Inhibitory Control in Post-Institutionalized Youth: Evidence from an Emotional Go-NoGo Paradigm

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Introduction

Early deprivation in the form of institutional or orphanage rearing has been associated with early cognitive delays and persistent risk for attention problems (Gunnar, Bruce & Grotevant, 2000; Stevens et al., 2008). In addition, early institutional care is associated with disrupted socioemotional development, including indiscriminate friendliness, anxiety, and insecure or atypical attachments (Bruce, Tarullo & Gunnar, 2009; Ellis, Fisher, & Zaharie, 2004; Zeanah et al., 2005). However, less is known about the interactions among cognitive and socioemotional functions within this population.

A number of researchers have begun to examine the impact of social or emotional context on inhibitory control in typical development using emotional go-nogo paradigms (e.g., Hare et al., 2008; Cohen, 2010). A recent study suggests that post-institutionalized 5-11 year olds are faster to respond to happy faces than neutral or negative faces, and make more errors for negative faces than non-institutionalized peers (Tottenham et al., 2010).

In the current study, we expand on previous work by examining the effects of duration of institutional care early in life on emotional go-nogo performance assessed in early adolescence.

Questions:

- **Do sustained attention and inhibitory control vary as a function emotional context?**
  - Hypothesis: Fearful faces will cause greater disruption in both sustained attention and inhibitory control than happy or neutral faces.
- **Do sustained attention and inhibitory control vary as a function of duration of deprivation?**
  - Hypothesis: Shorter periods of deprivation will be associated with better cognitive performance, particularly during inhibitory trials.

Participants

- 12- to 14-year-old post-institutionalized (PI) adolescents
- Adopted internationally from Africa (3.6%), Asia (42.9%), Eastern Europe (46.4%), and Latin America (7.1%)
- Screened for FAS, IQ <80, and pervasive developmental disorders

N	Gender	Age at adoption (months)
28	14 f, 14 m	M= 18.77 (2.37), Range= 5-48

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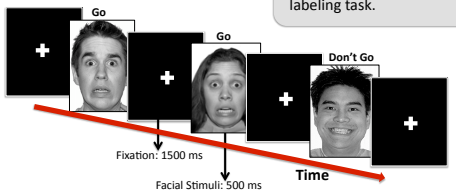
Methods: Emotional Go-NoGo

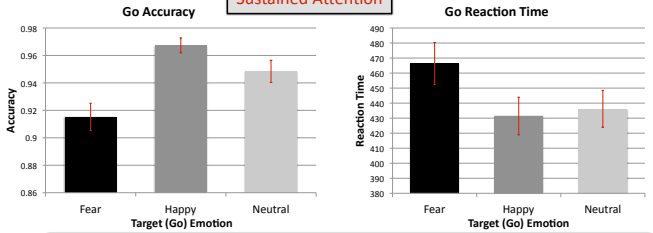
The task consisted of six blocks. Each block displayed two facial expressions including all possible combinations of happy, fearful, and neutral expressions as target or non-target stimuli.



Following the task, participants completed a forced-choice labeling task.

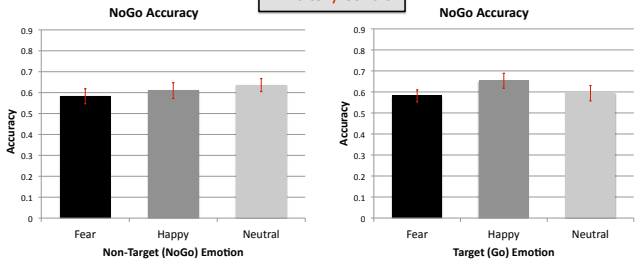
Results: Task Effects

Sustained Attention



- Overall PI adolescents performed well on Go trials (M= .94, se= .03).
- Go accuracy was highest for happy stimuli and lowest for fear stimuli ($p < .01$).
- Go reaction times were slower for fear stimuli compared to happy or neutral ($p < .01$).

Inhibitory Control



- Overall PI children performed worse on NoGo trials than Go trials (M_{NoGo}= .61, M_{Go} = .94, $p < .01$).
- Contrary to hypothesis, NoGo accuracy did not vary by non-target (NoGo) emotion.
- However, inhibitory control did vary by target (Go) emotion ($p < .05$) with better NoGo performance for blocks with happy targets.

Preliminary Results: Duration of Deprivation Effects

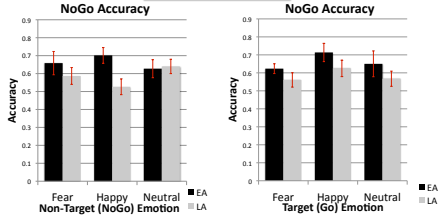
Participants were divided into earlier-adopted (EA) and later-adopted groups (LA) based on duration of deprivation (EA < 12 months).

Group	N	Gender	IQ, sd
Earlier Adopted (EA)	9	5 females	91.71, 8.42
Later Adopted (LA)	19	9 females	99.95, 12.73

Sustained Attention

- Overall EA and LA children had equivalent Go accuracy (M_{EA}= .947, M_{LA} =.942, *ns*).
- EA and LA adolescents showed similar performance on Go trials as a function of target and non-target emotion conditions.

Inhibitory Control



- LA adolescents showed poorer inhibitory control relative to EA adolescents only for happy non-targets ($p < .05$).
- No group differences were found for inhibitory control as a function of target (Go) emotion.

Discussion

Sustained attention was high in this PI sample, but was impaired under negative emotional contexts. In contrast to previous work, inhibitory control was poor overall, but less affected by negative emotional content.

Importantly, the duration of early institutional care was a significant predictor of inhibitory control. Later adopted youth made significantly more false alarms than earlier adopted youth, but only in the context of happy non-targets.

These results suggest that later adopted youth may have more difficulty inhibiting approach to rewarding stimuli.

Future studies of the development of reward processing systems in PI youth will be critical in determining the generalizability of these findings from emotional faces to other reward contexts.

References

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