processing, less efficient visual search and analysis, and poorer decision making about what is observed. These data suggest that further investigation into the consequences of perceptual organization impairments are warranted.
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OPTIMIZING MEASURES OF LOW- AND INTERMEDIATE-LEVEL VISUAL PROCESSING FOR USE IN BIOMARKER AND CLINICAL TRIALS RESEARCH

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Background: Visual processing disturbances in schizophrenia occur at various stages, and these impairments are associated with specific neurophysiological changes and clinical variables. For example, suppression effects during gain control are linked to activity within V1. Integration of features into wholes in the context of noisy backgrounds is associated with poorer premorbid functioning, disorganized symptoms, and activity in extrastriate occipital regions (eg, V2–V4) as part of a network including frontal and parietal areas involved in attentional control. However, standardized measures of visual processing measures that could be useful for clinical trials have not yet been developed. Methods: We examined, and made modifications to, a promising measure of gain control based on the Chubb illusion (Contrast-Contrast Effect Task, or CCE), and 2 measures of visual integration of Gabor elements into circular shapes (Spatial Offset Visual Integration task, or SOVI, and Jittered Orientation Visual Integration Task, or JOVI), to determine the versions with the greatest patient-control group separation and the greatest tolerability. An ongoing study is examining reliability of the optimized versions of each measure. Results: The CCE demonstrated a between-group difference indicating more veridical contrast sensitivity in response to the target patch among patients (ie, a smaller illusion effect caused by the contrast of the surrounding patch), but this effect was small, and considerably smaller than in an earlier published study. The SOVI data did not replicate the primary expected effect in control subjects and is being dropped from future study phases. The JOVI produced a moderate effect size for between-group discrimination, and replicated past studies. For both the CCE and JOVI, modifications were made including addition of practice trials to improve overall performance, the addition of catch trials to identify poorly motivated subjects, and elimination of conditions associated with floor and ceiling effects or that were seen as redundant. Test-retest reliability data on the CCE and JOVI will be will be complete by the time of presentation. Conclusion: Initial psychometric data suggest that the JOVI, a test of intermediate-level visual processing, is the most promising of the 3 measures developed, and this measure has already demonstrated validity in terms of known neurobiological correlates and clinical variables. Acknowledgments: Supported by NIMH grant 3R01MH084828-03S1.
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CAPACITY AND PROCESSING DEFICITS IN WORKING MEMORY IN SCHIZOPHRENIA

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Background: In research on working-memory (WM) deficits in patients with schizophrenia (SCZ), a major question has been whether such patients have a lower capacity than healthy controls (HCs). The results have been mixed, perhaps because the paradigms used have not provided a fine-grained variation in memory load. Another major question has been how to characterize the SCZ deficit in offsetting distraction. Methods: We present behavioral and imaging results from a new variant of the "Self-Ordering" paradigm (Petrides et al., 1993) that bear on both questions. In this paradigm, on each step of a trial participants are presented an array of novel geometric forms, have to select a form that has not been selected before; after each step the forms are scrambled in position, and represented to the participant who again has to select a form not chosen before. The number of steps that a participant can do without error is an estimate of their capacity in the face of perceptual distraction, and the estimate is based on a fine-grained variation in WM load within a single trial. Results: Our data indicate that patients with SCZ clearly have a lower capacity than HCs. Our fMRI data obtained while participants perform this task reveal step-by-step increases in activity in both the prefrontal cortex and the posterior parietal cortex, where the latter tracks memory load more precisely. Conclusion: Our results fit with other evidence (from normals) that the parietal area mediates WM capacity, while the prefrontal region mediates processes that deal with distraction.
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REDUCED AUDITORY LATERAL SUPPRESSION IN SCHIZOPHRENIA

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Background: Auditory processing deficits such as impaired frequency discrimination and reduced suppression of auditory brain responses have been documented in individuals with schizophrenia (SZ). These auditory processing deficits may contribute to abnormal social interactions by interfering with the accurate perception of vocal affect during conversation. Lateral suppression of non-stimulated neurons by stimulated neurons, which has not been previously assessed in SZ, likely plays an important role in precise encoding of sounds during frequency-based auditory tasks. Therefore, the purpose of this study is to determine whether lateral suppression of activity in auditory cortex is impaired in SZ patients. Methods: SZ patients and control participants watched a silent movie with subtitles while listening to trials composed of a 0.5 second control stimulus (CS), a 4 seconds comb-filtered masking noise (CFN), and a 0.5 second test stimulus (TS). The CS and TS were identical on each trial and had energy corresponding to the high energy (recurrent suppression) or low energy (lateral suppression) portions of the CFN. Event-related potentials were recorded during stimulus presentation, and suppression was measured as the change in amplitude between the CS and TS. Results: Mean amplitude of the auditory P2 component (160–230 ms) showed no group differences for recurrent suppression, but reduced lateral suppression in SZ patients. Conclusion: This reduced lateral suppression in SZ patients may lead to overlap of neuronal populations representing different auditory stimuli. Such imprecise neural representations may contribute to the difficulties SZ patients have in discriminating simple auditory stimuli in laboratory tasks and more complex stimuli such as vocal affect in everyday life.