

# Intersensory Redundancy: Five- & Seven-Month-olds' Perception of Affect

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## Abstract

Bahrlick and Lickliter (2000) recently proposed an intersensory redundancy hypothesis that states that early in development information presented redundantly, and in temporal synchrony across two sense modalities, recruits infant attention and promotes perceptual learning compared to circumstances where the same information is presented to one sense modality alone. In support of this hypothesis, they found that 5-month-old infants were able to differentiate between two rhythms when they were presented bimodally (audiovisually), but not when they were presented in one sense modality or out of synchrony. The present study extended the results of Bahrlick and Lickliter (2000) to older infants and to amodal information for affect. The results of the current experiment replicated those of Bahrlick and Lickliter (2000). Five-month-olds reliably discriminated a change in affect when it was presented bimodally but not when it was presented unimodally. Seven-month-olds, however, were able to discriminate affect when it was presented bimodally as well as unimodally. The current results demonstrate that discrimination of affect in younger infants is facilitated under conditions of bimodal specification, whereas older infants can discriminate changes in affect in a single sense modality in the absence of intersensory redundancy.

## Introduction

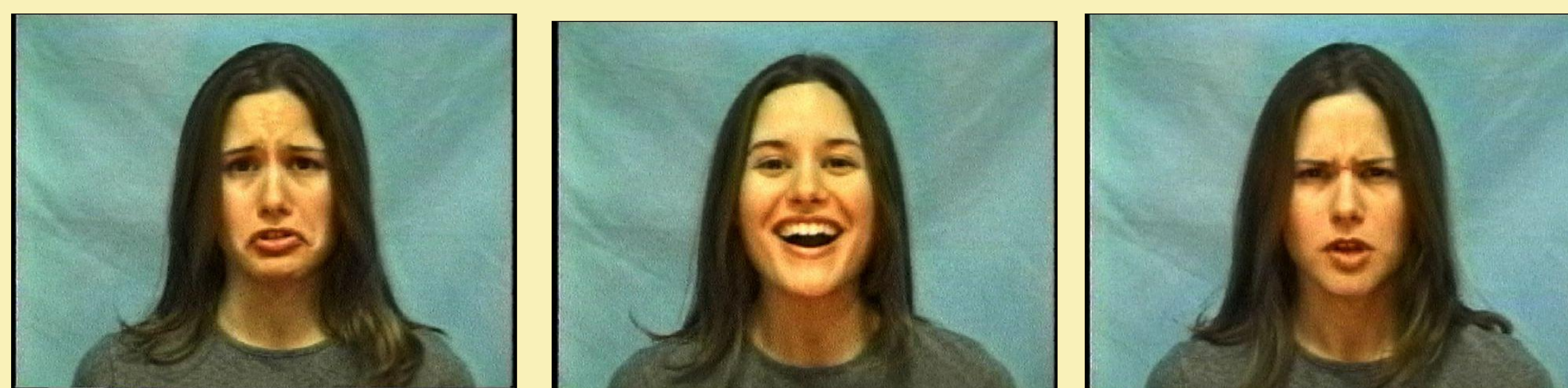
Research indicates that infants perceive coherent, unified, multimodal objects and events through different sense modalities within the first months of life. Little is known, however, concerning how they achieve such impressive intersensory capabilities at such young ages. Bahrlick and Lickliter (2000) have proposed an “intersensory redundancy” hypothesis as an explanation for how this process could be initiated and guided during early development. First, they have demonstrated that early in development when information is presented redundantly and in synchrony across sensory modalities, it recruits infant attention, causing amodal stimulus properties (such as duration, tempo, rhythm) to be more easily perceived. Bahrlick and Lickliter (under review) have also found that later in development infants are able to perceive amodal information in the absence of intersensory redundancy.

The present experiment was designed to examine the role of intersensory redundancy in 5- and 7-month-olds' discrimination of affect. It tests the prediction that 5-month-olds' discrimination of affect would be facilitated under bimodal (audiovisual) presentations and attenuated under unimodal (visual) presentations, whereas 7-month-olds would be able to discriminate changes of affect under conditions of bimodal or unimodal presentation.

## Methods

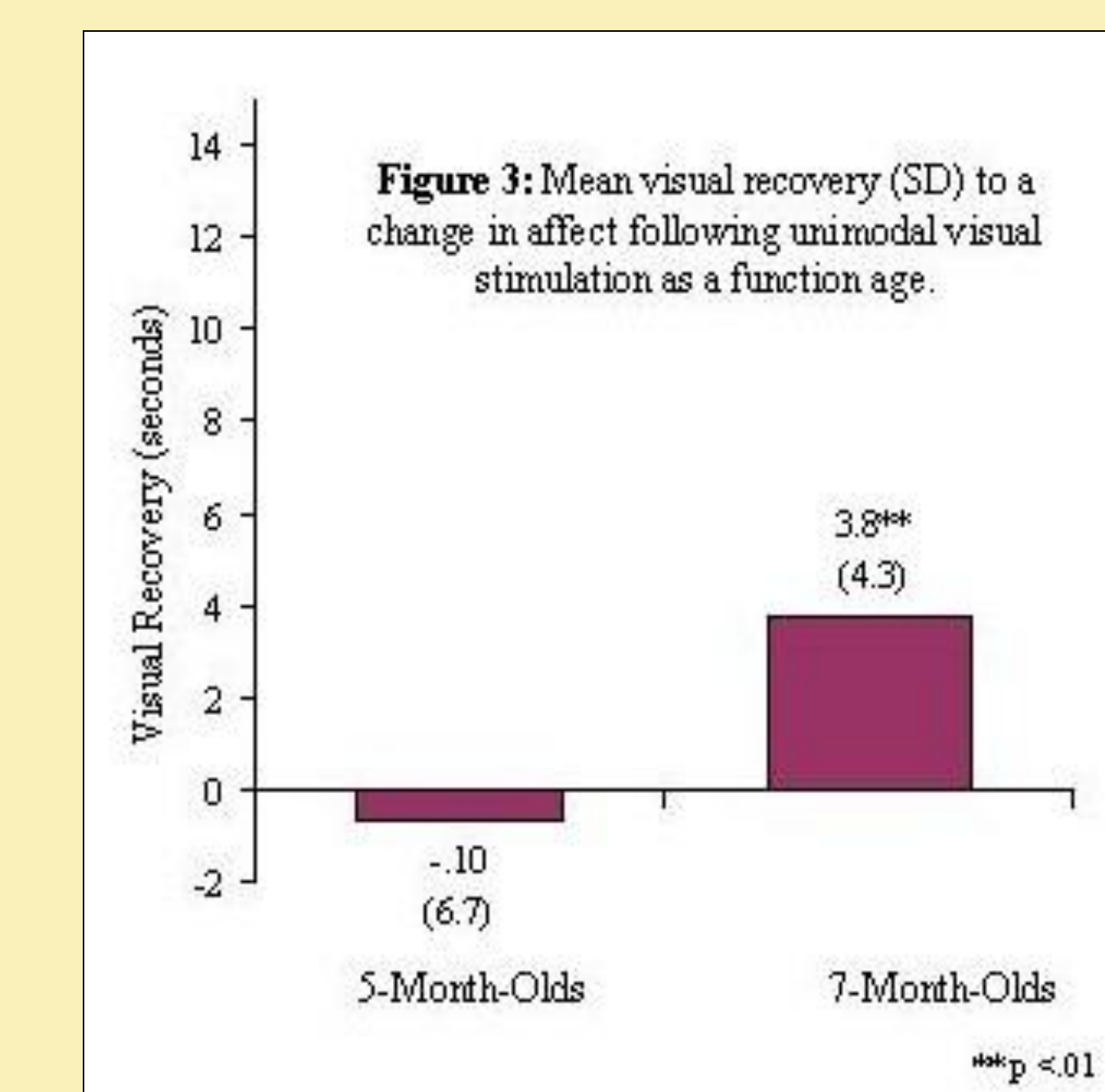
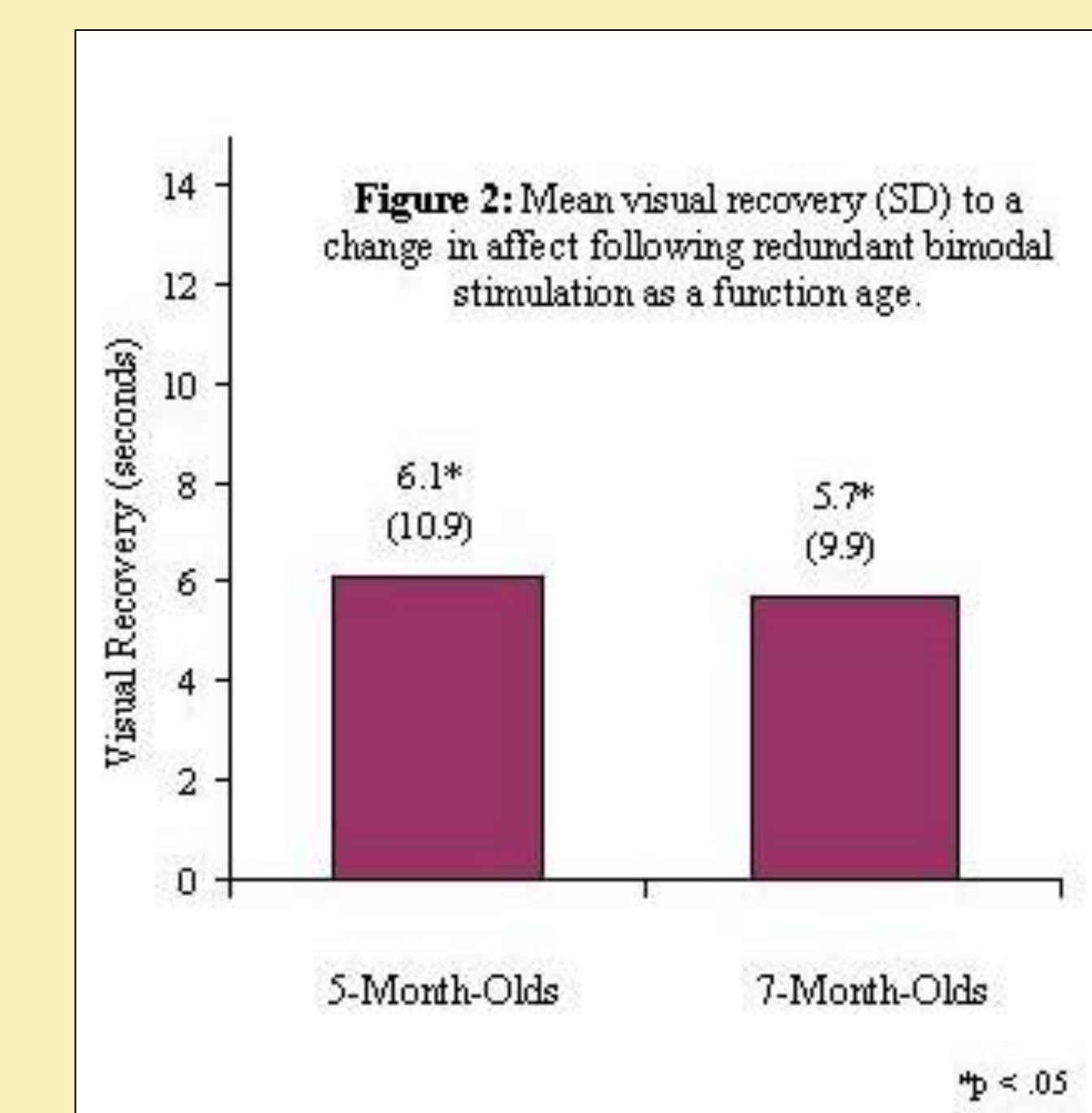
Thirty-six five-month-olds and thirty-six seven-month-olds participated. All infants were habituated in an infant-controlled procedure to one of three films of a woman conveying one of three affective expressions (happy, sad, and angry; see Figure 1). Each affect could be conveyed bimodally (audiovisually) as well as unimodally (visually). All videotaped events were presented dynamically and each of three actresses recited the same script conveying each affect. Eighteen infants at each age received bimodal (audiovisual) habituation to one of the three affective expressions with one of the three actresses. Following two no-change post habituation trials, infants received two test trials depicting only a change in affect. A second group of eighteen infants at each age, received unimodal (visual) habituation, two no-change post habituation trials, and two test trials depicting a change in affect. The affect and actress used for habituation were counterbalanced across infants in each condition.

Figure 1: An example of one actress conveying the three affective expressions



## Results

The dependent variable, visual recovery, was computed by subtracting the mean number of seconds looking during the two no-change post habituation trials from the mean number of seconds looking during the two test trials. The results of the bimodal condition (see Figure 2) indicate that both 5- and 7-month-old infants were able to differentiate between the affective expressions,  $t(17) = 2.39, p = .029$ ,  $t(17) = 2.5, p = .025$ , for each age respectively. The results of the unimodal (visual) condition (see Figure 3) indicate that seven-month-olds' visual recovery reached significance,  $t(17) = 3.76, p = .002$  whereas that of the five-month-olds did not.



## Conclusions

These findings document that five- and seven-month-olds are able to discriminate between affective expressions when they are presented bimodally. Only seven-month-olds, however, demonstrated the ability to discriminate a change in affect when presented unimodally. The results of this experiment replicate and extend the previous findings of Bahrlick and Lickliter (2000) regarding the role of redundancy in guiding attentional selectivity and perceptual learning in early infancy. It appears that when infants first learn to differentiate amodal information, differentiation is facilitated by intersensory redundancy. Finally, these findings also suggest that early in development intersensory redundancy promotes infants' discrimination of amodal properties. However, as development proceeds, intersensory redundancy is no longer required for the discrimination of amodal information. These results highlight the important role of intersensory redundancy in early perceptual learning.

## References

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Bahrlick, L.E. & Lickliter, R. (under review). The development of infants' detection of amodal properties of events in unimodal and bimodal stimulation: A further test of the intersensory redundancy hypothesis

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