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News From the Field

STATISTICAL ANALYSIS

Statistical Furor in Neuroscience

Vul et al. (in press). Voodoo correlations in social neuroscience. *Perspect Psychol Sci*. Go to www.edvul.com/pdf/Vul_etal_2008inpress.pdf.

As of February 10, 2009, approximately 14,800 Web pages contain the words "Voodoo correlations in social neuroscience," in exactly that order. All of them likely relate to the controversy surrounding Vul et al.'s article, which has criticized the use of statistics in fMRI studies to reveal brain activity dependent on the personality of the scanee. Finding such activity does seem unlikely, but several labs have claimed to do just that—and the excitement surrounding those reports has been exceeded only by the excitement generated by Vul et al.'s indictment of their statistics. Of course, Vul et al. acknowledge that not all studies are guilty, but their research suggests that the blameless studies form a minority. This suggestion is based on a survey of 54 authors who have reported significant correlations between a personality trait and BOLD activity. Over half of the survey respondents ticked a box that implicated them in inflating the reported correlations. Like the article itself, none of the numerous rebuttals have yet appeared in print, but some surely will. Not only have Vul et al.'s methodology and political motivation been questioned, but also their statistical analyses. However, at least one of their claims seems incontrovertible, and by no means is it limited to the field of social neuroscience, or even to neuroscience itself: The methods used to obtain the statistics reported in many studies remain unclear after reading the "typically brief and sometimes opaque method sections." If nothing else, the current furor may hasten an industry-wide improvement in the lucid reporting of statistics, and Vul et al. should be thanked for that. —J.A.S.

SYNESTHESIA

Creating a Synesthetic Experience

Cohen Kadosh et al. (2009). Induced cross-modal synaesthetic experience without abnormal neuronal connections. *Psychol Sci*, **20**, 258.

The integration of information across sensory modalities is a ubiquitous perceptual skill. A perceiver instantly recognizes, for example, the correlated visual and tactile consequences of a warm fuzzy sweater. In individuals with synesthesia, sensory experience in one modality leads automatically to experiences in another modality, and this has been hypothesized to result from abnormal neural interconnectivity between different sensory–perceptual areas in the brain. Cohen Kadosh et al. found that a posthypnotic suggestion to associate particular digits with particular colors induced grapheme–color synesthetic experiences in individuals without synesthesia. Individuals who received the posthypnotic suggestion had difficulty detecting achromatic digits against a background that matched a digit's assigned color, and also reported seeing the achromatic digits in the assigned color. In short, the posthypnotic suggestion appeared to induce temporary cross-modal synesthesia in nonsynesthetes. This finding indicates that synesthetic experience is not exclusively the result of abnormal cross-modal neural connections, but rather may result from disinhibition (in this case, induced) between sensory–perceptual areas in the brain. —L.C.N.

TIME PERCEPTION

Duration Distortions and Sensory Mode Issues

van Wassenhove et al. (2008). Distortions of subjective time perception within and across senses. *PLoS ONE*, **3**, e1437.

Many factors, such as attention to stimuli, are known to affect the impression that a time interval is short or long. In a series of experiments, van Wassendove et al. have recently shown that the sensory nature of stimuli is very important in time perception. During a task in which a series of 500-msec identical signals were presented, they introduced a different signal, and participants had to say whether the new signal was shorter or longer than the others. For instance, in the visual mode they manipulated whether disks were looming or steady, or in the auditory mode, whether the frequency-modulated sweep moved upward or downward. The researchers showed that (e.g.) a looming disk embedded in a series of steady disks led to time dilation, whereas a steady disk in a series of looming disks led to time compression. Most importantly, they showed that, in addition to the within-modality effects, visual inputs inserted within auditory sequences altered the perceived duration of the auditory signals, but auditory information seldom influenced the perceived duration of visual events. —S.G.

ATTENTION RESTORATION

Nature Can Nurture Your Attention!

Berman et al. (2008). The cognitive benefits of interacting with nature. *Psychol Sci*, **19**, 1207.

Over the past decade, how to promote and sustain cognitive fitness across the lifespan has generated increasing interest. This growing scientific literature has demonstrated that lifestyle choices involving participation in both physical and cognitive activities can enhance critical aspects of cognitive functioning over time. Many of the cognitive enhancement interventions that have been investigated require relatively long training regimens. However, Berman et al. have recently shown that spending as little as 10 min observing pictures of natural environments can have a restorative effect on certain executive control processes that involve the resolution of distraction. According to their attention restoration theory, natural environments place fewer demands on interference control mechanisms than do urban environments because

they contain fewer distracting stimuli. As a result, such mechanisms are idler during interactions with nature rather than civilization. To investigate this prediction, Berman et al. measured the effects of viewing naturalistic versus urban landscapes on three components of attentional functioning measured by the attention network test—alerting, orienting, and interference control—using a pre–post design. The findings provide clear-cut support for the attention restoration theory: Interference control, but not alerting or orienting, improved significantly following viewing of the natural scenes, but no change occurred in any of the three attention networks following viewing of the urban scenes. —B.S.G.

FACE PERCEPTION

Why the Long Face?

NETH & MARTINEZ (2009). Emotion perception in emotionless face images suggests a norm-based representation. *J Vis*, **9**(1), 5.

People judge the emotional states of others readily and rapidly from facial expressions. The particular sets of muscle movements that create expressions of sadness, anger, and happiness have been well described by the science of face perception (Ekman & Oster, 1979, *Ann Rev Psych* 30:527). Neth and Martinez report that another cue is used to judge emotion in others—facial feature configuration. They created multiple images from 12 expressionless faces by displacing the eyes (with eyebrows) and mouth closer to or further from the nose. Participants saw two images of the same person in succession and judged whether the second face expressed less sadness (or anger) than the first, the same amount of emotion, or more. The results showed that observers reliably judged the faces with crowded features as more angry and the faces with longer spaces between features as more sad. This was also true in a second experiment, in which the participants judged the second of a pair of faces on a continuum from sad to angry. These results are surprising, given that people cannot change the location of their facial features when experiencing different emotions. However, it does coincide with the common impression that some people look more sad or angry than others, even when they are expressionless. Neth and Martinez demonstrate the utility of this cue in art by showing that the sadness of the farmer in Grant Wood's famous painting *American Gothic* (1930) is due to feature configuration. —A.E.S.

VISUAL ATTENTION

Attending to Perception

SCHNEIDER & KOMLOS (2008). Attention biases decisions but does not alter appearance. *J Vis*, **8**(15), 3.

Since at least the time of Helmholtz, many have speculated about the effects of attending to a visual stimulus. One widely discussed effect, in which attention changes the way something is perceived, is often referred to as *perceptual enhancement*. With the arrival of signal detection and information-processing approaches to cognition, however, other possible effects of attention have emerged. One alternative to perceptual enhancement is the theory that attention could alter decision processes but not affect perception itself. A wealth of studies have pitted enhancement effects against such decisional effects, and Schneider and Komlos jump feet first into this debate. They note that, according to a signal detection model, signal enhancement accounts and decisional accounts make different predictions, depending on the task that participants perform. When tasks are manipulated, perception should not change, because the perceptual inputs should remain identical. However, when the task varies, the decisions associated with the tasks will differ, allowing perceptual and decisional effects to be disentangled. The participants performed two tasks in which they reported either (1) which of two stimuli appeared higher in contrast (a comparative judgment) or (2) whether two stimuli were the same or different (an equivalence judgment). Attention produced different results across tasks, suggesting that decisional, not perceptual, processes were affected. Schneider and Komlos conclude that attention operates by influencing decision processes, possibly via prioritizing of where it is deployed. Under such an account, attention could make some stimuli more salient than others, and will be directed first to more salient items over less salient ones. Most importantly, according to this decisional account, attended and unattended items are not perceived differently. —S.P.V.

TACTILE PERCEPTION

What Good Are Fingerprints?

SCHEIBERT ET AL. (2009). The role of fingerprints in the coding of tactile information probed with a biomimetic sensor. *Science*. Go to www.sciencemag.org/cgi/content/abstract/1166467.

Although fingerprints usually enter our awareness as elements in some real or fictional crime story, it seems clear that they did not evolve to serve as little ID cards. What, if anything, are they for? One classic hypothesis is that they improve your grip. In a current article, Scheibert et al. explore evidence for a theory that might be more interesting to readers of *AP&P*: Fingerprint ridges may be part of the transduction mechanism that turns fine surface texture into a signal in the nervous system.

Static texture is not much of a stimulus, at least not when the elements are small. Texture must be turned into vibration by moving the detector (e.g. the fingers) relative to the surface. The vibrations are picked up by Pacinian fibers that behave as bandpass filters with an optimal frequency around 250 Hz. You cannot record from human fingertips in behaving humans, so Scheibert et al. built a fingertip and looked at its responses with and without fingerprint ridges. Without fingerprints, the fingertip did not respond well to features smaller than about 1 mm. The fingerprint ridges, however, created vibrations whose frequency was set by the ratio of the scanning speed to the spacing of the ridges. Under normal circumstances, people move their fingers at a rate of about 10–15 cm/sec. At this speed, the fingerprints generate a signal in the 250-Hz range optimal for the Pacinian fibers.

Of course, this does not work if you run your finger over a surface in a direction parallel to the ridges. However, since your fingerprint is an elliptical swirl of ridges, some ridges are always orthogonal to the direction of motion. This raises the possibility, still to be tested, that the underlying sensors might be orientationally tuned, giving still more richness to the sensory possibilities of the fingertip. —J.M.W.