivity to structural regularities in speech may constitute an early perceptual ability that sets the stage for the acquisition of spoken language. —L.C.N.

PERCEPTUAL BIAS

Biases for Direction and Tilt

Stocker & Simoncelli (2008). A Bayesian model of conditioned perception. *Adv Neural Inf Process Syst*, **20**, 1409. Go to http://books.nips.cc/papers/files/nips20/NIPS2007_1016.pdf.

Many contemporary theorists have described perception as a form of Bayesian inference. That is, our perceptions result from the combination of prior beliefs with data we gather from the environment. For example, consider the convex appearance of concave faces (Gregory, *The Intelligent Eye*, 1970); to a Bayesian, this phenomenon suggests a belief that faces are concave with a very low probability (Yellott & Kaiwi, 1979, *Perception* 8:135). Of course, in natural scenes, concave faces have always had a very low probability, and therefore our "priors" for facial curvature might quite literally have evolved with the rest of the visual system. On the other hand, some perceptual biases might form much more rapidly and have little to do with the statistics of natural scenes. Stocker and Simoncelli suggest that observers can develop a new prior for the apparent direction or spatial orientation of a visual stimulus on every trial of an experiment, after first explicitly or implicitly comparing that stimulus with some reference. Convincing evidence for this idea comes from Jazayeri and Movshon's (2007, *Nature* 446:912) experiment with moving dots. However, applying it to orientation biases is another matter. Near-vertical and near-horizontal line segments typically appear *more* similar to vertical and horizontal references than they really are. Perhaps such normalization (Gibson & Radner, 1937, *JEP* 20:453) reflects yet another prior waiting to be quantified. —J.A.S.

SCENE PERCEPTION

Memory Errors Extend to Perception

Intraub & Dickinson (2008). False memory 1/20th of a second later. *Psychol Sci*, **19**, 1007.

Perception of scenes is quick and easy, but is it also wrong? *Boundary extension* is a well-established error in scene memory in which people remember a picture as set at a wider angle than it actually was. For example, after memorizing an image of garbage cans in front of a fence, people recall the scene with the picture boundaries extended—with smaller cans and more fence. Such memory distortions have been attributed to meaningful reconstructions that occur because memory degrades during the retention interval. Intraub and Dickinson recently demonstrated that boundary extension can also occur at very short intervals, such as the duration of a saccade, or as little as 42 msec. Errors at such a short time scale indicate that boundary extension may also stem from perceptual mechanisms. Intraub and Dickinson suggested that mechanisms that fill in occluded surfaces, leading to amodal completion, might also play a role in "filling out" the perception of a scene, leading to boundary extension. Such perceptual extrapolation may benefit predictions of what will be seen next when looking at a scene. If what we see truly does extend beyond the edges of a picture, scene perception researchers should consider looking outside the box. —A.E.S.

VISUAL ATTENTION

The End of Salience?

Einhäuser et al. (2008). Objects predict fixations better than early saliency. *J Vis*, **8**(14), 18.

A red disk "pops out" in a field of green disks, drawing attention and, probably, your eyes. Similar effects are produced if any of a variety of other features make an item highly salient because of a strong contrast with neighboring items. Influential studies (e.g., Itti & Koch, 2000, *Vis Res* 40:1489) have shown that a salience map is readily computable from measurements made in early stages of visual processing. These maps, it is proposed, play an important role in the deployment of attention and the eyes. However, bottom-up salience could never be a complete theory of attention deployment. In a field of heterogeneous colored spots, for instance, top-down guidance clearly could deploy attention to red, green, and purple items in turn, with no change in bottom-up salience.

Now a new attack on salience, exemplified by Einhauser et al., argues that it becomes irrelevant when the stimuli are meaningful scenes. They asked observers about the objects in a scene, used that information to create an "object map," and recorded eye movements while the observers either made an aesthetic judgment about a photograph or searched for a hard-to-find object. They found that their object map predicted fixations better than an Itti–Koch-style salience map. Indeed, an optimal combination of object and salience information was no more predictive than the object information alone. There are some complications—for instance, objects tended to be in the center of photographs, and people tend to look at the center of images. However, the massive and elegant series of analyses in the article indicates that the eyes are directed to interesting objects, not to points of high salience.

So, is salience dead? Do low-level features lose their role in guiding attention when we study real scenes? Probably not, for many visual tasks and many stimuli beyond those used here. When you scan the trees for a bird or scrape the ice off your windshield, your eyes are likely drawn by salient local features modulated by their top-down relevance. Einhäuser et al. point to the richness of the forces moving the eyes. They would probably agree that they have shown the limits of salience, not its demise. —J.M.W.

VISUAL PROCESSING

A New Slant on Preattentive Vision

Sousa et al. (in press). Slant cues are combined early in visual processing. *Vis Res*.

Despite its effortless automaticity, preattentive vision embodies remarkable inferences about the objects causing the retinal input. Search tasks are often used to try to determine the dimensions of preattentive visual sensitivity: If a target "pops out" from a field of distractors, regardless of the number of distractors, a preattentive visual dimension must exist along which (1) the target differs from the distractors but (2) the distractors do not differ from each other. Past work has suggested that a target pops out if it differs in frontal surface slant from its distractors, but the possibility has remained open that the feature driving pop-out was not surface slant per se, but the particular cue that was manipulated (e.g., binocular disparity—Holliday & Braddick, 1991, *Perception* 20:355—or 2-D shape—Enns & Rensink, 1991, *Psychol Rev* 98:335). Sousa et al. now have presented firm evidence that surface slant is itself a preattentive visual dimension. In particular, they created stimuli whose apparent surface slant resulted from combining stereoscopic and object-shape cues and demonstrated that targets popped out when they differed from distractors in their (combined-cue) surface slant. Control experiments, however, showed less efficient search based on the individual cues alone. Thus, preattentive visual dimensions need not be computationally simple; rather, surface slant itself, not the simpler cues that contribute to it, is the preattentive dimension. —C.F.C.

VISUAL SELECTION

Toward a Biologically Plausible Theory of Visual Selection

Torralbo & Beck (2008). Perceptual-load-induced selection as a result of local competitive interactions in visual cortex. *Psychol Sci*, **19**, 1043.

Efficient visual selection plays a critical role in adaptive functioning because it allows observers to remain focused on goal-relevant information in the face of distracting information. Recent attempts to understand how such adaptive behavior is accomplished have identified *perceptual load* and the *consumption of perceptual resources* as major determinants underlying the efficiency (or locus) of visual selective attention (Lavie, 1995, *JEP:HPP* 21:451). Evidence in support of the perceptual load hypothesis has shown that distracting information can be effectively ignored under conditions of high perceptual load—when perceptual resources are thought to be fully exhausted by the processing of task-relevant stimuli—but not under conditions of low perceptual load. However, researchers have been hard-pressed to explain what it means to "manipulate perceptual load" or "exhaust perceptual resources," especially in language consistent with contemporary neuroscience. In an attempt to shed light on these issues, Torralbo and Beck recently provided empirical support for a simple, yet biologically plausible, explanation: The neural representations underlying perceptual load reflect the magnitude of local, competitive interactions in intermediate levels of visual cortex (V1–V4), and the neural representations underlying the consumption of perceptual resources reflect the biasing mechanisms needed to resolve this competition in favor of task-relevant stimuli. These findings represent a first step toward providing a biologically plausible theory of the locus of selection. —B.S.G.