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Infants' ability to parse continuous actions: Further evidence

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ABSTRACT

In two experiments, we examined 6- and 8-month-old infants' capacities to detect target actions in a continuous action sequence. The primary question was whether action segments consisting of an *event* (e.g., occlusion, containment) are more salient than action segments consisting of a *transition* (e.g., bounce, slide). In Experiment 1, infants were habituated to long action sequences. After meeting the habituation criterion, infants were shown an alternation between test trials consisting of either novel or familiar segments made up of an event and transition. The results demonstrate that infants dishabituated to the novel test segments. In Experiment 2, infants were habituated to the same long action sequences but the novelty/familiarity of the events and transitions were crossed with each other. The results demonstrate that infants looked longer at test trials with novel events compared to test trials with novel transitions. These experiments replicated and extended the phenomena reported in Hespos, Saylor, and Grossman (2009). Together these findings demonstrated that in event processing, events having greater relative salience than transitions. These findings suggest that object knowledge could provide insights to the process of event segmentation.

Observations of human action can range from the mundane (e.g., passing a stranger on the street) to the memorable (e.g., watching your child take their first steps). Thus, how we determine what constitutes a meaningful unit in the continuous flow of human action is a fundamental question given the wide range of action types. Research on adults suggests that event segmentation is automatic, scaffolds later memory, and is associated with brain activity in posterior visual and multimodal processing areas (Zacks & Swallow, 2007). Zacks, Tversky, and Iyer (2001) analyzed how adults segment video events; they found that there is a hierarchical bias of encoding that is used to guide story understanding and memory for events. The studies on adults demonstrate that events can be parsed at different timescales (e.g., a course- or fine-grained level of analysis, see Kurby and Zacks (2008) for a review). The course-grained level often describes goals, causal relations, and interactions among characters. In contrast the fine-grained level, borrows from the well-studied domain of object perception for insights on how to characterize event segmentation. Shipley and Maguire (2009) point out that objects can be distinguished as units in the perceptual array because there are regularities that predictably identify the boundaries of objects from layouts. They go on to suggest that a similar mechanism may be at play for event segmentation in that certain properties of the world change in predictable ways and that event segmentation is likely to occur when there is an abrupt change in the predictable patterns of events. Evidence that supports the hierarchical organization of these different levels of analysis comes from the fact that when the same person is asked to segment a scene in a coarse- and fine-grained manner they find that the subunits of the fine-grained approach fit neatly inside the larger course-grained goals and causal relations (Zacks et al., 2001).

Given the fundamental and ubiquitous nature of parsing continuous actions, it is likely that the parsing ability should be evident early in development. In an effort to better understand the mechanism that underlies our ability to parse continuous actions we focus on the origins of infants' event segmentation ability. Our question concerns how infants' attention is allocated during continuous sequences that contain familiar and novel actions.

What predicts when a continuous action should be parsed into an event for infants? Transitions between events may be salient to infants because of the properties of these segments—transitions tend to include rapid, ballistic movement and changes in head and eye direction. Adults sometimes rely on these types of features of action when segmenting continuous events (Levin, Hunter, Wikes, Heton, & Saylor, under review; Zacks, 2004). This strategy would be consistent with a bottom-up mechanism guiding action parsing. On the other hand, infants may use their knowledge of familiar events to segment the continuous flow.

In keeping with the second, knowledge-rich possibility, there is an extensive existing literature demonstrating that young infants

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have sophisticated expectations about how objects behave and interact (for a recent review, see Baillargeon, Ng, & Yuan, 2009). Research on infants' physical reasoning has revealed that infants form distinct event categories such as occlusion, containment, support, and covering (Casasola, Cohen, & Chiarello, 2003; Hespos & Baillargeon, 2001a, 2001b; McDonough, Choi, & Mandler, 2003; Wang, Baillargeon, & Paterson, 2005). These findings suggest that infants approach the task of learning about objects and events by breaking the world into smaller categories and learning within these categories. However, the question of how infants parse a continuous sequence of actions into discrete events is relatively uncharted territory, and therefore the focus of this paper.

The first developmental studies that examined infants' ability to detect structure in continuous human action focused on infants nearing their first birthday (Baldwin, Baird, Saylor, & Clark, 2001; Saylor, Baldwin, Baird, & LaBounty, 2007). These studies demonstrated that infants from 9 to 11 months segment continuous human action into units that align with actors' goals and intentions. Further studies have demonstrated that infants detect goal-directed actions in the first months of life (Csibra, Gergely, Biro, Koos, & Brockbank, 1999; Sharon & Wynn, 1998; Sommerville, Woodward, & Needham, 2005; Woodward, Sommerville, & Guajardo, 2001; Wynn, 1996). These studies used presegmented action and hence infants did not need to engage in event segmentation to detect goal relevant actions. Because much of day-to-day behavior flows continuously, we focused our efforts on examining how infants recognize segments in continuous human action sequences.

In our initial study, we tested whether infants capitalized on their knowledge about events to help them parse continuous actions (Hespos et al., 2009). Specifically we examined whether 6- and 8-month-old infants' could detect target actions in a continuous action sequence. These results provided the first demonstration that infants, as young as 6 months, have at least rudimentary capacity to recognize familiar events in a continuous action sequence. These findings support the proposal that early event segmentation may capitalize on what infants know about how objects behave and interact. We suggest that infants may use their physical knowledge to help them parse continuous human action at event boundaries because repeated event categories establish familiarity and when viewed in multiple different positions they established unit boundaries.

There are some remaining questions that were not addressed in the first paper. For example, in Hespos et al. (2009) infants were habituated to a long sequence and test trials consisted of either novel or familiar events (Experiment 2) or novel or familiar transitions (Experiment 3). Viewing the events or transitions in isolation with few distracting differences provided an ideal situation in which to form a generalization. It demonstrated that infants can recognize certain segments of the habituation sequence and the ability is evident early in development. However, the events and transitions were presented in isolation so this leaves questions about whether infants would succeed when the events and transitions are presented together providing a test that is more representative of actions in everyday events. In this paper we address this issue. In Experiment 1, the events and transitions were either both novel or both familiar. In Experiment 2, the novelty/familiarity of the events and transitions were crossed with each other to determine the relative influences of these factors on infants' ability to recognize segments of continuous actions.

1. Experiment 1

This experiment was modeled closely on an experiment done by Hespos et al. (2009). The specific events used in the sequences were chosen because they represented distinct event categories, and previous research has demonstrated that infants have expectations about these event categories as early as 6 months of age (Baillargeon, 2004). Infants were habituated to a long action sequence (a 24-s cycle repeated continuously). After reaching the habituation criterion, infants were shown an alternation between novel and familiar test trials. The novel test trial was a 5-s segment consisting of a novel event and transition. The familiar test trial consisted of a 5-s segment that they saw during habituation consisting of an event and transition as well. This study presented events and transitions in one segment to explore how they function together. Our prediction was if 6- and 8-month-old infants could remember the segments of the habituation sequences, then they would look longer at the novel compared to the familiar test trials, replicating and extending the Hespos et al. findings to more test stimuli that have longer segments consisting of events and transitions.

1.1. Method

1.1.1. Participants

The participants were 20 healthy, term infants, 11 female and 9 male in two age groups: 6 months ($n = 13$; range: 5 months, 19 days to 6 months, 16 days; $M = 6$ months, 0 days) and 8 months ($n = 7$; range: 7 months, 21 days to 8 months, 12 days; $M = 8$ months, 3 days). The infants were split between two habituation conditions, explained below. One additional infant was tested but eliminated because of inattentiveness.

Infants' names in this and the subsequent study were obtained from purchasing commercial mailing lists. The participants' parents were contacted with letters and follow-up phone calls. They were given a t-shirt or book as a thank-you gift but were not compensated monetarily for their participation. The ethnicity of the sample was 76% non-Hispanic, 21% Hispanic, 3% 'chose not to answer'. The racial make-up was 76% white, 2% Asian, 3% Black/African American, and 12% multiracial. The remaining 7% did not answer. The highest education level for the mothers of the children who participated was: 5% had a high school diploma, 14% had some college, 78% had a college degree or higher, and 3% did not answer. The highest education level for the fathers of the children who participated was: 3% had some high school, 1% had a high school diploma, 12% had some college, 81% had a college degree or higher, and 3% did not answer.

1.1.2. Apparatus

The apparatus consisted of a wooden display 213 cm high, 106 cm wide and 78 cm deep (see Fig. 1). The infants faced an opening that was 77 cm above the floor, 60 cm high, and 99 cm wide and 78 cm deep. Gray marbled contact paper covered the floor of the apparatus, and white cardboard covered the side walls. The back wall was made of cardboard that was orange and had 21 cm of cream-colored fringe covering the bottom portion to allow the experimenter to manipulate the objects on stage. There was a small hole centered in the front of the apparatus 5 cm below the stage floor where a small video camera was positioned to video the infant's face during trials. In the back wall of the stage, centered 41 cm above the apparatus floor, there was a small opening 3 cm high and 13 cm wide used by the experimenter to monitor his or her actions on the objects. The opening was cut through the back wall on the sides and bottom only, leaving the top attached to form a flap; this flap served as a visor and prevented eye contact between the infant and experimenter.

The ball used in trials was colorful with 6 sections of fabric of 3 different patterns. It also had a bell inside that made a subtle jingle sound as the ball was moved. There were three obstacles that the ball traversed. The box was made out of pink cardboard and was 14.5 cm × 14.5 cm × 14.5 cm and open on the top. The screen was

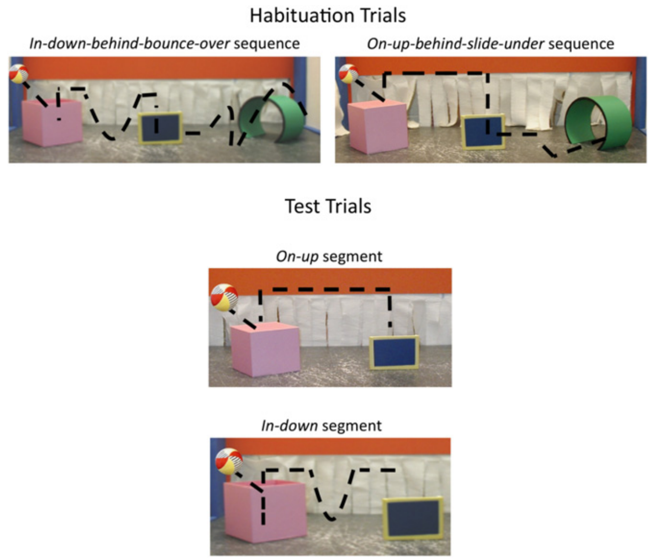

Fig. 1. Schematic of the habituation and test trials for Experiment 1. The ball was held by the experimenter's hand and traversed the path depicted by the black dashed line. The infants saw either the in-down-behind-bounce-over sequence or the on-up-behind-slide-under sequence during habituation trials. During test trials, all infants saw an alternation between the novel and familiar test segments.

made of blue foam core glued into an L-shape. The front portion was 10 cm tall and 12 cm wide and the edges were covered with yellow electric tape. The base was 5 cm deep. The bridge was made out of a piece of plastic pipe 16.5 cm in diameter and 10 cm long. There was a 12 cm portion cut out lengthwise so that the pipe formed a bridge when resting on the cut-out portion. The plastic pipe was covered with green contact paper and the edges were painted black.

Two white curtains extended from the front corners of the stage to the corners of the room behind the infants to isolate the infants from the experimental room. At the end of each trial, a board covered with red contact paper was lowered in front of the stage.

The video image of the infant's face was viewed by two research assistants in a separate room. The researchers pressed a computer button when the infant attended to the objects on stage and let go when the infant looked away. Looking times and habituation criterion were recorded using xhab software (Pinto, 1996).

1.1.3. Action sequences

In the *in-down-behind-bounce-over* habituation condition, infants saw a 24-s continuous sequence (*in*, *behind*, and *over* were the events and *down*, and *bounce* were the transitions). When the screen was raised the box, screen, and bridge were on the stage. At the start of the trial, the experimenter's left hand held the ball above and to the left of the pink box, it entered and exited above and to the right of the box (seconds 1–3). Then the ball continued in a U-shaped motion to the right until centered above the screen (seconds 3–5) then the ball went behind the screen and then came out the right of the screen (seconds 6–8). When the ball came out from the side of the screen, it performed an inverted-U-shaped bounce until it was in front of the bridge (seconds 8–10). Finally, the ball went over the bridge and touched down on the other side of the bridge (seconds 10–12). This action sequence was then repeated in the reverse order and the entire 24-s cycle was repeated until the computer signaled that the trial ended. The experimenters were trained to make the motion continuous and never pause as they went through the motions. To help the experimenter adhere to the script, a metronome beat softly once per second.

In the *on-up-behind-slide-under* habituation condition, infants saw the same action sequence described above with two novel events and two novel transitions. The events changed from *in* to *on* (we inverted the box to form a pedestal so that the ball was tapped on top) and *over* to *under* (the ball traversed under the bridge instead of over). Additionally, the transitions changed *down* became *up* (after the ball bounced on the box it remained on a linear and high path until it was above the screen) and *bounce* became *slide* (from the side of the screen the ball performed a 3-s, J-shaped slide along the stage floor until it was next to the side of the bridge.

After habituation trials, infants saw an alternation between novel and familiar test trials. The novel test trials consisted of a 5-s segment from the habituation condition that they did not see. The familiar test trial consisted of a 5-s segment from the habituation condition that they did see. For example, when habituated to *in-down-behind-bounce-over*, during test trials, an infant would see *on-up* (the novel test trial) followed by *in-down* (the familiar test trial). Like above the action sequence was then repeated in the reverse order and the entire 10-s cycle was repeated until the trial ended.

1.1.4. Design

The infants were habituated to one of two habituation conditions. All infants saw test trials which consisted of 5-s segments from each of the habituation conditions. The elegance of this design was that it capitalized on the fact that infants would react differently to identical test segments depending on what condition they saw in habituation—the test trial that is novel for one condition is the familiar test trial to the other condition. Furthermore we sampled 2 different test segments from each habituation trial and counterbalanced presentation across infants. In Fig. 1, we depict only the on-up and in-down segments for the sake of clarity but half of the infants within each habituation condition saw the slide-under and bounce-over segments of the sequence during test trials. These aspects of the design are consistent with the view that it is the habituation to the action sequences broadly defined (as opposed to some intrinsic preferences of the particular actions) that is responsible for the longer looking times at the novel compared to the familiar test trials.

1.1.5. Procedure

Prior to the experiment, each infant was shown the ball used in the experiment. During the experiment, the infant sat on the parent's lap in front of the apparatus. The parents were asked to refrain from interacting with their infant during the experiment, and to close their eyes during the test trials. All trials ended when the infant either looked away for 2 consecutive seconds after having looked at the event for at least 2 s, or looked at the event for 60 cumulative seconds without looking away for 2 consecutive seconds. The endings of the trials were determined by a computer, which then signaled the experimenter to lower the screen. The habituation criterion was at least a 50% decline in total looking duration from the first three to the last three habituation trials or a maximum of 9 trials. The average number of trials to reach criterion was 7. Infants who did not reach the habituation criterion were eliminated from the data analysis. Each infant viewed 6 test trials (3 familiar, 3 novel presented in alternation). The type of test event shown first was counterbalanced across infants. Interobserver agreement averaged 94% per trial per infant for this experiment.

Preliminary analyses revealed no significant effect of habituation condition, age, sex, or test trial order on the looking times of the infants; the data were therefore collapsed across these variables in subsequent analyses.

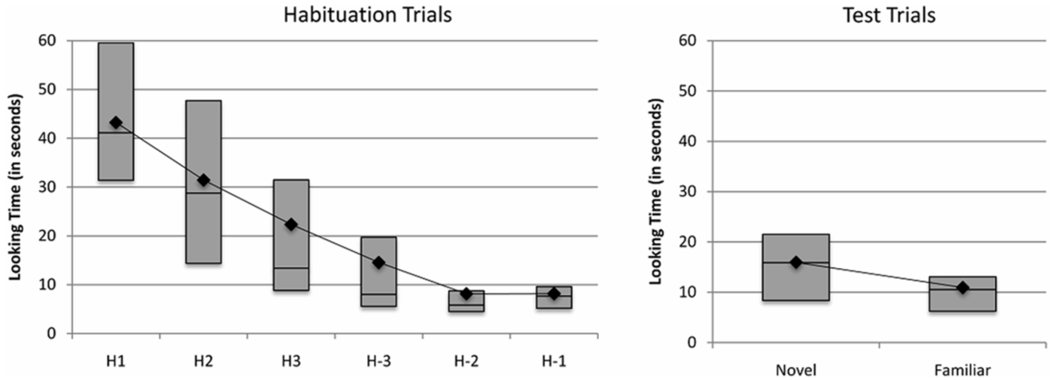

Fig. 2. Box plots showing mean looking times during the habituation and test trials in Experiment 1. For habituation, the graphs include results for the first three trials (H1, H2, H3) and the last three trials before the habituation criterion was met (H-3, H-2, H-1). Black diamonds represent means, the central line in each box is the median, and the upper and lower portions of each box represent the third and first quartiles, respectively.

1.2. Results

Infants looked significantly longer at novel compared to familiar test segments. Fig. 2 presents the mean looking times to the habituation as well as the novel and familiar test trials. The average looking times for the novel and familiar test trials were 15.94 s and 11.67 s, respectively. A repeated-measures analysis of variance (ANOVA) with trial type (novel or familiar) as a within-subject factor, indicated that this difference in novel and familiar looking times was significant $F(1, 19) = 7.211, p = 0.02, \eta^2 = 0.28$. Similarly, 15 of the 20 infants had longer looking times at the novel compared to the familiar test trials ($p = 0.021$, binomial comparison).

In further analyses we measured recovery after habituation by comparing the looking time of the last habituation trial to the first novel and familiar test trials. There was a significant recovery to the novel test trial, $t(19) = -3.029, p = 0.007$ but not to the familiar test trial $t(19) = -1.547, p = 0.138$. This finding suggests that infants dishabituated to the novel trials and generalized habituation to the familiar test trials.

1.3. Discussion

Experiment 1 demonstrated that infants were able to detect the novel test segment after habituation to a long action sequence. Infants generalized habituation to the familiar test segment and dishabituated to the novel one. These results provide converging evidence for the phenomena described in Hespos et al. (2009), demonstrating that the presentation of a longer target segment did not change infants' ability to detect the novel or familiar portions of the sequence that they saw during habituation. Because of the counterbalanced design (e.g., the target actions that were novel for half of the infants were the familiar actions for the other half of the infants) it seems unlikely that the preferences for the novel segments could be attributed to any low-level perceptual bias. There were no differences in performance based on age, sex, or type of habituation sequence. Taken together, these findings suggest that there is flexibility in infants' ability to recognize segments of a continuous action sequence.

2. Experiment 2

One could argue that the results from Experiment 1 are not that surprising because both the events and transitions were supporting the same outcome in that they were both novel or both familiar. However, the first experiment laid important groundwork for Experiment 2 where we crossed the novelty and familiarity of events and transitions against each other directly to see which one had more influence.[2] In this experiment, infants saw the same habituation trials as Experiment 1; the difference was that the test trials were a 5-s segment that consisted of: a novel event/familiar transition or a familiar event/novel transition. Our prediction was that if events are more salient than transitions then infants should look significantly longer at the novel event/familiar transition segment compared to the familiar event/novel transition segment and the novelty/familiarity of the transition would not make a difference in performance.

2.1. Method

2.1.1. Participants

The participants were 20 healthy, term infants, 12 female and 8 male in two age groups: 6 months ($n = 12$; range: 5 months, 18 days to 6 months, 9 days; $M = 6$ months, 0 days) and 8 months ($n = 8$; range: 7 months, 16 days to 8 months, 13 days; $M = 8$ months, 2 days). As in Experiment 1, the infants were split between two habituation conditions. Three additional infants were tested but eliminated 2 because of fussiness and 1 fell asleep during test trials.

2.1.2. Procedure

The apparatus, stimuli, design, procedure, and habituation trials were identical to Experiment 1. The only difference was the actions sequences during test trials (see Fig. 3). They consisted of either a *novel event* paired with a *familiar transition* or they had a *familiar event* paired with a *novel transition*. For example, when habituated to *in-down-behind-bounce-over*, during test trials, an infant would see *on-down* (the novel event/familiar transition trial) followed by *in-up* (the familiar event/novel transition trial).

The average number of trials to reach criterion was 7. Preliminary analyses revealed no significant effect of habituation condition, age, sex, or test trial order on the looking times of the infants; the data were therefore collapsed across these variables in subsequent analyses.

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2 We tried to an experiment that was an entirely repeated-measures design, presenting all four types of novel and familiar versions of events and transitions to a single participant. The outcome was that we had a dramatic increase in experimenter errors because the procedure was so complex and the pilot data suggested that we succeeded in confusing the infants as well. Consequently we retreated to the current between-subject design that resulted in happier research assistants and babies.

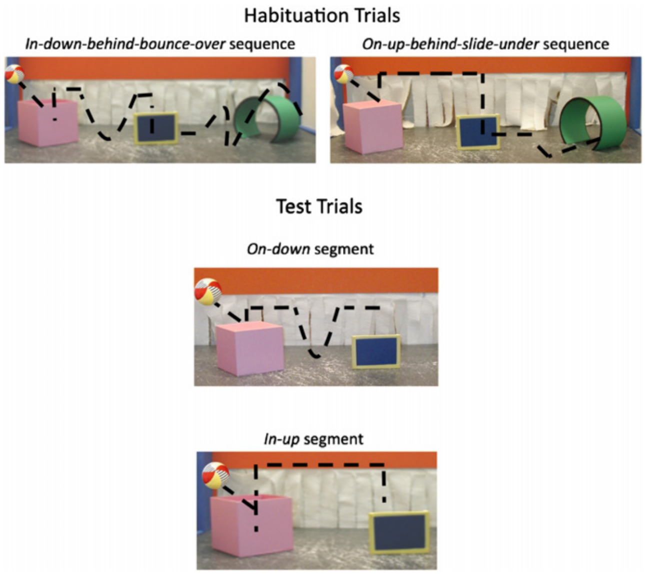

Fig. 3. Schematic of the habituation and test trials for Experiment 2. The ball was held by the experimenter's hand and traversed the path depicted by the black dashed line. Like Experiment 1, infants saw either the in-down-behind-bounce-over sequence or the on-up-behind-slide-under sequence during habituation trials. During test trials, all infants saw an alternation between the novel event/familiar transition and the familiar event/novel transition test segments.

2.2. Results

Infants looked significantly longer at test segments that contained novel event/familiar transition compared to familiar event/novel transition. Fig. 4 presents the mean looking times to the habituation as well as the test trials. The average looking time for the novel event/familiar transition and familiar event/novel transition test trials were 16.45 s and 11.68 s, respectively. A repeated-measures ANOVA with trial type (novel event/familiar transition or familiar event/novel transition) as a within-subject factor, indicated that this difference was significant $F(1, 19) = 4.269$, $p = 0.05$, $\eta^2 = 0.183$. The binomial comparison narrowly missed significance by one baby in that 13 out of 20 infants looked longer at the novel event/familiar transition trial ($p = 0.132$, binomial comparison).

In further analyses we measured the recovery from habituation by comparing the looking time for the last habituation trial to the first two test trials. There was a significant recovery to both types of test trials; the novel event/familiar transition test trial was $t(19) = -3.19$, $p = 0.005$ and the familiar event/novel transition test trial was $t(19) = -2.33$, $p = 0.031$. This finding suggests that infants detected the novel event as well as the novel transition because they dishabituated to both types of test trials.

Table 1
The mean looking times (in seconds) separated by condition.

		Transitions	
		Novel	Familiar
Events	Novel	15.94	16.45
	Familiar	11.68	10.94

Finally we combined the numbers from Experiments 1 and 2 to evaluate the relative contributions of novelty and familiarity of events and transitions (see Table 1). We did a univariate analysis with looking time as the dependent variable and event (novel or familiar) and transition (novel or familiar) as fixed factors. We found that there was a significant main effect for event ($F(1, 76) = 8.015$, $p = 0.006$) but there was no main effect for transition nor was there an interaction between event and transition (both $Fs < 1$). This analysis suggests that overall the novelty/familiarity of event was predictive of infants' behavior compared to transitions.

2.3. Discussion

The novelty of the events, not the transitions, predicted infants' performance in this experiment. Infants looked significantly longer at trials with the novel event/familiar transition compared to the familiar event/novel transition segments. This is not to suggest that infants never encoded transitions. The fact that the binomial comparison was only marginal indicates that the transitions may influence performance. In addition, it is clear that infants detected the novel transitions (as well as the novel events) because the recovery from habituation analysis demonstrated that infants dishabituated to both types of test trials. Together these findings suggest that infants encode events and transitions but that events are more salient than transitions. These findings go beyond previous research because they crossed the novelty/familiarity of events and transitions in a single context.

3. General discussion

Together these experiments shed new light on infants' action parsing abilities. In Experiment 1, we demonstrated that putting events and transitions together did not hinder detection of novel action segments. Combining these results with Hespos et al. (2009), infants detected novel segments when tested with events alone and events plus transitions, but not when tested with transitions alone. In Experiment 2, we contrasted the novelty/familiarity

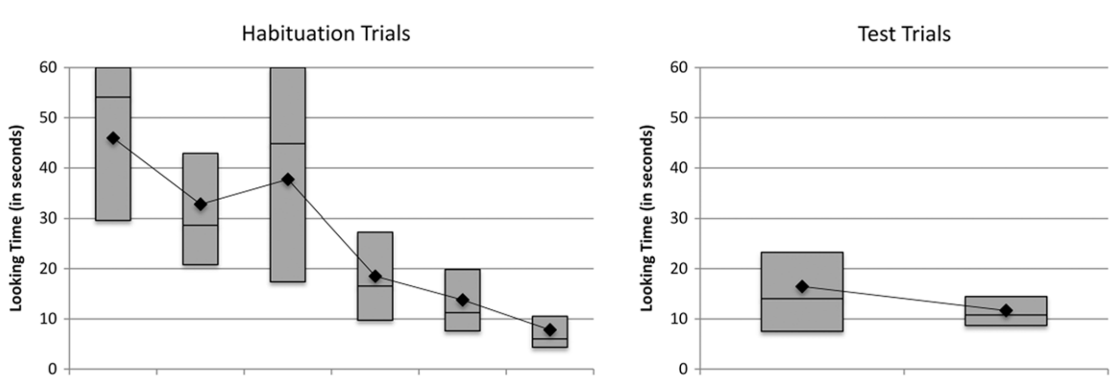

Fig. 4. Box plots showing mean looking times during the habituation and test trials in Experiment 2. For habituation, the graphs include results for the first three trials (H1, H2, H3) and the last three trials before the habituation criterion was met (H-3, H-2, H-1). Black diamonds represent means, the central line in each box is the median, and the upper and lower portions of each box represent the third and first quartiles, respectively.

of events and transitions directly and the data revealed that performance was predicted by events not transitions. We reiterate that infants do not ignore transitions altogether. In Experiment 2 infants dishabituated to novel transitions. Similarly in Experiment 3 of Hespos et al. (2009) we found that infants dishabituated to novel transitions is that context as well. Taken together, these findings comprise growing evidence that events are more salient than transitions.

These findings connect to the existing literature in three ways. First, we conclude that infants used their knowledge about objects to help them parse continuous human action at event boundaries. The repetition of these familiar events may help infants to establish unit boundaries in continuous sequences. This conclusion shares similarities with the adult literature on event segmentation. In the introduction we described research on adults' event segmentation with regard to course- and fine-grained boundaries. The relative salience of events over transitions supports a course-grained processing of the event because it incorporates causal relations like occlusion, support, and containment in segmenting the continuous events. However, fine-grained processing is also evident in the data because infants discriminated the novel from familiar transitions demonstrated by the recovery scores. Together, these findings suggest that the elements of multiple time-course processing and hierarchical organization may be evident early in infancy with regard to parsing continuous action sequences.

Second, there are parallels between parsing human actions and language processing. Baldwin and Baird (2001) described how both processes are unique to humans, universal within the human species, and emerge in a piecemeal fashion starting in early infancy. Like event segmentation, the speech stream is continuous without obvious breaks. A language acquisition study by Bortfeld, Morgan, Golinkoff, and Rathbun (2005) demonstrated that infant-directed speech tends to offer a small class of key words repeatedly (thus establishing familiarity) and in multiple positions (thus establishing unit boundaries) and that these qualities may contribute to infants success in learning how to parse the language into meaningful units. We see parallel roles of familiarity and boundaries in these experiments. The event categories of support, containment, etc. comprise a small class of key repeated events that are presented in multiple positions that in turn create boundaries that could promote segmentation.

Third, cross-linguistic studies demonstrate that languages vary in terms of the semantic structures used to describe events. For example, Talmy (1983) classified languages based on whether the language was path or manner biased. Wagner and Lakusta (2009) raised the question of whether prelinguistic infants' representations of motion events have a manner or path bias as proposed by Talmy and whether the broad semantic roles (e.g., source and goal) are evident in infants' event representations. The existing infant data suggest that there are biases evident by the time infants are nearing their first birthday. English has been characterized as a path-biased language (Talmy, 1983). Pruden, Hirsh-Pasek, Maguire, and Meyer (2004) showed that infants growing up in English-speaking families detect changes in path at 10 months but it is not until 13 months that they detect changes in manner. The action sequences presented in this paper do not map precisely onto the linguistic distinctions captured by path/manner. Nonetheless these data contribute to the ongoing debate about the origins of semantic structures by suggesting that these early characteristics are probably not coming from languages initially; it seems more likely that language capitalizes on pre-existing knowledge about how objects behave and interact and the ambient language influences these concepts as children acquire language (Hespos & Piccin, 2009; Hespos & Spelke, 2004).

The full story of how people learn to parse human actions into meaningful units is going to have influences from many inputs. What is new about these studies is that young infants are coming into the action parsing ability with flexibility and early knowledge about how objects behave and interact. Future studies will test the limits of the flexibility in an effort to better characterize the early capacities so that we will be in a better position to understand how influences like language change our event segmentation abilities.

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