The Origins of Snake and Spider Fear: How Infants Learn to Associate Evolutionary Fear-Relevant Stimuli and Paired Stimuli

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Abstract

Previous research has demonstrated that female infants are capable of learning paired associations between predatory and emotional stimuli that male infants do not learn (Rakison, in review). These findings come in conjunction with evidence pointing towards inherent evolutionary psychological learning mechanisms that allow for the rapid detection of, attending to, and learning about predatory animals that allow for the learning of fear and appropriate fear responses associated with these threats (Rakison & Derringer, 2008, Öhman & Mineka, 2001). Understanding how these learning mechanisms are constrained and develop is important in the path of research eventually leading to treatments and interventions of phobias. In this study, I examined whether female infants demonstrate differences in learning paired associations between predatory and arbitrary stimuli compared to males and whether motor experience would influence infants’ learning paired associations between predatory and emotional stimuli. Infants 11 and 7 to 5 months of age were habituated to these pairings and tested for learning through dishabituation.
The origins of snake and spider fear:

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The ability to survive is one of the greatest determining factors to whether or not an individual will pass on their genetic information. Naturally, because trial and error in interactions with potentially dangerous predators, such as snakes and spiders, could lead to rather deadly results, innate abilities to detect, orient, and learn about such dangers are extremely plausible and may have resulted from evolutionary selective pressures. In terms of the evolution of survival mechanisms, the ability to recognize recurring threats within the environment and learn to act in an appropriate manner toward them would be a favorable trait that would spread through the population, perhaps via genetics or social learning. A properly functioning mechanism of detection and learning fear for recurrent threats in infancy would serve a great benefit in preventing premature mortality, while over-exaggerated fear of threats could otherwise produce a harmful dysfunction in later life that we term as being a phobia. By determining the predictors and patterns early on that lead to severe phobic anxieties, it may be possible to produce interventions, treatment, and counseling to prevent their emergence.

All humans universally experience and express the emotion of fear as a signal of danger during certain situations that may be a potential threat to survival (LeDoux, 1996; Marks, 1987). Humans probably experienced numerous environmental threats throughout evolutionary history and would have benefited from the ability effectively to protect themselves from these experiences. Fear of snakes and spiders, which are both considered to be common threats to survival in early human history, are not thought to be innate characteristics in human and non-human primates, learned. Early studies of Watson and Rayner (1920) demonstrated that fear can
indeed be learned through conditioning, but threat relevant stimuli appear to more readily become objects of fear, supported by increasing evidence that fear arises from the presence of evolutionary psychological mechanisms which provide the ability to rapidly detect, attend to, and learn about predators (Rakison & Derringer, 2008, Öhman & Mineka, 2001).

Evidence of fear prevalence and response to snakes in non-human primates, comparable to humans, would suggest evolutionarily relevant explanations behind the development of fear perhaps related to genetic variation or differences in learning associations with predatory stimuli (Öhman & Mineka, 2003). Rhesus monkeys raised in the wild show strong fear responses to snakes, unlike their captive counterparts. Lab monkeys, found to not show initial fear responses to snakes, were easily able to learn fear of snakes through observations of live and videotaped wild monkeys demonstrating fear responses to not only live, but toy snakes (Cook & Mineka, 1990). However, these monkeys were not capable such substantial fear conditioning for non-threatening stimuli, like flowers and toy rabbits, though could still be trained to implement both these, as well as the predatory stimuli, as conditioned signals for food. This research supports constrained selective learning of fear with evolutionary threats.

Rakison and Derringer (2008) found evidence that human infants may possess evolved spider and snake detection mechanisms, based on perceptual templates, which may have aided in our early ancestors’ abilities to learn about and avoid these predators to ensure survival. In this study, preferential looking and habituation paradigms were used with 5-month-old infants to assess the perceptual template structures for spiders. It was demonstrated that infants showed preference to attending to schematic images of spiders, compared to template spiders with features reconfigured or completely scrambled, but did not show this preference with another biological, but non-threat-relevant stimuli, specifically a flower. It was also found that when
Infants were habituated to real colored static images of spiders, they generalized the real spiders to the schematic template but not the reconfigured and scrambled images, indicating that the perceptual preference for the schematic spider was not the product of a simple shape preference.

Adult humans and young children appear to possess a greater ability quickly to find evolutionary fear-relevant stimuli, such as snakes and spiders, amid non-fear-relevant stimuli, including flowers, mushrooms, frogs, and caterpillars, than the reverse of non-fear-relevant stimuli mixed with of fear-relevant stimuli (LoBue & DeLoache, 2008; Öhman, Flykt, & Esteves, 2001). Where Öhman, Flykt, and Esteves (2001) primarily studied adults' rapid detection of threatening stimuli hidden among non-threatening stimuli and showed that those who most fear the threatening stimuli, snakes, found them fastest, resent research has demonstrated that young children are also quite capable of this performing similarly in this task. In studies with children 3 to 5 years of age as well as adults, LoBue and DeLoache (2008) demonstrated that the young children were likewise able to more quickly detect threat-relevant stimuli, snakes, than non-threat-relevant stimuli hidden among the opposite stimuli on a touch screen. For greater support of this rapid detection mechanism, they were able to show that threat-relevant stimuli were more rapidly detected among non-threatening stimuli that were of both differing and similar physical appearance and properties, including flowers, frogs, and caterpillars. In combination with the findings of Rakison and Derringer (2008), the evidence for the existence of predator templates is strong, and be argued to serve as a facilitator learning of fear responses associated with the predator through the initial provision of rapid identification of the potential threat, thus aiding in survival.

There is significant variation in the intensity of fear and the methods through which fear leads to responses that provide defense against dangers. The response to fear-relevant stimuli
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often varies between individuals not only with each differing situation but also by gender (Fetchenhauer & Buunk, 2005). While men are often more likely to encounter threats to their survival that result in injury and death, women typically report greater fear towards such events. It is proposed that sexual selection created more risk taking tendencies in men, decreasing the extent of their fears, whereas women have favored more cautious strategies. Such caution would not only allow them to provide direct protection for their young, but would furthermore ensure women's survive, thus prolonging their ability to care for their young. As such, risk taking would be of a greater reproductive cost to women than men. The necessity to avoid risks and reasoning behind it could explain why over three times as many women as men list snakes as their object of most extreme fear or phobia (Fredrikson, Annas, Fischer, & Wik, 1996; Agras, Sylvester, & Oliveau, 1969).

Recent research suggests that there may indeed be differences in how male and female infants attend to and learn about threatening stimuli, like snakes and spiders (Rakison, under review). In this research with 11-month-old infants, association of facial expressions paired with images of recurrent threats, specifically snakes and spiders, and non-threats, specifically flowers and mushrooms, an often implemented control stimuli by Öhman, Mineka, and others (2001, Cook & Mineka, 1990), was studied. Infants were shown pairings threatening and non-threatening categories of pictures with stimuli consisting of positive and negative facial expressions. After infants were habituated to a member of either the threatening or nonthreatening category paired with one variation of facial expression, they were then presented with test trials of another member of that category as well as a member of the category to which they were not habituated, paired with the opposite facial expression. It was found that female infants learned the pairing of snakes and spiders with facial expression, but not of flowers and
mushrooms paired with facial expressions, while male infants learned neither of the pairings. It is apparent that infants’ perceptual templates for predatory animals allow for greater associative learning with faces in females than in males of the same age, but it thus specifically questioned whether female infants’ demonstrated stronger paired associative learning with predators are constrained to emotional paired stimuli or if females, who tend to have more phobias than males, simply more apt to learn any associations between predators and stimuli. One goal of the present study was to determine if the learning found in female infants was simply due to the pairings with emotional stimuli or if any and all associations might be learned. Specifically, I examined whether past results will carry over in learning associations of snakes and spiders paired with arbitrary stimuli, shapes, compared to flowers and mushrooms paired with arbitrary stimuli.

By 11 months, most infants have become capable of crawling. It is of interest to explore whether infants of similar ages who have reached or have yet to reach this self-locomotion milestone, typically between six to eight months of age, will demonstrate differences in predator learning. Similar effects for self-locomotion have been found for a variety of infant behaviors in which infants learning patterns change with crawling experience (Cicchino & Rakison, 2008; Bertenthal, Campos, & Caplovitz, 1983). Fears for such dangers as heights and drop-offs, as well as fear of strangers and more specifically human males, develop during the same frame of time in which infants gain the ability to crawl (Scarr & Salapatek, 1970, Ainsworth, Blehar, Waters, & Wall, 1960). Theoretically, infants who are capable of crawling are and were more likely to come into contact with potentially dangerous situations as they become more independent of their mothers and have the ability to explore their environment. Those who have reached the milestone of self-locomotion would be in greater need of quickly and efficiently detecting and learning about these recurrent threats. An infant who is capable of autonomously exploring their
surroundings will have a greater likelihood of encountering the threat of a snake or spider than when they remain protected by the guard of their parent. The present study aimed to track if infants’ paired associative learning is dependent on an infant’s crawling status.

There is little research indicating whether sex differences will carry over into paired non-emotional, arbitrary stimuli, if learning patterns are found more so in those who are capable of self-locomotion, and whether the results will demonstrate a connection between phobias later in life. Infants of seven to nine months and eleven months of age were tested.

**Experiment 1**

This first experiment was designed to address the questions left by the results in previous research by Rakison (in review). With it being found that female infants learned pairings between predatory stimuli and facial stimuli that males did not learn it is important to investigate whether this gender difference will carry over to associations of all variations of pairings between predatory stimuli and other stimuli. To do so, I sought to determine if learning would occur in 11-month-olds when predatory stimuli were paired with arbitrary stimuli of no particular evolutionary relevance.

**Methods**

**Participants.**

Participants were 15 health-term infants of 11 months of age (mean: 11 months 7 days, range: 10 months 25 days to 11 months 19 days). There were 8 female and 7 male infants tested. Additionally, 9 infants were tested but were excluded from analysis due to (5) fussiness and (4) experimenter error. Majority of the infants were Caucasian and of middle socioeconomic status, recruited via a purchased database of births in the Pittsburgh area.
Design and Procedure.

The habituation model with Habit X 1.0 used by Cohen and Oakes (1993) was implemented in this study, with stimulus being created with Macromedia Director 8.0 for PC. Infants sat on their parent’s lap facing a television monitor (size: 14 in. x 24 in.; distance: 24 in.). The parent was instructed not to talk to their child or point at the computer screen. An attention-getting stimulus comprised of an expanding and contracting green circle on a black background flashing with a synchronized bell sound, drew the infant’s focus to the screen before the infant was presented with each trial. The infant’s look times through all trials were coded by an experimenter watching on a computer screen connected via video line to a camera behind the screen presenting the stimulus to the infant. Coding occurred through the press and release of pre-selected keyboard strokes.

To ensure that there was not an a-priori preference for one stimulus type, prior to habituation, infants were first presented with trials of a static image of a threatening stimuli type (snakes or spiders, as seen in Figure 1 and 2) and a non-threatening stimuli type (flowers or mushrooms, as seen in Figure 3 and 4) in counterbalanced order. After this, the infant saw a static color image of another member of their assigned threatening stimuli category for five seconds, followed by, directly to the side of the image, either an arbitrary stimulus of a static red circle or blue square shape, as seen in Figure 5. Each paired stimulus trial continued until the infant looked away for more than one second or maintained looking for twenty seconds. The same paired stimulus remained throughout the habituation trials until the participant was judged to have habituated. The entire habituation phase continued until the sum of last three trials of infant’s look time was measured to be fifty percent of the first three trials or a total of sixteen trials were reached, after which followed the test phase. Infants were then presented with a test
phase to track learning through dishabituation, signaled by significantly increased looking time for new predator stimuli pairings. During the test phase, infants were presented with an image of the original threatening and non-threatening stimuli first shown in the pretest trial now each paired with the colored shape not shown during the habituation trials.

Figure 1. Predator stimuli from trials: Snakes.

Figure 2. Predator stimuli from trials: Spiders.

Figure 3. Non-predator stimuli from trials: Flowers.

Figure 4. Non-predator stimuli from trials: Mushrooms.
Results

It was predicted that if female infants’ increased learning, compared to males, of paired associations between predatory and emotional stimuli carry over to pairings with arbitrary stimuli, they will look longer when a new arbitrary stimulus is paired with the threatening type image during test trials than male infants. It was also possible that the results for female infants learning paired associations with predators and emotional stimuli would not carry over with non-emotional stimuli, which would indicate a constraint on learning predator associations.

Examination of infants’ looking times during test trials was conducted, comparing differences in response to predatory and non-predatory stimuli paired with shapes by females and males. The visual fixation times from both sexes were analyzed by imputing the data into a 2 (sex: female vs. male) x 2 (test trial: predator vs. non-predator) analysis of variance (ANOVA). This analysis revealed that between the two sexes, for predator and non-predator trials there were no significant differences in looking time between females (Predator: $M = 5.10$ s, $SD = 2.64$ s; Non-predator: $M = 4.53$, $SD = 2.14$ s) and males (Predator: $M = 6.90$ s, $SD = 4.71$ s; Non-predator: $M = 7.79$ s, $SD = 5.96$ s) across the two test trials, $F(1,13) = 0.41$, $p = 0.53$. In combining both female and male data to main effect of trial type, there were similarly no significant differences in looking time between the predator and non-predator test trials, $F(1,13) = 0.02$, $p = 0.89$. 
Discussion

Results imply that findings from Rakison (under review), regarding female infants’ superior learning of paired associations between predatory and emotional stimuli compared to males, do not hold when predatory stimuli are paired with arbitrary stimuli, in this case shapes. Females in this present study did not demonstrate looking time significantly longer than male infants for paired predatory stimuli with shapes, nor did they look longer at predatory pairings than non-predatory pairings. This would suggest that learning associations with predatory stimuli might be constrained to pairings with relevant emotional stimuli that would cue infants on the appropriate reaction towards a present threat rather than having an improved learning any arbitrary pairing of no specific consequence. Such a constraint might prove beneficial in that it would avoid increased attention on learning any number of irrelevant associations with a threat while assuring that the most important associations, those of suitable reactions to the threat, would be learned to ensure that interactions and actions conducive to survival are produced.

Experiment 2

As noted, infants who are capable of crawling have been found to develop changes in the way they learn through their new motor experience, and begin to develop other evolutionarily relevant fears (Cicchino & Rakison, 2008; Bertenthal, Campos, & Caplovitz, 1983, Scarr & Salapatek, 1970, Ainsworth, Blehar, Waters, & Wall, 1960). In this study, I aimed to determine whether crawling status in 7- through 9-month-olds, particularly in female infants who were previously found to be responsive at a later age in the same task, would demonstrate increased learning of associations of predatory and emotional paired stimuli.
Methods

Participants.

Participants were 21 health-term infants 7 and 9 months of age. Of these infants, 13 were not capable of crawling (mean: 7 months 16 days, range: 7 months 4 days to 9 months 10 days) including 7 females and 6 males, and 8 were capable of crawling (mean: 7 months 24 days, range: 6 months 19 days to 9 months 7 days) including 5 females and 3 males. Additionally, 6 infants were tested but were excluded from analysis due to (4) fussiness and (2) experimenter error. Majority of the infants were Caucasian and of middle socioeconomic status, recruited via a purchased database of births in the Pittsburgh area.

Design and Procedure.

Experiment 2 followed a procedure similar to Experiment 1 except that the threatening and non threatening stimuli in the habituation and test trials were paired with an emotional stimulus of a positive or negative emotive face instead of shapes, as seen in Figure 6). Prior to beginning the study, parents were asked to complete selected questions of the Motor Development Questionnaire (see Appendix A, based on Frankel, Campos, & Anderson, 2005) to ascertain whether the infant was capable of crawling.

Figure 5. Emotional Paired Stimuli: Faces.
Results

It was predicted that infants who are capable of crawling will have an increased implementation of the previously recognized threat detection mechanism as a learning device with predatory animals and will more look longer when a new stimulus is paired with the threatening type image, compared to non-crawling infants. It can likewise be predicted from previous research that female infants will look longer when a new stimulus is paired with a threatening type image, than male infants. In consideration of past research, one might expect crawling females to perhaps demonstrate results similar to 11-month-old female infants from previous research by Rakison (under review).

Examination of infants’ looking times during test trials was conducted, comparing differences in response to predatory and non-predatory stimuli paired with faces by females and males based on crawling status. The visual fixation times from both genders were analyzed by imputing the data into a 2 (gender: female vs. male) x 2 (crawling status: crawling vs. non-crawling) x 2 (test trial: predator vs. non-predator) analysis of variance (ANOVA). This analysis revealed that for the interaction of gender and crawling status, for predator and non-predator trials there were no significant differences in looking time between non-crawling females (Predator: \( M = 10.47\) s, \( SD = 6.23\) s; Non-predator: \( M = 8.23\), \( SD = 6.49\) s), crawling females (Predator: \( M = 5.48\) s, \( SD = 4.41\) s; Non-predator: \( M = 6.50\), \( SD = 6.29\) s), non-crawling males (Predator: \( M = 5.75\) s, \( SD = 4.77\) s; Non-predator: \( M = 6.70\) s, \( SD = 6.57\) s), and crawling males (Predator: \( M = 9.33\) s, \( SD = 2.63\) s; Non-predator: \( M = 14.60\) s, \( SD = 4.53\) s) across the two test trials, \( F(1,17) = 0.33, p = 0.86\). Tests on the main effect of gender and crawling status independently for predator and non-predator trials likewise demonstrated no significant differences in looking time, respectively \( F(1,17) = 1.65, p = 0.22\) and \( F(1,17) = 1.72, p = 0.21\). In
combining the data of all participants to assess main effect of trial type, there were likewise no significant differences in looking time between the predator and non-predator test trials, $F(1,17) = 0.74, p = 0.40$.

**Discussion**

With the current data, it can be suggested that crawling status does not influence infants’ learning of associations between paired predatory and emotional stimuli. The limited number of infants within each gender-crawling category, however, would indicate that this study is working with partial data, suggesting that more crawling infants need to be tested in order to yield accurate results. Should these results remain upon the testing of further infants capable of crawling, finding no significant difference between crawling female infants and the other three groups, then it is possible that infants simply need more motor experience, which they acquire by 11 months of age, before they begin using social learning in associations with predatory stimuli. It might be suggested to test infants who are of primarily 9 months of age and have had experience crawling to assess whether after increased self-locomotion experience female infants begin showing the learning patterns that were not found with the present group of 7 to 9 month olds.

**General Discussion**

The present studies aimed to determine constraints and motor development impact on infants’ learning of stimuli paired with predatory stimuli. An important measure of assessment was in regards to whether prior findings of females and not males learning pairings of emotional stimuli with predatory stimuli would likewise carry over when predatory stimuli were paired with arbitrary stimuli. Further, it was of interest to investigate whether an infant’s self-
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locomotion capabilities would have any effect on their learning of associations of predatory and emotional stimuli. The present research suggests that infants, and more specifically female infants, are constrained to learning pairings that have evolutionary relevance, as is the case with predatory and emotional stimuli pairings, as opposed to arbitrary pairings such as predator stimuli paired with shapes. It was likewise found that with the partial data available, crawling infants, and in particular crawling females, had not begun to demonstrate differences in leaning at the tested age range of 7 to 9 months of age that were previously found in 11-month-old females.

These experiments have provided some possible solutions to questions from recent research while pushing the boundaries of what we about how infants learn fear of predatory animals. The present research leaves us to question the extent and characteristics of constraints on associative learning of paired predator and emotional stimuli and just how much females and males differ in the way they learn about potential threats to their survival. With the possibility that infants can focus their learning related to predatory stimuli specifically with relevant stimuli as opposed to other random stimuli in their environment, a highly efficient psychological model can be suggested. It would be of interest to explore what variations of stimuli similar to emotional stimuli could likewise produce the previously demonstrated learning in female infants of associations of predatory and emotional paired stimuli. One could perhaps investigate whether any variety of biological stimuli of evolutionary importance paired with predatory stimuli would elicit similar learning patterns in infants or if the learning is constrained specifically by emotional facial reactions.

Of further importance is investigation into how motor experience leads to changes in learning fear of threat relevant stimuli. With current data not providing necessarily accurate
information in regards to the effect of crawling status on female infants' learning, it is difficult to indicate whether the milestone of crawling does lead to changes in how the infant learns about predatory animals and fear. There is the possibility that the present direction of the data will hold, showing that younger, less experienced crawling female infants do not have increased learning capacity compared to males and those who do not crawl. In this case, it may be of importance to conduct research with slightly more experienced female crawlers to begin finding affects similar to 11-month-olds in learning associations found by Rakison (in review).

With the conclusion of this particular set of studies, it is of importance to begin follow up with other infants from the past Rakison (in review) study to delve into whether predictions can be made early in infancy to determine whether those who have particularly high level of associative fear-relevant learning will later in childhood begin to show stronger phobic tendencies. It has been proposed that by age two, children begin to demonstrate significant physical fear of snakes and spiders, thus allowing at this time for further analysis to be conducted with past participants (Buss & Kiel, 2004). As noted, by Öhman, Flykt, and Esteves (2001), those who showed the most fear tended to detect threatening stimuli more quickly. While connections have not yet been made in regards to pace of learning and the extent of fear as compared to detection speed and extent of fear, the possibility of such a finding is deserving of research. With increases in research in terms of how infants learn fear of predators, further ground can be made on improving treatments and interventions for those who suffer from phobias of these threats, while continuing to expand our knowledge of our evolutionary history.
References


Rakison, D. H. (under review). Does women’s greater fear of snakes and spiders originate in infancy?


Appendix

Appendix A: Motor Development Questionnaire

MOTOR DEVELOPMENT QUESTIONNAIRE

Baby’s Birth Date_______________   Today’s Date_____________

We’d like to learn a little bit about your baby’s motor development. Please answer every question. (Many of your answers may be “Not Yet”.) Several of the questions ask you to tell us when your baby started doing something: Early, Mid or Late in which Month. Many parents find it easier to do if they remember some other event that occurred around the same time, for example, Just before my mother’s birthday, The week before Thanksgiving, or the like. If you happen to know the exact date, for example, because you wrote it down at the time, please write that in instead. Thank you for being as accurate as you can.

Sleeping: What percent of the time does your baby sleep: On the back____%, On the tummy____%, On the side____%

- Not Yet
- Early
- Mid ______________
- Late (month)

Sitting: Has your baby started to sit for 30 or more seconds unsupported? Since ________________

- Never
- Early
- Mid ______________
- Late (month)

Exersaucer: Has your baby ever used an exersaucer? Starting ________________

At the peak of her or his enjoyment of the exersaucer, most days of the week, my baby is/was in the exersaucer:

- 0 weeks
- ½ week
- 1 week
- 1½ weeks
- 2 weeks
- More than 2 hours per day, most days
- 30 minutes to 1 hour per day, most days
- 15 - 30 minutes per day, most days
- 1 - 15 minute per day, most days

That peak of enjoyment of being in the exersaucer (has) lasted:

- Never
- Early
- Mid ______________
- Late (month)
- 1½ weeks
- 2 weeks
- More than 2 hours per day, most days
- 30 minutes to 1 hour per day, most days
- 15 - 30 minutes per day, most days
- 1 - 15 minute per day, most days

Walker: Has your baby ever used a walker? Starting ________________

At the peak of her or his enjoyment of the walker, most days of the week, my baby is/was in the walker:

- 0 weeks
- ½ week
- 1 week
- 1½ weeks
- 2 weeks
- More than 2 hours per day, most days
- 30 minutes to 1 hour per day, most days
- 15 - 30 minutes per day, most days
- 1 - 15 minute per day, most days

That peak of enjoyment of being in the walker (has) lasted:

- Never
- Early
- Mid ______________
- Late (month)
- 1½ weeks
- 2 weeks
- More than 2 hours per day, most days
- 30 minutes to 1 hour per day, most days
- 15 - 30 minutes per day, most days
- 1 - 15 minute per day, most days

Adult-Supported Walking: Does your baby grab an adult’s or an older child’s fingers/hands to walk upright (that is, your baby first grabs onto your hands, and then maybe you grab back to give extra support)? Starting ________________

- Never
- Early
- Mid ______________
- Late (month)
- Rarely
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At its peak, my baby grabbed/grabs on to walk like this:  

- Every two to three days
- Once or twice a day, most days
- Several times a day, most days

That peak of enjoyment of adult-supported walking (has) lasted:  

- 0 weeks
- 1 week
- 2 weeks
- 3 weeks
- 4 weeks
- Longer ____________________ (how long)

**Belly (‘commando’) Crawling:** Has your baby started crawling WITH his/her belly touching the floor?  

- Not Yet / Never
- Early
- Late (month)

Has your baby started belly crawling, for a distance of at least twice her or his own length? Since  

- Not Yet / Never
- Early
- Mid ________________
- Late (month)

**Hands & Knees Crawling:** Has your baby started crawling on hands and knees, WITHOUT his/her belly touching the floor?  

- Not Yet / Never
- Early
- Mid ________________
- Late (month)

Has your baby started crawling on hands and knees, for a distance of at least twice her or his own length? Since  

- Not Yet / Never
- Early
- Mid ________________
- Late (month)

**Rolling:** Has your baby started rolling?  

- Not Yet / Never
- Early
- Mid ________________
- Late (month)

Has your baby started rolling, for a distance of at least twice her or his own length? Since  

- Not Yet / Never
- Early
- Mid ________________
- Late (month)

**Scooting:** Does your baby scoot? (sitting up and dragging her or his butt)?  

- Not Yet / Never
- Early
- Mid ________________
- Late (month)

Does your baby scoot (sitting up and dragging her or his own butt), for a distance of at least twice her or his own length? Since  

- Not Yet / Never
- Early
- Mid ________________
- Late (month)

**Other Non-Upright Moving About:** If your baby is/was most commonly moving around in one or more ways that are **not** walking on two feet, and also **not** crawling, rolling, or scooting, which is the way of moving about your baby most commonly uses/used?  

- Not Yet Moving Around
- Crab-Walking
- Other ____________________________________________

When did your baby begin moving this way? Please specify for all kinds of movement checked off above.  

- Not Yet / Never
- Early
- Mid ________________
- Late (month)

Type of movement: _____________________ Since  

- Not Yet / Never
- Early
- Mid ________________
- Late (month)
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Does/did your baby move this way for a distance of at least twice her or his own length?

- Not Yet/Never
- Early
- Late (month)

Type of movement: _____________________ Since Mid _____________ Late (month)

Crawling Down One Step: Has your baby started to crawl down a single step of about 6 inches or less, for example:
- off of a step platform for aerobic exercise,
- off of a mattress or thick cushions on the floor,
- through doorways where the floor on one side is lower than the other by 6” or less,
- down very wide steps where your baby crawls completely down onto one step before crawling down onto the next step,
- or the like? Since Mid ___________ Late (month)

Pull-Up to Standing: Has your baby started using furniture to pull-up to standing? Since Mid ___________ Late (month)

Getting Down from Standing: Has your baby started getting down from standing instead of just falling, by climbing down, or by reaching for the floor before letting go with the hand that’s holding on? Since Mid ___________ Late (month)

“Cruising”: Has your baby started walking by moving upright on two feet among furniture and walls that she or he holds onto, for at least 3 steps at a time? Since Mid ___________ Late (month)

Free Standing: Has your baby started standing without holding onto anything/anyone, for at least 2 seconds at a time? Since Mid ___________ Late (month)

Walking: Has your baby started walking without holding onto anything/anyone, for at least 3 steps at a time? Since Mid ___________ Late (month)