

Infant Attention to Intersensory Redundancy in Social and Nonsocial Events is Enhanced Even in Early Processing

Bahrick, L. E., Todd, J. T., and Ronacher, C. H.
Florida International University

Introduction

According to the Intersensory Redundancy Hypothesis (Bahrick & Lickliter, 2000, 2002), infants show heightened attention to bimodal, audiovisual events as compared with unimodal (visual or auditory) events because they provide intersensory redundancy (e.g., synchrony, rhythm, and tempo, invariant across the senses). Further, relative to nonsocial events, social events provide an extraordinary amount of intersensory redundancy across face, voice, and gesture, that attracts and maintains attention. Given the importance of social events for promoting cognitive, social and communicative development, we explored when and under what conditions infants show heightened attention to social vs. nonsocial events. Bahrick et al. (2009) demonstrated that although infant attention to events decreases across age, infants show greater attention (more processing time during habituation, longer looks, less disengagement) to bimodal (audiovisual) than unimodal (visual) stimulation, and greater attention to social than nonsocial events, with differences increasing across age. The present study assessed whether these effects were most pronounced in early (first 30 s), middle, or late (last 30 s) phases of habituation.

Method

Data from 535 infants at 2, 3, 4-5, and 6-8 months (N = 117, 136, 159, 124, respectively) were analyzed from a number of infant-control habituation studies conducted in our lab. Infants were habituated to dynamic displays of bimodal audiovisual versus unimodal visual (silent) social events (women speaking in infant-directed speech) or nonsocial events (a toy hammer tapping a rhythm). Three measures of attention were evaluated across the first 30 s, middle portion, and last 30 s of habituation: mean total looking time (processing time), mean length of look, and mean number of looks away per minute (disengagement).

Results

Age (2, 3, 4-5, 6-8 months) x event type (social, nonsocial) x condition (bimodal, unimodal) between subjects ANOVAs were performed. They indicated decreasing attention across age ($ps < .001$) and greater attention (more processing time, longer looks, less disengagement) to bimodal than unimodal stimulation across all phases of habituation ($ps < .05$; see Figures 1, 2, and 3). In addition, increased attention to bimodal over unimodal and social over nonsocial events was increasingly apparent across age ($ps < .05$) and most evident in early and mid processing (first 30 s and mid-habituation), but not in later processing time (last 30 s of habituation).

Conclusions

These findings demonstrate that virtually all effects (greater attention to bimodal than unimodal and social than nonsocial events across age; Bahrick et al., 2009) previously found across habituation, were most apparent in early and mid processing phases. These findings have important theoretical and methodological implications and demonstrate that significant attention differences emerge across age as a function of event type, even with limited exposure time (30 s familiarization). Social events that provide intersensory redundancy (as compared with nonsocial events and events that provide no intersensory redundancy) elicit heightened attention, longer looks and less frequent disengagement in infants by 4-5 months of age, even during brief exposures. Further, attention differences to social and nonsocial events providing bimodal and unimodal stimulation may be evident in fixed trial and visual paired comparison procedures with limited exposure times. These procedures can more easily be adapted for identifying infants at risk for attention impairments such as impairments observed in children with autism

Figure 1. Processing time (total looking time in seconds) as a function of habituation phase

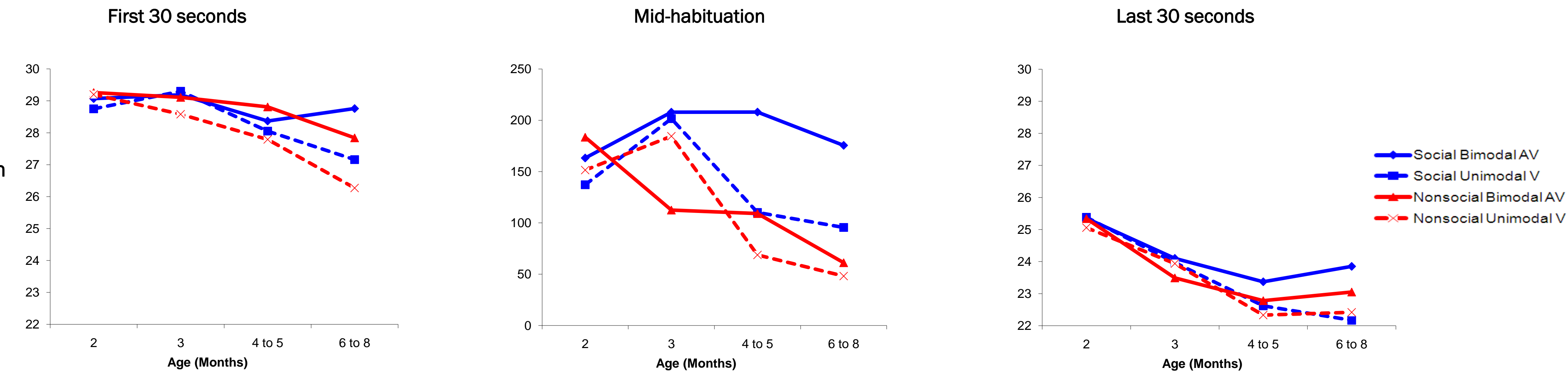


Figure 2. Average Length of Look as a function of habituation phase

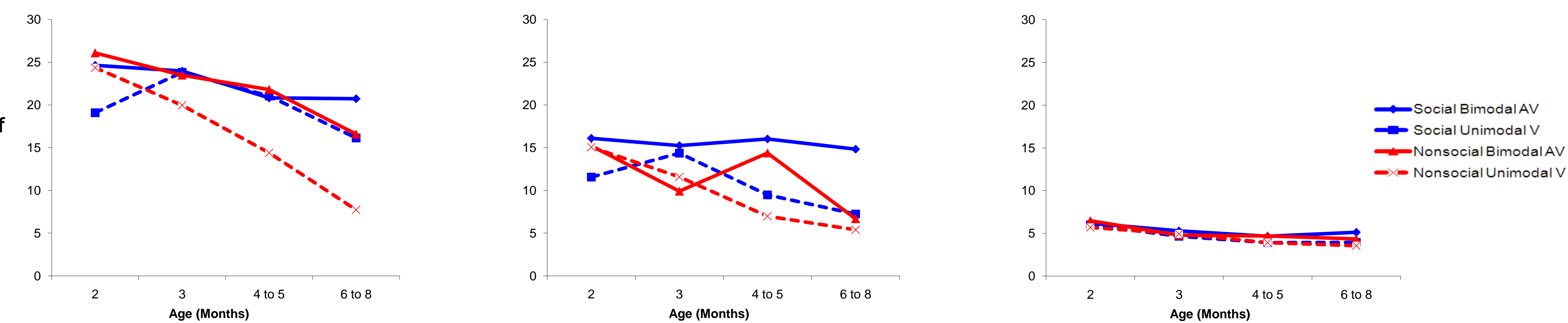
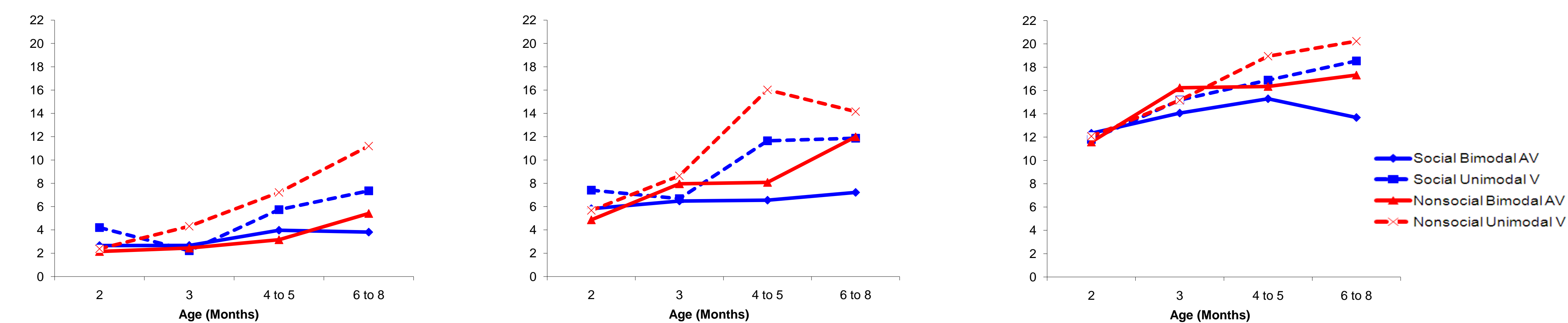


Figure 3. Disengagement (mean # of looks away per minute) as a function of habituation phase



References

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