

Preferential Looking and Intermodal Perception in Infancy: Comment on Lewkowicz (1992)

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preferential looking intermodal perception intersensory equivalence

Lewkowicz (1992a) reported two experiments that used a visual preference method to investigate 4- and 8-month-old infants' detection of two auditory-visual temporal invariants: rate and synchrony. Infants showed no visual preference for an event occurring at the same rate as a concurrent sound; they showed a weak visual preference for an event occurring in synchrony with a concurrent sound. Based on further experiments using habituation methods, Lewkowicz concluded that infants are sensitive to temporal invariants in bimodally specified events (Allen, Walker, Symonds, & Marcell, 1977; Humphrey & Tees, 1980; Lewkowicz, 1992a, 1992b). Nevertheless, he concludes, infants do not express this sensitivity by looking preferentially at an acoustically specified visual display.

The stimuli and the procedure of Lewkowicz's preference experiments were designed to resemble closely those of experiments reported in Spelke (1979), and a major focus of Lewkowicz (1992a) concerns the relation between the findings of these two sets of studies. According to Lewkowicz (1992a), "Spelke (1979) and Spelke, Born, and Chu (1983) reported that infants prefer to look at a bouncing object whose rate of impact with a surface corresponds to the rate at which a sound is made . . ." (p. 298); the findings reported in Lewkowicz (1992a) therefore "differ from the findings reported by Spelke (1979)" (p. 303). The general discussion of the article focuses on possible reasons for this difference. In fact, the findings of the studies reported in Lewkowicz (1992a) agree quite closely with the findings reported in Spelke (1979), and they are consistent with the find-

ings of Spelke et al. (1983). I review these findings briefly.

Spelke (1979) reported three experiments investigating 4-month-old infants' sensitivity to the temporal invariants of rate and synchrony in filmed events in which bouncing inanimate objects were arbitrarily paired with percussive sounds. In each experiment, sensitivity to the invariants was tested by two methods: a visual *preference method* developed by Spelke (1976) and a visual *search method* developed by Spelke and Owsley (1977). In the preference method, two filmed events were projected side by side, and two streams of sound—each synchronized with one of the events—were played in succession for 100 s through a central speaker. The proportion of looking to the acoustically specified event was calculated; proportions reliably above 0.5 would provide evidence for detection of the auditory-visual invariant. In the search method, the same filmed events were projected side by side. On each of a series of trials, the infant's attention was drawn to a position midway between the two events, and one of the sounds was played briefly. Four looking measures were taken including measures of infants' search for an acoustically specified event (e.g., the number of trials on which infants looked first at the acoustically specified vs. nonspecified event) and a second measure of infants' preference for an acoustically specified event (i.e., the duration of time, during the brief playing of each sound, that infants looked at the acoustically specified and nonspecified events). Each infant was tested first by the preference method and then by the search method in two sessions separated by a short break.

In all three experiments, infants tended reliably to search for the visual event that was specified by a sound. Infants' performance on the search test therefore provided evidence for

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sensitivity to the temporal invariants of rate and synchrony. In no experiment, however, did infants show strong and reliable visual preferences for the acoustically specified event. During the preference session, preferences for the acoustically specified event were only marginally significant when the sound and object were united by synchrony (Experiments 1 and 3), and they were nonexistent when the sound and object were united by rate (Experiment 2). During the search session, no significant preference for the acoustically specified event was observed in any study. Spelke (1979) described the findings of the preference measures as "equivocal" (discussion of Experiment 1, p. 631), "absent[t]" (discussion of Experiment 2, p. 633), and "not convincingly strong" (discussion of Experiment 3, p. 635). Summarizing, the article states,

visual preference for acoustically specified events was distinctly weaker in the present study than in the experiments by Spelke (1976) and by Bahrick et al. (Note 3 [now 1981]). Despite these weak visual preferences, however, infants exhibited strong and consistent visual search for synchronized objects. (p. 635)

Based on the search findings, the article concludes that 4-month-old infants are sensitive to the two temporal invariants.

Spelke et al. (1983) used the same preference and search methods to investigate further infants' detection of synchrony relations between sounds and moving objects. Contrary to the description in Lewkowicz (1992a), this research did *not* investigate infants' sensitivity to rate; instead, rate information was eliminated or minimized so as to focus exclusively on synchrony. The search method provided evidence that infants perceived an auditory-visual relationship when a sound was synchronized with changes in an object's direction and speed of motion. As in Lewkowicz's studies, the evidence from the preference method was less strong.

In brief, the findings of Lewkowicz (1992a) and of Spelke (1979; Spelke et al., 1983) agree quite closely. In both sets of studies, no preference for an acoustically specified event was observed when the auditory-visual relationship

was specified by rate, and weak and inconsistent preferences were observed when the auditory-visual relationship was specified by synchrony. In both laboratories, moreover, clearer evidence for detection of auditory-visual relationships was provided by other methods: a habituation method (Lewkowicz, 1992a, 1992b) and a search method (Spelke, 1979; Spelke et al., 1983). Nevertheless, the Spelke articles may be faulted for emphasizing the positive experimental findings much more than the negative findings.

The findings of all these studies differ from the findings of a variety of experiments using the preference method with natural events and nonarbitrary auditory-visual relationships: In such experiments, infants have shown consistent visual preferences for acoustically specified events (e.g., Bahrick, 1983; Bahrick et al., 1981; Kuhl & Meltzoff, 1982; MacKain, Studdert-Kennedy, Spieker, & Stern, 1983; Spelke, 1976; Spelke & Cortelyou, 1981; Walker, 1982). Based on the studies available at the time, Spelke (1979) considered three possible explanations for this difference.

First, the events in the present study were more similar to each other than were the events presented to infants in the earlier experiments [i.e., Spelke, (1976) and Bahrick et al., (1981)]. Infants may look longer toward an acoustically specified event only if the alternative, nonspecified event differs markedly from it. Second, infants might have known something about the events in the earlier experiments—clapping hands, talking people, and the like—before these studies began. In contrast, infants could not have known previously about the sound-object pairings in the present study. Visual preference for an audible event may depend on such prior knowledge. Third, the kangaroo and donkey events [i.e., the events used in Spelke, 1979] were more repetitive than the events in the other experiments. Infants may have attempted to keep track of both of them by dividing their looking time between the acoustically specified and the nonspecified episodes. (p. 631)

Although a wealth of important research on auditory-visual perception has been conducted since 1979, I believe that these possibilities remain untested.

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