

Emotion-Semantic Priming & Electrocortical Reactivity in Parkinson's Disease



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Background

- Many patients with Parkinson disease (PD) have blunted physiologic reactivity to aversive pictures as measured by startle eyeblink and electrocortical indices (i.e., late positive potential (LPP). To date, there are few established methods for improving this emotional blunting.
 - Individuals with PD have difficulty initiating behavior (auto-evoked), but less difficulty when behaviors are extrinsically cued (exo-evoked).
- Previous studies in healthy young adults -> size of the LPP to neutral or emotional pictures can be automatically "enhanced" or primed when preceded by an emotional stimulus (McNamara et al, 2009).

Aims & Hypotheses

- **AIM 1:** Determine if emotional priming technique can increase physiologic reactivity to neutral or emotional pictures in individuals with Parkinson disease.
 - **Hypothesis:** We predicted that PD patients would show larger electrocortical (LPP) responses to pictures when they were immediately preceded by an emotional (vs neutral) stimulus, and this priming effect would be similar to that of Controls. This prediction was based on hypothesis that emotion priming is relatively automatic.
- **AIM 2:** Determine if emotion priming effects, if observed, are related to executive function..
 - **Hypothesis:** If priming is relatively automatic, then LPP priming effects should be unrelated to executive function.

Participants

- Sixteen PD patients (ages 50-80) recruited from UF's CMDNR and 8 controls recruited from the community.
- **Exclusion Criteria:** Dementia (DRS-R < 130); Depression (BDI-II > 14); Brain surgery; Psychiatric disturbance.

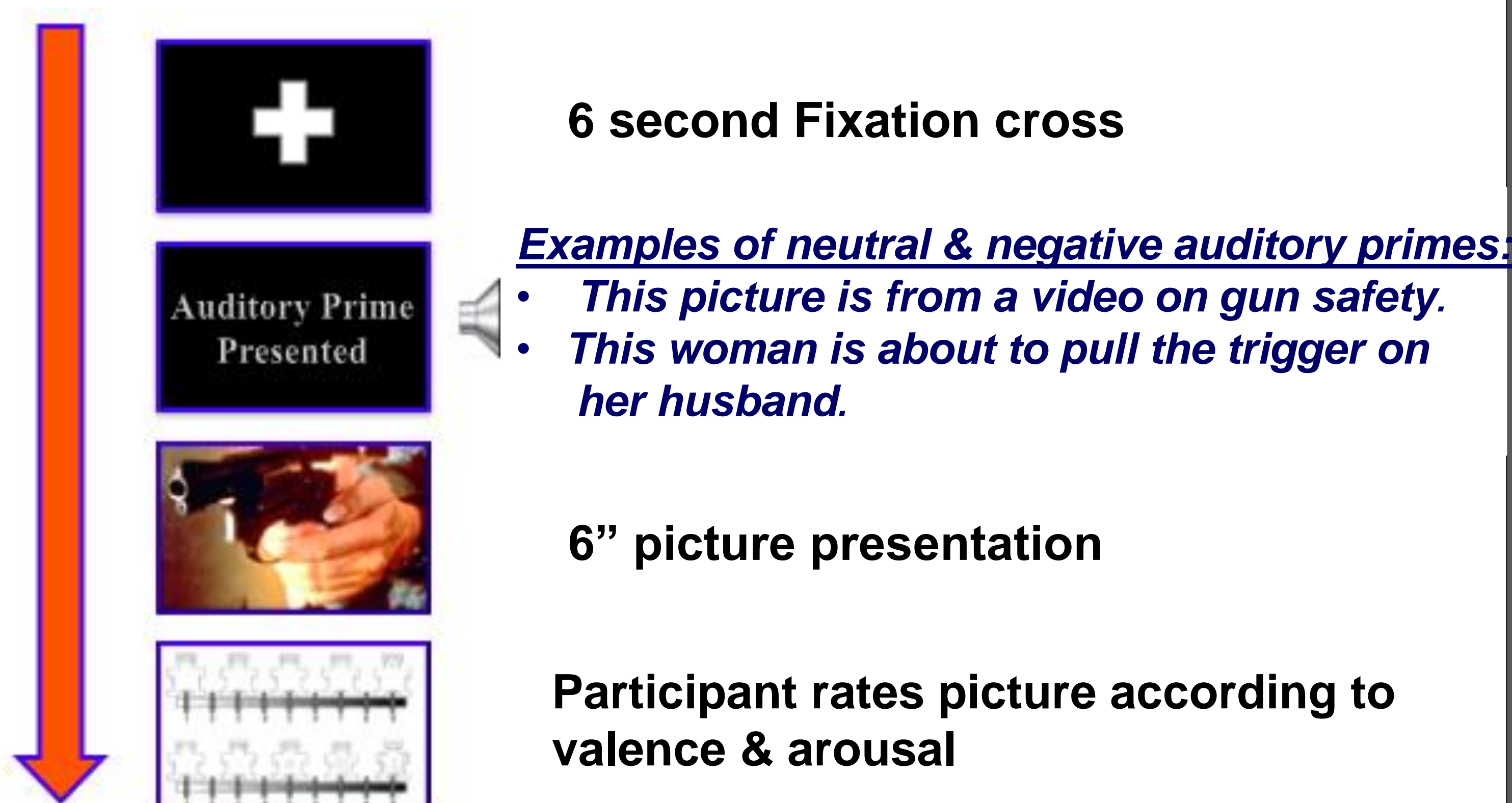
Sample characteristics

Variable	Controls	PDs	t/X ²	p
Age (yrs)	65.1 (6.6)	63.5 (9.4)		ns
Education (yrs)	16.8 (2.1)	15.9 (2.2)		ns
Gender (M/F)	5/3	15/1	3.75	0.05
DRS-2 Total (max=144)	139 (5.3)	137 (5.4)	??	ns

Method

- Participants viewed neutral & negative (IAPS) pictures while EEG was recorded from a 64-channel geodesic net. Each picture was preceded by a neutral or negative 'biasing' sentence modeled on the procedures of McNamara et al. (2009). See below. (HOW MANY TRIALS?)

Presentation Order of Priming Task

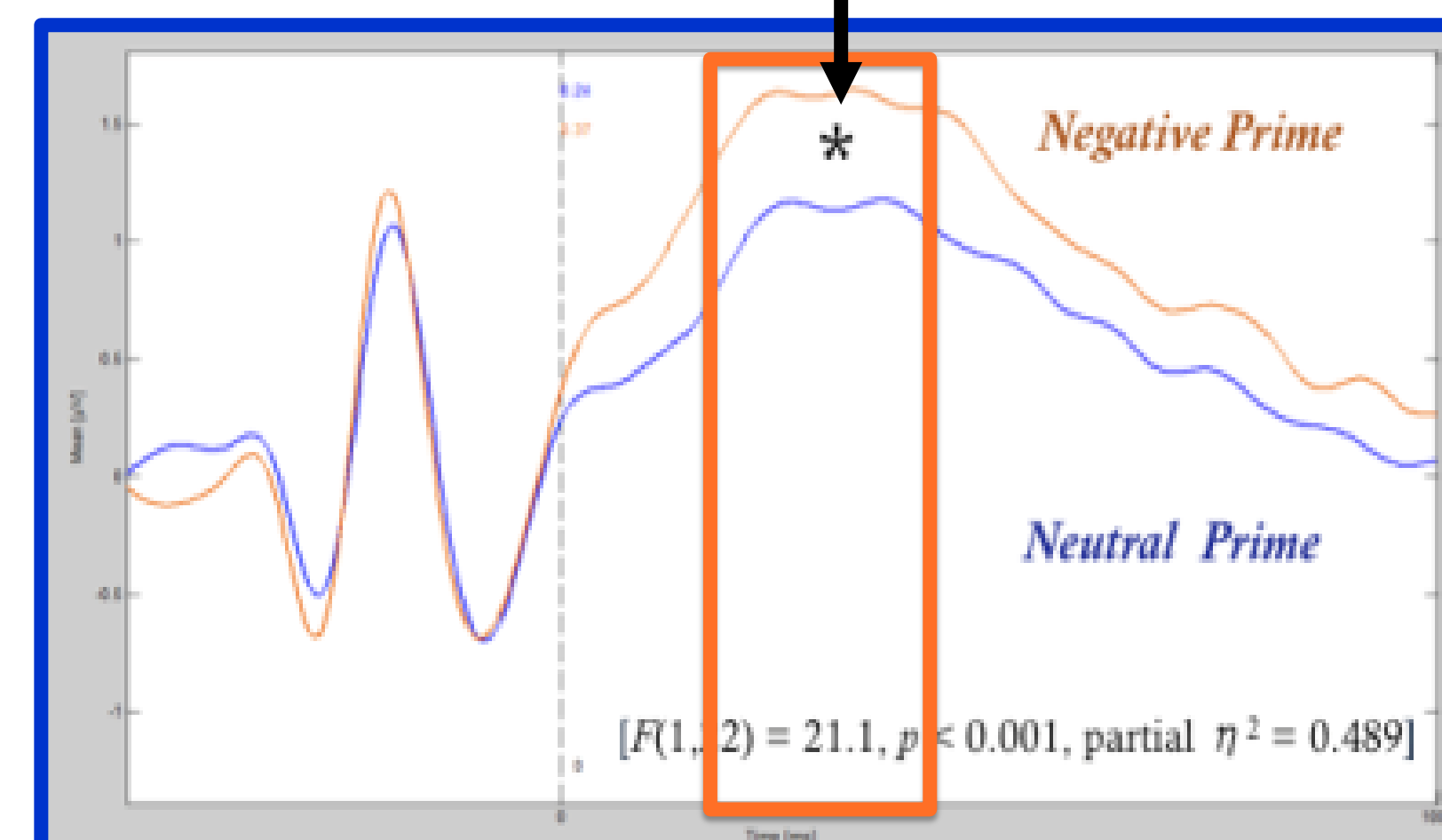


- **Mood/motivation measures:** BDI-II, Apathy Scale, STAI
- **Executive measures:** Trailmaking Test, L-N Sequencing, Stroop C-W; these were standardized and averaged to compute an Executive Function composite score (EF)

Results: Aim 1

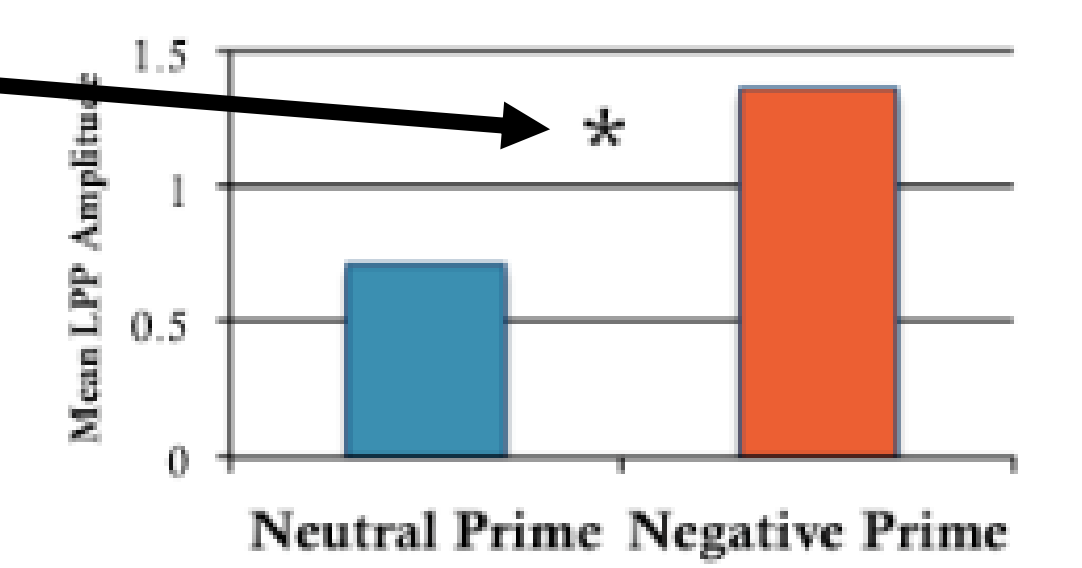
- PD patients showed significant emotion priming effect, as indexed by larger LPP to pictures that were preceded by negative vs. neutral cues ($p < 0.01$). This priming effect was similar for PD and Controls.

Priming Effect = difference in size of LPP to pictures when preceding sentence is negative versus neutral (Negative - Neutral).

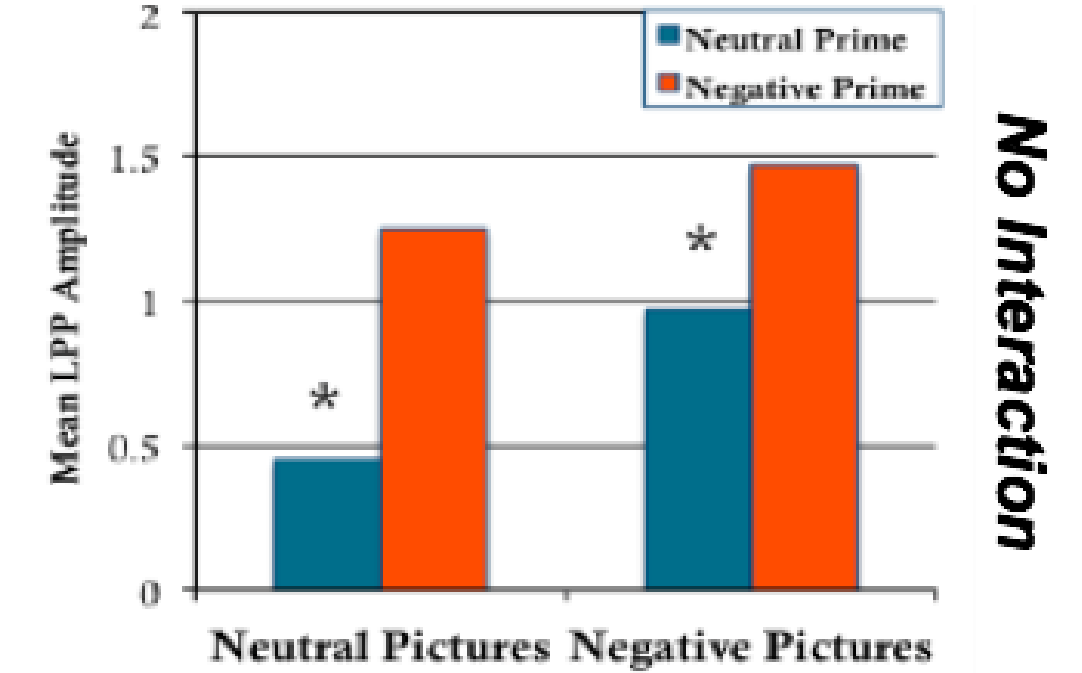


Main Effect of Prime Valence

LPP Amplitude is Greater with Negative vs. Neutral Primes

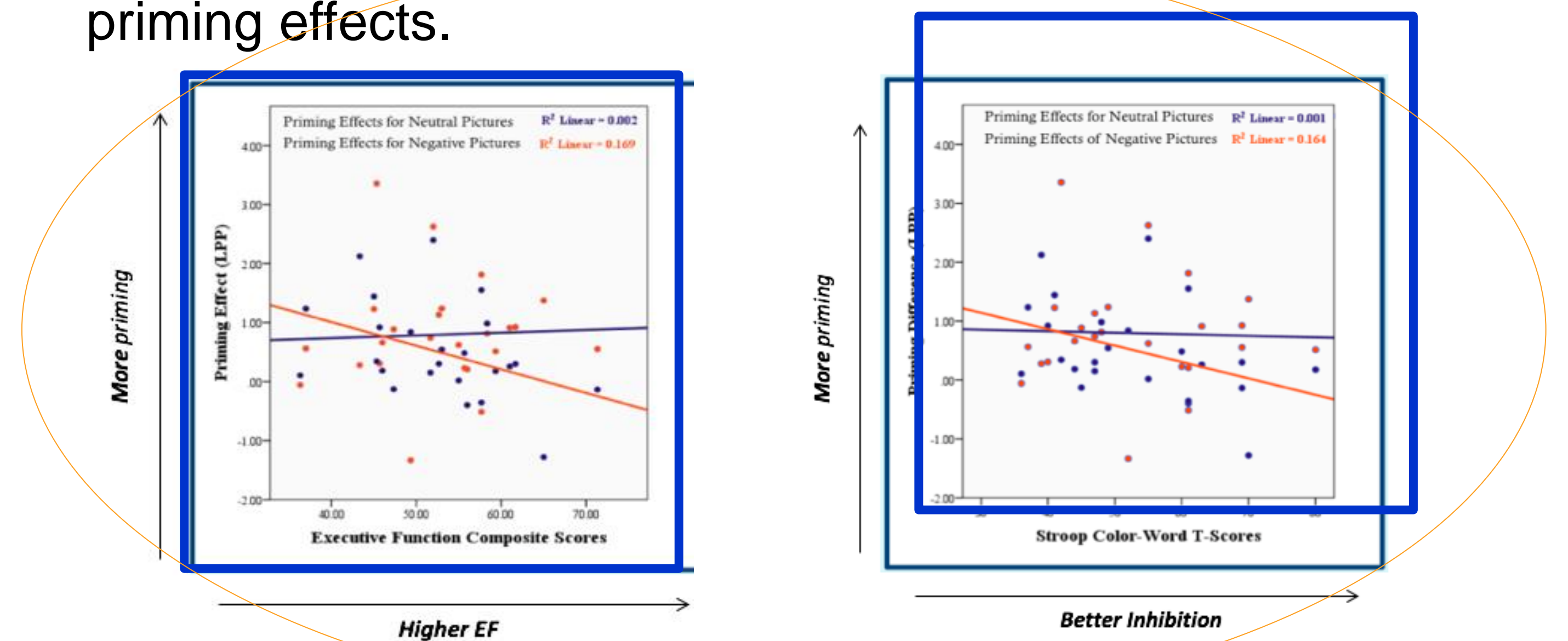


Similar Priming Effects for both Neutral & Negative Pictures



Results: Aim 2

- **Different results depending on whether picture was neutral or negative.**
 - **Neutral IAPS Pix:** Priming effects were unrelated to executive function
 - **Negative IAPS Pix:** Worse executive function (especially Stroop cognitive inhibition) was associated with larger priming effects.



- **Exploratory:** Priming effects were unrelated to mood/motivation in both groups & motor symptom severity in PDs. Longer PD duration was associated with less priming only for neutral pictures [$r(16) = -0.64, p = 0.01$].

Conclusions

- Nondemented 'relatively' intact PD showed similar physiologic priming effects, as measured by an ERP signal (LPP) to emotional pictures, as did controls. This implies that semantic/emotion activation effects continue to function adequately in PD patients with minimal cognitive and mood/motivation symptoms.
- Relationship to executive function: Individuals with worse cognitive inhibitory skills were more susceptible to priming for aversive stimuli. Although these findings may simply be an artifact of greater emotional blunting in patients with greater cognitive decline, future work is needed to clarify the nature this novel association between cognitive inhibition and emotion-semantic priming.
- **Future Directions:** Determine whether apathetic PD patients show this type of emotion priming. Determine temporal course & duration of priming;

Acknowledgments

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