

Selective Looking by Infants

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Previous studies of selective looking have shown that adults and young children can easily follow one visually specified event while ignoring another on which it is optically superimposed. The present experiments show that 4-month-old infants have the same ability. Two films were shown superimposed on the same screen, while one soundtrack was played in an attempt to influence the subjects' perceptual selection. When the films were separated during test periods, the infants looked mostly at the previously *silent* film, suggesting that it was novel for them. Control experiments showed that completely unfamiliar films elicited comparable novelty preferences in the same situation, that the soundtrack could also influence perceptual selection during side-by-side presentation of the same films, and that cross-modal habituation to the soundtrack alone could not account for the results. Perception is inherently selective, even in the first months of life.

In the normal environment, several objects or events may often be perceptible at the same time and in the same general direction. Apparently neither adults nor children experience any particular difficulty in such situations: perceptual selection is smooth and easy. Developmental studies of selective listening, for example, show that children can easily monitor a chosen "target" message when two voices are presented together (e.g., Sexton & Geffen, 1979, Experiment 2). The same effortless selection has been demonstrated in vision with the method of "selective looking" (Neisser & Becklen, 1975). In this method, videotapes of two natural events (a three-man ballgame and a handclapping sequence, or two ballgames) are played in full superimposition on the same television screen. The subject's task is to follow one of the episodes attentively, pressing a response key each time a predefined critical event (e.g., a ball throw) occurs in it. Adults can do this easily, even without eye movements (Littman & Becklen, 1976) and even when the two episodes are

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very similar or essentially identical (Neisser, 1979). Fourth-grade children do it just as easily, and so do first graders if the response requirement is simplified (Neisser, 1979; Rooney, Johnson, & Neisser, Note 1). For the most part, subjects in selective looking experiments simply do not see the secondary episode at all. Even rather unusual events—a young woman who saunters across the screen carrying an open umbrella, for example—typically go unnoticed (Neisser, 1979; Rooney et al., Note 1; Neisser & Dube, Note 2).

It seems to us that it would be a mistake to postulate any special mechanism, any “filter” to explain this easy selection. Because the selective looking display does not correspond to any natural situation, perceivers could not be expected to have such mechanisms available to deal with it. We prefer to assume that selectivity is inherent in the very act of perceiving. According to the theory put forward by one of us elsewhere (Neisser, 1976), perception takes place when appropriate schemata are actively and continuously tuned to the temporally extended information that specifies an individual event. Irrelevant events present information, too, but remain unperceived simply because no such active tuning occurs with respect to it.

We believe that perception must be selective in this way from the very first. We are skeptical of claims that selectivity itself undergoes development. Skills of perception develop, interests change, coordination improves, but the act of perceiving must be as selective in the neonate as in the adult. When an infant is looking at and listening to one particular event, others are likely to go unnoticed. Indeed, the chief developmental trend may run in the opposite direction. Skills of *divided* attention (Hirst, Spelke, Reaves, Caharack, & Neisser, 1980; Spelke, Hirst, & Neisser, 1976) are definitely acquired, so adults are probably *less* exclusively selective than children, better at monitoring two or more independent events (Sexton & Geffen, 1979).

It seems desirable to confirm these arguments by direct studies of perceptual selection in infancy. Some capacity for selective listening has already been demonstrated in 4-month-olds. Benson (Note 3) reported that infants could select their mothers' voices from a background of babble presented through the same loudspeaker. Spatial separation of the two sounds facilitated detection of the mother's voice, but was not necessary for selection to occur. We now report a successful demonstration of selective looking in the same age group (Experiment 3), together with three related studies.

Two problems arose in adapting the method of selective looking to infant research. First, the subjects had to be somehow “instructed” to follow a particular one of the two superimposed displays. Second, we had to determine whether or not they had followed this “instruction.” In addressing the first of these problems, we capitalized on a phenomenon

discovered by Spelke (1976, 1979a, 1979b). When infants are shown two motion pictures side by side while one of the corresponding soundtracks is played (through a central speaker), they look mostly at the sound-appropriate film. As Spelke pointed out, this suggests that the infants perceive a correspondence between the acoustic information from the soundtrack and optical information from the film. They are sensitive to an amodal temporal structure that is invariant across the auditory and visual modalities. For our purposes, however, the soundtrack can be thought of simply as a kind of instruction that “asks” the infant to watch one of the films. We hoped that it would exert the same influence when the films were superimposed rather than adjacent. To examine this possibility, we needed at least two sound films that (a) were interesting to infants; (b) were acoustically distinct, so the instructions given by the soundtrack would be unambiguous; (c) produced a strong Spelke effect when presented side by side. Experiment 1, the preliminary study, verified that these conditions were met.

In Spelke's method, one can determine which film the infant is watching by noting whether she/he looks to the left or the right. We could not do this during selective looking, because both films would then be presented straight ahead of the subject and superimposed. Our procedure in Experiment 3, therefore, was to interrupt the superimposed presentation every 20 sec, turning off the sound so that the soundtrack could no longer direct selectivity, and separating the two film images on the screen.¹ Either of two kinds of behavior on the part of the subjects could then be taken as an indication that they had been watching the sound-appropriate film: they might continue to watch it, or they might look consistently at the other, previously ignored film because it was novel for them. A priori we were not sure which tendency to expect. Experiment 2, the single-film familiarization control, settled that question in the direction we had initially thought less likely. Infants who had been watching a *single* sound film were intermittently presented with two silent films side by side (the old one and a new one); they looked mostly at the new one. The subjects of our main study (Experiment 3) exhibited the same preference after *superimposed* presentation, thus demonstrating successful selective looking. They had apparently seen the primary (soundtrack) film but not the secondary (no soundtrack) film during superimposition. Experiment 4, a sound-only familiarization control, was conducted to evaluate an alternative interpretation of the results of Experiment 3.

EXPERIMENT 1

The aim of Experiment 1 was to pretest the stimulus materials, replicating Spelke's (1976) effect with new naturalistic film sequences that

were optically and acoustically distinct enough to make a later selective looking study feasible.

Method

Stimulus materials. Three 2-min color motion pictures were made for use in the experiment, each depicting a different event. The "handgame" film (H) showed a rhythmic handclapping sequence; only the hands and forearms of two adults were visible, clapping together and onto an empty box. A predictable sequence of eight claps was repeated every 3 sec. The "xylophone" film (X) showed two striped wooden sticks striking one another and a toy xylophone. A 16-note nursery rhyme tune was repeated every 15 sec. The "slinky" film (S) showed a "slinky" toy (a tightly wound plastic spiral) being manipulated in an erratic pattern by a pair of gloved hands. The slinky moved vertically, diagonally, or in an arc. These events represented three different kinds of sounds: musical (X), percussive (H), and noise (S). They were all continuous over the 2-min period, and their soundtracks were recorded live.

Subjects. The subjects were 12 male and 12 female infants ranging in age from 3 months 8 days to 4 months 29 days (mean age 4 months 10 days). They were located through birth notices in local newspapers. Five of the initial group of 29 subjects were eliminated from the experiment; 3 on the basis of experimental error and 2 for excessive fussing.

Apparatus and procedure. In each 2-min presentation, a pair of motion pictures were rear-projected onto a translucent screen by a pair of Bolex Super-8 projectors. The two 30 × 38-cm film images (visual angle about 45°) were separated by 8 cm of blank screen. The subject sat in an infant seat 35 cm from the display. One of the appropriate soundtracks was played at about 65 db through a speaker centered between the images. The room lights were dimmed. Presentation of the two films and one soundtrack began as soon as a flashing light had successfully directed the infant's gaze to the center of the split screen. This was signaled by a trained observer who monitored the direction of the subject's gaze through an aperture located just below the screen. Throughout the 2-min presentation, the observer continuously indicated whether the infant was looking at the right or left side of the screen by pushing one of two buttons connected to an event recorder. (If the infant did not look at either film, or fixated between them, neither button was pressed.) To prevent bias in recording, the observer was "blind" to the critical condition: he did not know to which side the sound-appropriate film was being projected. To assess interobserver reliability, two other observers each monitored six of the same subjects. "Agreement" between two observers was defined by the number of seconds in the 2-min presentation (divided by the total time) during which both reported the same direction of gaze. If one or both observers indicated a change of gaze within a given 1-sec interval, that interval was divided into 200-msec segments; agreement was scored if four of the five segments included no discrepancy. The mean agreement was .95.

Film pair, soundtrack, and lateral position of the sound film were counterbalanced across infants. There were 12 possible combinations of these variables; given three possible pairings of the films (HX, HS, SX), either member of the pair could be presented in sound, and the sound film could be presented on either the right or left side of the screen. Two subjects were assigned to each of the 12 cells of the design.

Results and Discussion

"Total looking time" for each subject was defined as the sum of the times spent looking to the right and to the left (omitting any time during which the subject did not look at either film). The fraction of total looking

time spent in looking to the sound-appropriate side was taken as an index of the Spelke effect. The average magnitude of the effect for our 24 subjects was .673. In other words, the infants watched the sound films about twice as much as the silent films. This preference is significantly different from .500 [$t(23) = 3.53, p < .01$]. Twenty of the twenty-four infants watched the sound-appropriate film more than half the time (binomial $p < .001$). There were no significant differences in looking to the sound films for male as compared with female subjects and no significant side preferences. These results replicate and extend the findings of Spelke (1976, 1978): infants were apparently able to detect information common to the visual and acoustic portions of these complex, natural events.

A more fine-grained analysis of the data appears in Table 1, which shows the fraction of looking time devoted to each film when it was paired (in sound) with each other film. Every such pairing is essentially an independent replication of the experiment with four subjects. Preferences for the sound-appropriate films were above .70 in five of the six pairings. The exception occurred when film X was paired with S. The infants' preference for the slinky film apparently overrode their tendency to look at the sound-specified xylophone film.

Other analyses also revealed that film X was less interesting to our subjects. Two analyses of variance were performed on the proportions of total looking time devoted to the three different films: one included only trials when the given film was played with its soundtrack; the other only trials when the given film was shown silently. Both revealed significant differences among the films [$F(2,21) = 3.73, p < .05$; $F(2,21) = 4.13, p < .05$]. The xylophone film was the least attractive of the three under both sound and silent conditions. Given these results, only the slinky and handgame films were used in Experiments 2, 3, and 4.

EXPERIMENT 2

This study used a familiarization procedure. During most of the presentation, the subject viewed a single centrally projected film along with its soundtrack. Every 20 sec, however, the sound was shut off; during the brief silent intervals a previously unseen film became visible. This novel film appeared to slide out from behind the original one, as the two images moved rapidly in opposite directions until they appeared side by side. The infants' fixations were recorded to determine whether they would look preferentially at one of the films during the silent separation trials. This study was a necessary control for the selective looking procedure of Experiment 3, in which two *superimposed* films were shown during familiarization. Total "selectivity" was ensured in the present control study because only a single film was shown. This enabled us to determine the magnitude and direction of the preference established by seeing only

TABLE 1
Proportion of Total Looking Time Subjects^a Looked at the Sound-Appropriate Film

Sound film	Silent film	Proportion
H	S	708
H	X	861
S	H	740
S	X	719
X	H	720
X	S	291

^a $n = 4$ for each pair of films.

one film throughout the familiarization period and not seeing the other film at all. Thus, the results of Experiment 2 can be used as a baseline for evaluating the effectiveness of selective looking in Experiment 3.

Method

Stimulus materials. Longer versions of the handgame and slinky films (each 3 min 15 sec long) were used in this study.

Subjects. Sixteen infants, eight males and eight females, ranging in age from 4 months 6 days to 4 months 29 days (mean age 4 months 17 days) participated. No subjects were excluded.

Apparatus. The two projectors were mounted on adjacent wooden disks that could be rotated (like "lazy Susans") in either direction. Thus a given film could be projected either to the center or to one side of the screen as shown in Fig. 1. The revolving disks were connected by a figure-eight-shaped belt, so that the projectors always rotated in opposite directions and at the same rate. An opaque shield was placed so that it blocked the beam from one of the projectors whenever both were aimed centrally; hence only one film image could be seen. When the disks were rotated, the previously occluded image became visible. At their maximum lateral positions, the two images were 8–10 cm apart. The soundtrack of the centrally visible film was played through a speaker located 110 cm behind the center of the screen. Whenever the projectors were rotated out of the central position, a cam on one of the disks tripped a microswitch that cut off the loudspeaker. Thus the subject never heard the soundtrack during the times when both films were visible. These silent periods were automatically marked on an event recorder.

Procedure. The subject was placed in an infant seat facing the screen as in Experiment 1, and the projectors were turned on in their central positions. Because of the opaque shield, only one film was visible to the infant. The soundtrack of the visible film was played. Every 20 sec, the projectors were rotated so that the previously occluded film became visible; the two images moved apart quickly and silently until they appeared side by side. After the images reached this position, the projectors were rotated back to center, the silent film was again occluded, and the soundtrack resumed. This sequence occurred every 20 sec during the 3-min, 15-sec period. This allowed for nine separation trials which averaged 2.7 sec in duration. The directions in which the two films moved on each trial were varied in accordance with one of four predetermined orders, random except for the constraint that the sound film had to move one way on four of the trials and the other way on five. This ensured that the infant could not predict in which direction the sound film would move.

A trained observer monitored the subject's fixations throughout. During familiarization

(while the soundtrack was audible) she monitored fixation, responding whenever the infant was looking at the centrally projected image. In the intervals when the soundtrack was turned off and the films separated, she used two buttons to indicate whether the subject looked to the right or left side of the screen. (If the infant did not shift his gaze to either side,

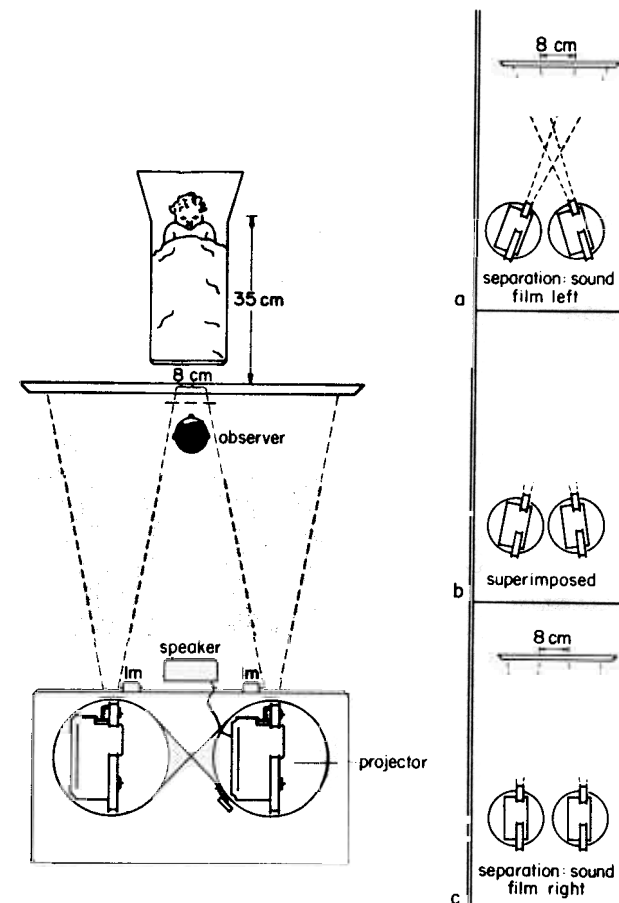


FIG. 1. Schematic top view of experimental setup. The observer is seated below the level of the projector beams, and sees the subject through a peephole. The projector on the observer's right was connected to the speaker in Experiments 2, 3, and 4; in Experiment 1 each projector was connected to the speaker, and a toggle switch (not shown) controlled soundtrack selection. Whenever the projectors were rotated out of the central superimposed position, a cam tripped a microswitch that cut off the speaker. (a) Projectors rotated completely as on one-half the separation trials: the film that had been in sound during superimposition is projected to the left. (b) Superimposed presentations of the films. (c) Projectors rotated to a forward position as on the remaining half of the separation trials (same view as at left): the film that had been in sound during superimposition is projected to the right. Opaque shields (Experiment 2) or blurring lenses (Experiment 4) could be inserted in the lens mounts (lm) to interfere with the projector beams in the superimposed position.

she pressed neither button.) The observer did not know the lateral positions of the films during the separation trials.

Eight subjects (four males and four females) were familiarized with the handgame film; eight others (four males and four females) were familiarized with the slinky film. We determined in advance that we would omit any subject who failed to look at one side or the other on at least five of the nine separation trials; however, all subjects met this criterion. There were a total of 14 trials on which no preference was exhibited; the analyses below are based on the remaining 130 trials.

Results and Discussion

The measure of primary interest was the direction of the infant's first look at the onset of each separation trial. Overall, 87 of the 130 first looks (.669) were directed to the nonfamiliarized, previously occluded film. Each subject's preference for the novel film was defined by the fraction of her/his 9 or fewer first looks that she/he directed to that film; the mean of these preferences was .674. This proportion is significantly different from the chance level of .500 [$t(15) = 4.156, p < .001$]. Thirteen of the sixteen infants directed a majority of their first looks to the nonfamiliarized film (binomial $p < .05$). There was no significant difference between the two familiarization groups (one shown the handclap film in sound, the other the slinky) in the extent of their preference for the novel film. A slight overall preference for the slinky film appeared, but was not significant: the proportion of first looks to the slinky, regardless of whether it had been previously visible or occluded, was .555 [$t(15) = .917, p > .10$]. There were no significant side preferences or sex differences. During the 17-sec familiarization periods when one film was centrally projected in sound, infants watched it for an average of 13.8 sec ($SD = 3.5$ sec). During the 2.7-sec separation trials infants looked at one or the other of the films for an average of 1.4 sec ($SD = .46$).

The sizeable and consistent preference for the novel film during the separation trials is consistent with results typically obtained with novel displays (e.g., Fantz, 1963). The magnitude of the preference effect can be compared with the results of Experiment 3.

EXPERIMENT 3

This study was intended as a demonstration that infants can look selectively at one of two simultaneously presented, overlapping motion pictures. The soundtrack of one film was used to control selection as in Experiment 1. To determine whether selection was taking place, the films were periodically separated as in Experiment 2. If selective looking had occurred during the superimposed presentation, the infants would, in effect, have seen only the sound-appropriate film and not the silent one. The latter should seem just as novel as the previously occluded film had been

in Experiment 2. The infants should look preferentially to this "novel" film during the silent test trials.

Method

Stimulus materials. The 3-min, 15-sec handgame and slinky films of Experiment 2 were used.

Subjects. Sixteen infants, eight males and eight females, ranging in age from 4 months 1 day to 5 months participated (mean age 4 months 20 days). Four subjects were excluded from the study for fussing or for looking on fewer than five of the nine separation trials.

Apparatus and procedure. The two projectors were placed on the revolving disks as in Experiment 2. No opaque shield was used. When the projectors were centrally positioned, the two films were fully overlapped on the screen, providing a display much like that of a double-exposed photograph. During this superimposition phase, the soundtrack appropriate to one of the films was played through a centrally placed speaker. Every 20 sec the interconnected discs supporting the projectors were quickly rotated in opposite directions. The soundtrack was automatically shut off and the two films appeared silently side by side. Then the projectors were again rotated quickly to the forward position, the images were displayed in full superimposition, and the soundtrack resumed. Nine separation trials were conducted.

A trained observer monitored the infant's fixations as in Experiment 2. Sound film was counterbalanced across subjects; eight subjects (four males, four females) heard the handgame soundtrack and eight (four males, four females) heard the slinky soundtrack during the superimposed phases. All other procedures were identical to those of Experiment 2.

Results and Discussion

There were eight separation trials on which the infant did not look to either film, leaving 136 trials for analysis. On 90 of these (.662) the subjects directed their first looks to the previously silent film. The mean of the 16 subjects' individual preferences for that film was .662. This proportion is significantly different from .500 [$t(15) = 5.08, p < .001$]. Thirteen of fourteen infants looked first to the silent film on a majority of the trials (binomial $p < .001$). Two subjects looked equally often to both films.

There were no significant side or film preferences; infants looked at the right side 51% of the time and at the slinky film 51% of the time. There was, however, a significant sex difference. The males looked first at the silent film on 74% of the separation trials, the females on 59% [$t(11) = 2.84, p < .05$].²

The average length of a separation trial was 2.65 sec ($SD = .3$), and the average duration of the infants' fixation during this period was 1.49 sec ($SD = .28$).³ During the superimposed periods of approximately 17 sec,

² The t test used here does not assume equal variances, and therefore the reported df is based on an approximation given by Ryan, Joiner, and Ryan (1976), making the analysis slightly conservative.

³ During the separation trials the infants' looking time averaged 0.86 sec for the previously silent film and 0.63 sec for the sound film, a result consistent with the first look data.

the infants spent an average of 12.67 sec ($SD = 3.37$) looking at the overlapped display.

As Fig. 2 shows, the results of this experiment are strikingly similar to those of Experiment 2, where subjects were shown only one familiarization film. In both studies, first looks were directed to the "novel" film on two-thirds of the separation trials. We conclude that our subjects successfully followed the sound film and ignored the silent one superimposed with it. The soundtrack directed selectivity so completely that infants later showed a novelty preference for the previously silent film. Infants, like adult perceivers, can attend selectively to an episode even when it lies in the same visual direction as another.

EXPERIMENT 4

Before the selective looking interpretation of our results can be accepted, another interpretation must be considered. In both Experiments 2 and 3, the familiarization periods presented a soundtrack as well as a visual display: perhaps the soundtrack alone was responsible for the habituation and subsequent novelty preference that we observed. Cross-modal habituation and familiarization effects have been demonstrated in infants under a number of conditions (Allen, Walker, Symonds, & Marcell, 1977; Bahrick, 1980; Gottfried, Rose, & Bridger, 1977). It is conceivable that infants who had been exposed to a particular soundtrack and rhythm during familiarization might then treat a *visual* event as especially novel if it portrayed a different rhythm, or showed an object incapable of making that sound. If this were the case, the visual presentation of a sound-appropriate film during the familiarization period may have been irrelevant and unnecessary: all habituation may have been to acoustically presented information. Experiment 4 was conducted to test this possibil-

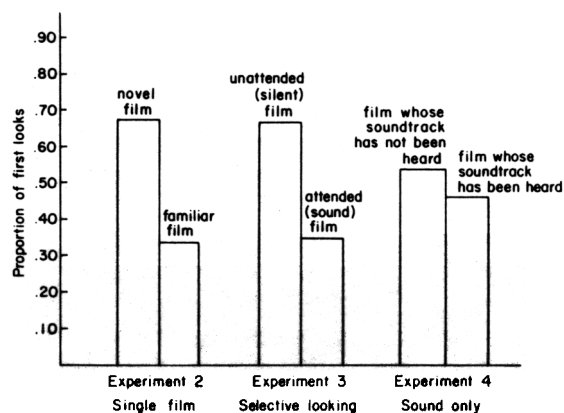


FIG. Proportion of first looks directed to each film in Experiments 2, 3, and 4.

ity by determining whether the presence of visual information during the familiarization period was essential to the outcome. Infants were shown a blurred, out-of-focus version of the superimposed display along with the usual single soundtrack. Separation trials with the fully focused films were conducted as before. If the cross-modal habituation hypothesis were correct, this procedure should reproduce the results of Experiment 3. If those results were genuinely due to selective looking, however, they should not appear when defocused images make visual selection impossible.

Method

Stimulus materials. The same slinky and handclap films were used.

Subjects. Sixteen infants (eight males and eight females) ranging in age from 4 months 4 days to 5 months (mean age 4 months 17 days) participated. Three subjects were excluded from the study for fussing or for looking on fewer than five of the nine separation trials.

Apparatus and procedure. The procedure of Experiment 3 was modified in one respect. Two lenses, each 30 mm in diameter with a 250-mm F.L. (Edmund Scientific lens MNS 94,642) were mounted in front of the rotating disks. They were placed so as to intercept the projector beams when these were centrally projected, i.e., when the film images were superimposed. The effect of the lenses was to blur the images and make the two events unrecognizable; only a jumbled mass of color and motion was visible. When the projectors were rotated to either side and the soundtrack shut off, the images were no longer projected through the blurring lenses and appeared in sharp focus side by side. Lateral position of the films and soundtrack presentation were counterbalanced as before.

Results and Discussion

There were 19 separation trials on which the subject did not look to either film, leaving 125 trials for analysis. On 67 of these (.536), the infants directed their first looks to the previously silent film. The mean of the 16 individual preferences was .527. As expected, this figure was not significantly different from .500 [$t(15) = .581, p < .50$]. Only 7 of the 16 infants directed a majority of their first looks to the previously silent film. There was a significant difference between the first-look preference in this experiment and in Experiment 3, when visual information for selective looking was available [$t(26) = 2.43, p < .05$].² Subjects in the present study lacked this information and thus failed to show the "novelty" preference.

There were no significant sex differences, film preferences, or side biases. The average length of each separation trial was 3.13 sec ($SD = .54$) and the average time infants looked at the films during these trials was 1.71 sec ($SD = .54$). During the superimposed phases infants looked at the blurred films an average of 7.65 sec ($SD = 2.44$), substantially less than to the fully focused superimposed films of Experiment 3 (12.67 sec) or the single film in Experiment 2 (13.8 sec). The amount of fixation to the blurred, superimposed films declined steadily over the experimental ses-

sion, averaging 9.85 sec ($SD = 5.1$) during the first 20-sec period, and reaching a mean of 3.71 sec ($SD = 3.34$) during the last. This suggests that the blurred films were less interesting to the subjects than the fully focused superimposed films.

These data do not support the hypothesis that cross-modal habituation was responsible for the results of Experiments 2 and 3. Looking behavior during the separation trials was not influenced by hearing the soundtrack alone during familiarization. This lends further support to our interpretation of Experiment 3; the infants could see either event clearly, and they looked selectively at the one whose soundtrack was audible. The subjects of Experiment 4, in contrast, saw only a jumble of color and motion because that was what we showed them. Infants need not experience a "blooming, buzzing confusion" unless one is specified by the information in the light.

GENERAL DISCUSSION

These four experiments provide converging evidence that young infants can selectively follow a visually specified event, even when it is optically superimposed on other ongoing action. This finding raises new questions about the basis of their selection. What information guided our subjects' selective looking? Featural differences between the two films may have played a role, but we would like to stress the potential contribution of higher-order and amodal information. We know that adults need not rely on featural differences for selective looking: they can follow one ball game and ignore another even when the two are featurally identical (Neisser, 1979). They apparently accomplish this by using kinetic information and temporal structure, which enables the perceiver to "follow" the flow of action.

It is likely that our subjects also used kinetic information to accomplish selective looking. In doing so, they may have derived a special benefit from the soundtrack that we presented to direct selectivity. The presence of the soundtrack may have provided certain amodal, invariant relationships which could serve to separate the sound-appropriate film from the other event that did not share this structure. The soundtrack and its proper film are united by a common temporal pattern and rate of action, as well as by repeated temporal synchrony relations. Moreover, the types of sound audible on the soundtrack are appropriate to the types of motions depicted in the corresponding film. Studies by Spelke (1976, 1979a, 1979b), Bahrick (1980), and Walker (1980) have shown infants to be sensitive to all of these intermodal relations. Because the same amodal information was available in both vision and audition, it could specify the auditory-visual event as unitary, setting it apart from the other event depicted in the silent film. The experience is a compelling one for adults:

the sound-appropriate event seems to stand out sharply and vividly from the superimposed display on the screen.

These studies indicate that infants, like adults, can selectively attend to one complex, visual event while ignoring another superimposed upon it. Such superimposed displays, however, rarely occur in nature. It is not likely that evolution has equipped human infants with special mechanisms for dealing with superimposition, and even less likely that they have had any relevant experience during their first 4 months of life. Selective attention is not a separate ability, and does not require any separate cognitive structures or processes. Selectivity is inherent in the act of perceiving from the beginning.

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