For this study a simple 12 minute visual color recognition go-no-go task was presented to male and female substance abusers (i.e., opiate addicts) while event-related potentials (ERPs) and reaction time (RT) differences are measured by taking the peak-to-peak values across a window corresponding to the latency of each component N50, P100, N100, P200, N200, P300, LN, and LP within each subject, and then averaged across subjects. 

For the EEG data, data were recorded with a 128 channel HCGSN EGI system – 10-20 montage. Subjects were seated in a comfortable chair approximately 61 cm from the computer monitor located 61 cm from the eye of the subject in a darkened room. Subjects were also administered 3 timed basic neuropsychological tests and 4 different computer visual processing protocols including this color task (with breaks in between). Participants were also instructed to respond to the Relevant stimulus. The International 10-20 electrodes are shown in the figure looking down on the head from above. Violet represents extreme negative potentials and red represents extreme positive potentials. The pre-stimulus maps show no activity associated with the Relevant stimulus in males. (B) These topomaps are grand averaged waveform (Relevant stimulus only shown) and topomaps at 699 msec. This graph summarizes ERP amplitude measurements in males and females and addicts. Males had significantly greater N200, P300, LN and LP amplitudes compared to females. Only additive task differences were significantly lower than controls. Asterisks *** represent significance values P<0.001 between gender, respectively. Symbols ### represent significance values P<0.001 between controls and addicts. 

This study extends these previous findings to determine if EEG evoked potential (VEP) components are controversial. For example, using both visual and auditory oddball tasks and single-stimulus paradigms, Polich et al. (1992) also found that, in an auditory discrimination task, females produced larger P300 amplitudes than males. Likewise, Steffensen et al. (2008) recently reported sex differences in a visual object recognition task where female P300 amplitudes were significantly greater than males (see Figs 1,2).

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RESULTS

**VEPs and ERPs**
- **Sex Differences in Controls for Blue Relevant vs. Red/Green Irrelevant P300s in Color Discrimination Go-No-Go-Task**
- **P300 ERP**
- **Sex Differences in Controls vs Opiate Addicts**
- **ERP Amplitude and Latency Summary**
- **Sex Differences in Controls vs Opiate Addicts**
- **Blue Relevant Stimulus**
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Table 1: This table contrasts ERP amplitude (AMP) and latency (LAT) measurements in males and females and addicts for the N200-LP ERPs.

- Male control P300s and LPs were greater than females for both controls and opiate addicts.
- Female opiate addicts' P300s and LPs were markedly lower than male controls.
- Female opiate addicts' P300s and LPs were mildly lower than female controls.

**SUMMARY AND CONCLUSIONS**
- The color recognition go-no-go task produced robust P300s to the Relevant Stimulus.
- A pronounced task-related VEP was also evoked at 700 msec after the stimulus (LP) and ~350 msec after the subjects' reaction time (RT).
- Male control P300s and LPs were greater than females for both controls and opiate addicts.
- Male opiate addicts' P300s and LPs were markedly lower than male controls.
- Female opiate addicts' P300s and LPs were mildly lower than female controls.