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Does Temperament Underlie Infant Novel Food Responses?: Continuity of Approach–Withdrawal From 6 to 18 Months

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Abstract

This study investigated whether temperamental approach–withdrawal underlies infants' responses to novel foods. Data were drawn from a longitudinal study of mother-infant dyads ($n = 136$). Approach–withdrawal responses to novel foods and novel toys were coded when infants were 6 and 12 months of age. When infants were 18 months of age, approach–withdrawal behaviors, positive affect, and negative affect were used in a latent profile analysis to identify groups of toddlers who exhibited similar responses to novelty. As predicted, novel food and novel toy responses were concurrently associated at 12 months and followed a similar developmental pattern across the 1st year. Furthermore, novel food acceptance at 12 months of age, but not 6 months, predicted greater toddler approach.

Approach–withdrawal processes underlie individual differences in infants' responses to novel or unfamiliar stimuli. Infants predisposed to respond with approach behaviors are likely to show positive affect and physically move toward novel stimuli, whereas infants predisposed to respond with withdrawal behaviors are likely to show negative affect and move away from the same stimuli (Fox & Henderson, 1999; Rothbart & Bates, 2006). Individual differences in infants' approach–withdrawal tendencies are considered to be a reflection of infant temperament and have been extensively examined in response to new toys, new people, and new situations (Kagan, Snidman, & Arcus, 1998; Putnam & Stifter, 2002). However, novel foods have rarely been examined as another type of stimulus that may elicit approach–withdrawal responses. Furthermore, infants' reactions to novel toys and objects have been examined as predictors of later temperamental style (Putnam & Stifter, 2005), but responses to novel foods have not been considered. Thus, the goal of this study was to investigate whether infants' approach–withdrawal tendencies were associated with responses to novel foods. We addressed this goal in three ways: (a) by examining the concurrent associations between infants' approach–withdrawal responses to novel toys and their responses to novel foods, (b) by investigating the developmental patterns of responses to novel toys and novel foods in the 1st year of life, and (c) by examining whether infants'

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responses to novel foods predicted their approach–withdrawal behaviors and temperamental style during toddlerhood.

Prior research has established that approach–withdrawal processes drive infants' responses to novel toys (Putnam & Stifter, 2002; Rothbart, 1988), but there are several reasons to believe that approach–withdrawal processes may also relate to infants' responses to novel foods. First, infants' reactions to novel toys and foods appear to follow a similar pattern of development across the 1st year of life. Research on infants' reactions to novel objects has established that young infants, before approximately 9 months of age, approach novel objects with little hesitation. Their latencies to grasp for objects do not vary according to the familiarity or intensity of the object (Putnam & Stifter, 2002; Rothbart, 1988; Schaffer, Greenwood, & Parry, 1972). However, in the second half of the 1st year of life, infants develop the ability to inhibit their approach tendencies and may hesitate when exposed to novelty. Both Rothbart (1988) and Putnam and Stifter (2002) showed that after this emergence of inhibited approach, infants continue to reach quickly toward low-intensity toys but tend to hesitate before reaching toward high-intensity toys. This hesitation during later infancy indicates the emerging ability to select an appropriate response to novelty, such as approach or avoidance, which is not present during early infancy (Putnam & Stifter, 2002; Rothbart, 1988; Schaffer et al., 1972), likely because this ability is more adaptive once infants become mobile and capable of avoiding danger (Campos, Barrett, Lamb, Goldsmith, & Stenberg, 1983).

A similar developmental pattern of hesitation in response to novelty during later infancy has been proposed in the feeding literature. Many researchers believe that food neophobia, or the tendency to avoid or reject new foods, emerges in the second half of the 1st year of life as infants transition to solid foods. This tendency is believed to develop in order to protect infants from ingesting toxic substances (Birch, Gunder, Grimm-Thomas, & Laing, 1998; Dovey, Staples, Gibson, & Halford, 2008). Thus, minimal neophobic tendencies during early infancy may be adaptive because parents control their infants' access to foods during this time, whereas stronger neophobic tendencies may be necessary once infants become more mobile, independent, and at risk for the possibility of ingesting foods that are not monitored by parents (Birch et al., 1998). Empirical work by Mennella and Beauchamp (1996) and Mennella, Lukasewycz, Castor, and Beauchamp (2011) seems to support this pattern of development. Infants younger than 4 months of age were more accepting of a bitter, protein hydrolysate formula compared to 7- to 8-month-old infants in a randomized controlled trial. These results seem to suggest the emergence of food neophobia in later infancy or a possible sensitive window for acceptance of new flavors during early infancy. Furthermore, these results and the proposed timing for the development of food neophobia also seem to parallel the emergence of inhibited approach: Both food neophobia and inhibited approach emerge as infants begin self-locomotion in the second half of the 1st year of life (Birch et al., 1998; Campos et al., 1983; Putnam & Stifter, 2002).

Recent studies have also supported the idea that approach–withdrawal responses may underlie reactions to novel foods by directly relating the temperament dimension of approach to infants' responses to novel foods. Forestell and Mennella (2012) showed that when controlling for past exposure to vegetables, higher scores on temperamental approach in 4- to 9-month-old infants were related to greater consumption of a novel vegetable (green beans), a longer duration of feeding, fewer lip raises and nose wrinkles while eating the food, and higher ratings by the mother on how much she thought her infant liked the food. Similarly, Moding, Birch, and Stifter (2014) found that high-approach infants, as rated by their mothers, showed more positive or neutral facial expressions when tasting a novel food, hummus, or cottage cheese, on the first offer compared to low-approach infants at 12 months of age. However, low-approach infants showed fewer rejection behaviors, such as swatting the spoon and crying or fussing, in response to the later offers of food when they had previous exposure to more solid foods. Both studies show that temperamental approach is associated with infants' responses to new foods, but the infants' feeding history may modify initial tendencies to approach or withdraw.

Although the studies conducted by Forestell and Mennella (2012) and Moding et al. (2014) suggest that temperamental approach is related to infants' responses to novel foods starting at 4 months of age, both were cross-sectional, thus developmental differences in infants' responses to novel foods across the 1st year of life could not be examined. It remains unclear whether infants respond differently to novel foods, as with novel objects, before and after the emergence of inhibited approach. The present longitudinal study addressed this gap in the research by investigating the associations between infants' responses to novel toys and foods at 6 and 12 months of age, as well as the developmental pattern of these responses.

Continuity of Approach–Withdrawal

Prior research has established that approach–withdrawal responses during the 1st year of life are somewhat stable into toddlerhood (Degnan et al., 2011; Fox, Henderson, Rubin, Calkins, & Schmidt, 2001; Putnam & Stifter, 2005). For example, one study revealed that high levels of approach (i.e., smiling and positive motor behaviors) in response to unfamiliar and unpredictable stimuli at 9 months of age predicted temperamental exuberance, characterized by approach behaviors, high positive affect, and sociability at 24 months of age (Degnan et al., 2011). Putnam and Stifter (2005) showed that infants who quickly approached high-intensity toys also exhibited high levels of approach during both low- and high-intensity novel tasks at 24 months of age. Furthermore, infants' responses to the high-intensity toys also predicted their toddler temperament group classifications. These temperament groups were created using a person-centered approach which classified toddlers into groups based on their variations in positive affect, negative affect, and approach–withdrawal behaviors across a variety of novel tasks. The toddlers classified as exuberant based on their high approach and positive affect had reached more quickly toward the high-intensity toys at 12 months of age compared to toddlers classified as inhibited based on their low-approach and high negative affect. Importantly, there were no differences between the exuberant and inhibited temperament groups on their latencies to reach for toys at 6 months of age.

The studies by Degnan et al. (2011) and Putnam and Stifter (2005) have two important implications for the present study. First, these studies suggest that infants' approach–withdrawal behaviors in response to novelty are somewhat stable into toddlerhood. However, there is no existing research examining whether infants' responses to novel foods are associated with their later approach–withdrawal behaviors. The present study will address this point by examining infants' responses to novel food as a predictor of their approach–withdrawal behaviors and resulting temperament group classifications at 18 months of age. Second, the study by Putnam and Stifter also suggests that responses to novelty during later infancy may be more predictive of temperamental style in toddlerhood than responses to novelty during early infancy due to the emergence of inhibited approach. Based on these results, infants' responses to novel foods at 12 months, but not 6 months, were expected to predict toddler approach–withdrawal and temperamental style in the present study.

Finally, previous research also suggests that parenting may play a role in infants' concurrent approach–withdrawal behaviors, as well as the development and continuity of these behaviors over time. For example, Crockenberg and Leerkes (2004) found greater maternal contingent responsiveness to relate to less infant distress concurrently during a highly intense, novel toy task. However, other studies have shown mixed results. Hane and Fox (2006) showed that greater sensitivity during routine parenting contexts, such as feeding, at infant age 4 months, was associated with less negative affect in response to a fear-eliciting masks task at 9 months of age. Kiel and Buss (2012) showed that maternal protective behavior, or comforting and shielding the child, when their toddlers were exposed to a novel stimulus was associated with greater reports of child inhibited behavior at age 3. Although this group of studies presents somewhat mixed results, these studies suggest that parenting may have differential effects on child approach–withdrawal outcomes depending on the specific parenting behaviors measured (i.e., sensitivity vs. comforting behaviors) and the context in which they are examined (i.e., routine vs. novel contexts). Because infant responses to novelty were examined within a dyadic interaction and maternal behaviors during novel contexts have been associated with infants' responses to novelty, in the present study maternal behaviors were controlled for in the analyses so that the associations between infants' approach–withdrawal behaviors across contexts and over time could be examined.

The Present Study

The overall goal of the present study was to investigate whether infants' approach–withdrawal tendencies are associated with their responses to novel foods. We addressed this goal in three ways. First, we examined whether infants' responses to novel foods were related to their concurrent tendency to approach or withdraw in response to novel toys at 6 and 12 months of age. Although there is limited research on novel food as another context that may elicit approach–withdrawal responses, recent studies have shown a link between reactions to novel foods and temperamental approach during infancy (Forestell & Mennella, 2012; Moding et al., 2014). Based on these findings, infants' responses to the novel toys were hypothesized to be associated with their responses to the novel foods concurrently cd at 6 and 12 months of age. Infants who showed high approach in response to novel toys were also expected to show greater acceptance of the novel foods.

Second, we explored whether infants' responses to novel toys and novel foods in the present study followed the pattern established in the literature for the development of inhibited approach (Putnam & Stifter, 2002; Rothbart, 1988). As infants tend to be more approaching of novelty before the emergence of inhibited approach in the second half of the 1st year of life, we expected infants in the present study to show greater approach in response to the novel toys and foods at 6 months compared to 12 months of age.

Third, we investigated whether infants' responses to novel foods could predict their later approach–withdrawal behaviors and temperament group classification during toddlerhood. Existing evidence has revealed that responses to unfamiliar toys during infancy can predict later responses to novelty and temperament group classifications (Degnan et al., 2011; Putnam & Stifter, 2005), but no previous research has explored whether responses to novel foods predict later approach–withdrawal behaviors and temperamental style. However, if responses to novel foods are associated with approach–withdrawal behaviors, it is likely that reactions to novel foods during infancy will also predict toddler approach–withdrawal. Thus, reactions to novel foods were hypothesized to predict toddlers' approach–withdrawal, positive affect, and negative affect in response to novelty and their resulting temperament group classifications at 18 months of age. Infants who responded with high acceptance to the novel foods were also expected to have a greater likelihood of membership in the exuberant group (i.e., more approaching of novelty, high positive affect, low negative affect) during toddlerhood compared to other infants. Furthermore, based on the results of previous research showing that reactions to novelty at 12 months of age are better predictors of toddler temperament than reactions at 6 months of age (Putnam & Stifter, 2005), responses to novel foods at 12 months, but not 6 months, were expected to predict behaviors in response to novelty and temperament group membership at 18 months of age.

Method

Participants

Primary caregivers and their infants ($N = 160$; 75 female infants) were recruited as part of a longitudinal study with data collection occurring when the infants were within 2 weeks of being 4, 6, 12, and 18 months of age. In all but one of the families, the mother served as the primary caregiver; thus, primary caregivers are hereafter referred to as "mothers." The dyads were recruited through birth announcements and a local community hospital. Criteria for inclusion in the study were mothers' full-term pregnancy, ability to read and speak English, and maternal age > 18 years. The families were primarily Caucasian ($n = 152$). Mothers averaged 29.66 years of age at the birth of their infant and at least 2 years of education beyond high school. The majority of mothers were married ($n = 131$).

The present study includes data collected from laboratory visits when the infants were 6 ($n = 148$), 12 ($n = 136$), and 18 months of age ($n = 136$). Data collection took place between November 2009 and November 2013. Primary reasons for study attrition include family relocation and inability to contact families to schedule laboratory visits. Compared to mothers who completed all three visits ($n = 135$), mothers who dropped out of the study tended to have fewer years of education, $t(144) = 2.06$, $p = .04$, and were less likely to breastfeed their infants through 6 months of age ($\chi^2 = 5.91$, $p = .02$), but they did not differ on other demographic characteristics.

The study sample was reduced by missing data on the novel food task at 6 and 12 months of age. Twenty-eight infants who participated in the 6-month laboratory visit did not participate

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in the novel food task: 27 infants had not yet started solid foods, and 1 infant was ill during the visit. Two infants who completed the 12-month visit were excluded from the novel food task: 1 infant was not eating solid foods at the time of the visit, and 1 infant did not take a bite of the novel food. No systematic differences between the infants who completed the novel food task at 6 and 12 months and those who did not on demographic variables emerged.

Procedures

6 and 12 Months—When the infants were 6 and 12 months of age, they participated in laboratory visits with their mothers. The two visits were identical and included two specific tasks designed to elicit the infants' responses to novelty: the novel food task and the novel toy task. Mothers participated in both tasks with their infants and the interactions were digitally recorded for later behavioral coding. Procedures for each of the tasks are described next.

Novel food task.: Prior to the 6- and 12-month laboratory visits, mothers were informed of the novel food task where their infants would taste a new food. Mothers were asked whether their infant was currently eating solid foods; if not, the infant did not participate in the novel food task during the upcoming visit. If the infant was currently eating solid foods, mothers were asked to select a food that was novel to her infant: hummus ($n = 76$), pureed green beans ($n = 42$), or pureed squash ($n = 2$) at 6 months; and hummus ($n = 71$), cottage cheese ($n = 60$), or plain yogurt ($n = 3$) at 12 months. When selecting the food, mothers were asked to consider possible food allergies; however, in all cases, mothers were able to select a food for their infant that was both novel and risk free in terms of potential food allergies.

The novel food task occurred approximately halfway through the 6-month laboratory visit and toward the beginning of the 12-month laboratory visit. During this task, the infants sat in a high chair across from their mothers. One camera focused on the infant and another camera focused on the mother. An experimenter gave the mother a plastic spoon and a small cup containing the previously selected novel food. The mother was asked to feed her infant the new food until the infant rejected it three times or until 3 min had elapsed. The 3-min duration for the task was used to ensure that only infants' initial responses to the food that were not influenced by satiation were captured. From the observation booth, the experimenter watched for rejection of the novel food. Rejections of the food included turning away, swatting the spoon, or refusing to take a bite of the food. The task ended when the experimenter observed the infant reject the food three times or when 3 min had elapsed. In a few cases, the task ended when the infant had finished the entire cup of food. The mother stopped feeding her infant after the experimenter reentered the room unless she requested to continue feeding her infant.

Novel toy task.: For the novel toy task, infants and mothers were seated on the floor. One camera focused on the infant, and another camera focused on the mother. The experimenter asked the mother to introduce her infant to three new toys: a stuffed octopus, a musical ball, and a toy popper at 6 months; and a stuffed snail, a tambourine, and a bumble ball at 12 months. These toys were specifically selected because it is unlikely that the infants had previously seen or played with these types of toys outside of the laboratory. The mother and infant played with each toy for 1 min. After 1 min had elapsed, the experimenter entered the room and handed the mother the next toy to introduce to her infant.

18 Months—When the children were 18 months of age, they participated in a third laboratory visit with their mothers. The visit contained a variety of tasks designed to elicit the toddlers' tendencies to approach or withdraw in the presence of novelty, as well as assess the toddlers' receptive vocabulary and cognitive development.

Risk room.: At the start of the 18-month visit, toddlers participated in the risk room task. Mothers and toddlers entered a laboratory room that contained four objects: a tunnel, stairs next to a large mattress, a large black box with painted eyes and teeth, and a gorilla mask placed on a table (Buss & Goldsmith, 2000; Goldsmith, Reilly, Lemery, Longley, & Prescott, 1994). For the first 3 min, the mother and child were left in the room alone; the mother was asked to sit in a chair in the corner of the room and the child was told that he or she could play with the toys however he or she wanted. After 3 min had elapsed, an experimenter entered the room and asked the child to engage with the objects up to three times per object. During the experimenter-present portion of the task, the mother was asked to remain silent.

Bayley Scales of Infant and Toddler Development.: Due to possible differences in understanding of requests for behaviors in the risk room at 18 months, toddlers' receptive vocabulary and cognitive development were assessed using the Bayley Scales of Infant and Toddler Development, 3rd ed. (Bayley, 2006). Scaled receptive vocabulary ($M = 10.35$, $SD = 3.21$) and cognitive scores ($M = 10.43$, $SD = 2.20$) were determined for each toddler. Although receptive language may be the skill most related to the toddlers' understanding of requests in the risk room, language abilities and cognitive skills are very highly correlated during infancy and early childhood (Burchinal et al., 2000), so both receptive vocabulary and cognitive scores were examined as possible covariates in the present study.

Measures

6 and 12 Months

Infant novel food response.: In order to assess the infants' responses to the novel food, recordings of the 6 and 12-month novel food tasks were coded using an interval-based computer program that timed 5-s intervals (Better Coding Approach, Danville, PA). Trained pairs of coders rated the presence or absence of seven behaviors in response to each offer of food: positive behavior (smiling, reaching toward spoon), neutral response (no positive or negative affect), negative vocalizations (crying, whining), force out (physically removing food), refusal (swatting spoon, mouth pursed shut), gagging, and distaste expressions (nose wrinkling, shuttering). An offer began when the mother approached the infant with a spoonful of novel food and ended when she began to approach the infant with another spoonful. Multiple codes could be selected for each interval. Interrater drift reliabilities were calculated for 20% of the total recordings. Final Cohen's kappas for the infant novel food response codes ranged from .81 to .97.

Composite variables for analyses.: Following the measurement approach used by Moding et al. (2014) in this study sample, composite variables were created for infant *acceptance* and *rejection* of the novel food at 6 and 12 months of age based on theoretical considerations and face validity. In order to ensure that infants' responses to the novel food were not influenced by satiation, scoring for infants' responses to the novel food was limited to the first seven offers of food. The *acceptance* proportion scores were created by summing the frequencies of positive behaviors and neutral responses and dividing this sum by the total number of behaviors exhibited in response to the food. Positive behaviors and neutral responses were included together in this proportion score because both behaviors indicate a nonnegative response to the food. The *rejection* proportion scores combined the scores for force out, negative behaviors, and refusal because each of these behaviors indicate a behavioral rejection and negative response to the food. The frequencies for these three behaviors were summed and divided by the total number of behaviors exhibited in response to the food. Finally, as the acceptance and rejection proportion scores were highly correlated at both 6 months ($r = -.71$, $p < .001$) and 12 months ($r = -.89$, $p < .001$), the scores were combined by taking the inverse of the rejection scores and averaging the new score with acceptance at both 6 and 12 months. This resulted in an *acceptance-rejection* composite at both ages with higher scores indicating greater acceptance.

Infant novel toy response.: Recordings of the 6- and 12-month novel toy tasks were also coded in 5-s intervals. Eight behaviors were coded to capture the infants' responses to the novel toys: physically moving away from the toy, negative vocalizations (fussing, crying), rejection (pushing toy away), physically moving toward the toy, positive behaviors (smiling, laughing), exploring (looking at and manipulating the toy), visual engagement (looking at the toy), and bored (playing with other objects in room). Trained pairs of coders rated the presence of absence of each behavior and multiple codes could be selected per interval. Interrater drift reliabilities were calculated for 20% of the total recordings. Final Cohen's kappas for the infant novel toy response codes ranged from .84 to .94.

Composite variables for analyses.: Separate composite variables were created for infant *approach* and *withdrawal* in response to the novel toys at 6 and 12 months. First, each of the eight coded behaviors were averaged across the three novel toys. The *approach* composites were then created by summing the frequencies for physically moving toward the toy, exploring, and positive behaviors and dividing this sum by the total number of behaviors exhibited in response to the toys. The *withdrawal* composites were created by summing the frequencies of moving away from the toy, negative vocalizations, and rejections of the toy and dividing this sum by the total number of behaviors exhibited in response to the toys. As the approach and withdrawal composites were moderately correlated at both 6 months ($r = -.33$, $p < .001$) and 12 months ($r = -.38$, $p < .001$), the scores were combined by taking the inverse of the withdrawal scores and averaging the new score with approach at both ages. This resulted in an *approach–withdrawal* composite at both 6 and 12 months, with higher scores indicating greater approach.

Maternal sensitivity.: As it is possible that mothers' behaviors while feeding or playing with their infants would influence the infants' concurrent responses to the novel food or novel toys, maternal sensitivity was coded during the 6- and 12-month novel food and toy tasks based on the maternal sensitivity coding scheme outlined in Fish and Stifter (1995). The maternal sensitivity coding in the present study focused specifically on the appropriateness and timing of maternal responses to the infant's affect and actions, as well as encouragement of the infant's efforts. Codes for maternal sensitivity were selected from a 4-point scale ranging from 0 (*none; does not respond to the infant's actions or attend to the infant for the majority of the interval*) to 3 (*high; contingently and appropriately responds to or vocalizes about the infant's actions for the majority of the interval*). One code was selected for each 10-s interval. The codes for each level of sensitivity were averaged to create a final maternal sensitivity score for each mother in the novel food and novel toy tasks. Drift reliability was assessed on a minimum of 20% of recordings, intraclass correlation coefficients (ICCs) ranged from .82 to .95.

18 Months

Approach–withdrawal behaviors.: Similar to previous studies (Fox et al., 2001; Putnam & Stifter, 2005), approach–withdrawal behaviors were rated in response to the experimenter-present episode of the risk room task during the 18-month laboratory visit. This particular episode was selected because the presence of the unfamiliar experimenter made this episode relatively high risk compared to the episode with the mother and child alone. Three behaviors were coded using 5-s intervals: activity level, level of engagement with risk room objects, and spontaneous vocalizations. Activity level was coded on a 4-point scale ranging from 0 (*child is completely still*) to 4 (*vigorous or exuberant activity*), and the peak level of activity was selected for each interval. Engagement with the objects was coded on a 6-point scale ranging from 0 (*no engagement with any object*) to 5 (*high active engagement, such as jumping off the steps or crawling through the tunnel quickly*). The average level of activity and engagement was calculated for each child across the experimenter-present episode of the task. Finally, the number of spontaneous, nondistressed vocalizations were counted across the experimenter-present episode. Drift reliability was assessed on 20% of recordings for the activity level (ICC = .971), engagement (ICC = .996), and spontaneous vocalizations coding schemes (Cohen's κ = .70).

Three additional behaviors were coded continuously per second: proximity to the mother, latency to play with the first object in the room, and duration of time playing with the novel objects. Proximity to the mother ranged from 1 (*clinging to the mother*) to 5 (> *2 arm's lengths from the mother*). Average level of proximity to the mother during the experimenter-present portion of the task was calculated for each toddler. *Latency to engage* with the first object was defined as the amount of time (in seconds) from when the child first entered the risk room to when they began engaging with one of the objects in the room as follows: crawling through the tunnel; crawling onto the steps or jumping off a step; putting hand, arm, or head inside the box; or petting the mask with sustained or repeated contact. *Duration of time playing* with objects in the room was defined as the total time (in seconds) that the child engaged with any object as described above from when the child first entered the room to when the task ended after the final prompt to engage with the mask. To account for variable task lengths and the amount of time considered uncodable (child out of view of the camera) between children, proportion scores were created for the latency to play and duration of time playing variables by dividing time spent in these behaviors by other coded behaviors in the scheme such as not playing with any object and uncodable. ICCs for the proximity (ICC = .996), latency to play (ICC = .921), and duration of time playing coding schemes (ICC = .996) indicated good reliability.

The individual approach–withdrawal behaviors tended to be moderately or strongly intercorrelated (*r*s ranging from .15 to .82, all *p*s < .08). Thus, following Putnam and Stifter (2005), a composite variable was created for *approach–withdrawal* behaviors across the risk room task by standardizing and averaging all the approach–withdrawal behaviors listed above. Higher scores on this composite variable indicate greater approach behavior during the task.

Affect.: Toddler positive and negative affect were rated in 5-s intervals based on facial and vocal expressions during the experimenter-present episode of the risk room task. Positive affect scores were coded on a 4-point scale ranging from 0 (*no positive; no indication of positive facial affect and no positive intonation in voice*) to 3 (*high positive; smile with mouth open widely, intense laughing, or squealing with delight*). Negative affect was also coded on a 4-point scale ranging from 0 (*no negative; no indication of negative facial affect and no negative intonation in voice*) to 3 (*high negative; screaming, extreme crying, or large grimace with mouth open wide*). Positive and negative affect ratings were averaged separately across the experimenter-present episode of the risk room task. Drift reliability was assessed on 20% of recordings (ICC = .983).

Temperament groups.: In addition to the variable-centered approach of examining the approach–withdrawal, positive affect, and negative affect variables separately, a person-centered approach was used to identify groups of toddlers who exhibited similar constellations of behaviors during the risk room. All the individual approach–withdrawal behaviors, positive affect, and negative affect variables were entered into a latent profile analysis (LPA), and the resulting temperament groups were examined for associations with infant acceptance–rejection responses to the novel food. A person-centered approach has been utilized in previous studies (e.g., Caspi & Silva, 1995; Dollar, Stifter, & Buss, in press; Putnam & Stifter, 2005) and is useful in identifying the interconnectedness of multiple characteristics within individuals and to emphasize the person, as opposed to variables, as the unit of analysis (Caspi & Silva, 1995; Robins & Tracy, 2003; Stifter & Dollar, 2016).

Potential covariates.: The following variables were examined as covariates in the present study because of their potential association with infants' responses to the novel foods, infants' responses to the novel toys, or toddlers' responses to novelty: demographic information (maternal education, family income), infant gender, toddlers' scaled receptive vocabulary and cognitive scores, and maternal sensitivity in the novel food and novel toy tasks. Additionally, feeding history could be related to infants' responses to the novel foods, so the following variables were also examined as potential covariates: age introduced to solid foods (weeks), exclusive breastfeeding for 4 months (yes or no), type of novel food received during the visit (green beans, squash, hummus, cottage cheese, plain yogurt), time since last feeding (minutes), and number of food offers the infant received.

Infants' responses to the novel food were correlated with the number of offers they received at both 6 and 12 months, such that a greater number of offers was associated with greater acceptance at both ages ($r = .33$, $p < .001$ and $r = .60$, $p < .001$, respectively). Maternal sensitivity during the novel food task was also associated with greater acceptance at both 6 ($r = .20$, $p = .028$) and 12 months ($r = .44$, $p < .001$). Thus, number of offers and maternal sensitivity were entered as covariates in all models including infants' novel food responses. The type of novel food the infants received was also significantly related to acceptance of the food at 6 months only; infants who received the green beans showed greater acceptance ($M = 0.28$, $SD = 0.23$) than the infants who received the hummus ($M = 0.17$, $SD = 0.25$; $t = 2.17$, $p = .032$), so novel food type was entered as a covariate in all analyses including novel food response at 6 months. Maternal sensitivity in the novel toy task was unrelated to infants' responses to the novel toys, but it was controlled for in all models involving the novel toy responses based on previous research (Crockenberg & Leerkes, 2004; Hane & Fox, 2006; Kiel & Buss, 2012) and to account for differences in maternal behavior. Finally, toddlers' scaled cognitive scores were associated with both toddlers' approach-withdrawal ($r = .24$, $p < .01$) and positive affect ($r = .32$, $p < .01$) in the risk room and maternal education was associated with toddler positive affect ($r = .21$, $p = .016$); thus, these variables were included as covariates in models predicting toddler approach-withdrawal and positive affect, respectively. All other variables were unrelated to infants' responses to the novel foods, infant's responses to the novel toys, or toddlers' responses to novelty so they were not considered further.

Results

Preliminary Analyses

Latent Profile Analysis—In order to identify subgroups of toddlers who exhibited similar patterns of approach–withdrawal and affective responses to the experimenter-present portion of the risk room task at 18 months of age, a LPA was conducted using the following continuous variables as indicators of latent profile membership: proximity, activity level, spontaneous vocalizations, latency to play, total time playing, engagement, positive affect, and negative affect. Models with one through five profile solutions were specified and the best-fitting model was determined using the following model fit indices: Bayesian information criterion (BIC), sample-size-adjusted BIC, entropy, and the Lo–Mendell–Rubin adjusted likelihood ratio test (LMR-LRT). Smaller values for both BIC statistics and higher entropy values (ranging between 0 and 1) indicate better model fit. The LMR-LRT indicates whether the addition of one profile significantly improved the model fit. As indicated in Table 1, the model specifying four latent profiles provided the best fit for the data. This model had the lowest BIC and adjusted BIC combined with a significant LMR-LRT. Thus, the four profile solution was selected as the best model.

As displayed in Figure 1, the first profile, labeled *exuberant* ($n = 38$), characterized toddlers who, compared to the sample mean, showed very high levels of positive affect (0.52 *SD*s above) and high levels of behavioral approach in terms of their increased distance (proximity) from their mothers (0.74 *SD*s above) and higher levels of activity (0.56 *SD*s above). These toddlers tended to have a short latency to play with the objects in the room

(−0.67 *SD*s below the mean) and spent more time playing with the objects (1.28 *SD*s above mean) at a high level of engagement (1.08 *SD*s above mean) compared to other toddlers. The second profile, labeled *average approach* (n = 52), characterized a group of toddlers who were very close to the sample mean on all indicators of approach-withdrawal and affect except they were slightly above the sample mean on proximity (0.41 *SD*s above) and activity level (0.32 *SD*s above). Finally, the third and fourth profiles, labeled *extremely inhibited* (n = 4) and *inhibited* (n = 40), were characterized by toddlers who showed greater proximity to their mothers (−1.33 and −1.12 *SD*s below the mean), a long latency to play with the objects (1.15 and 0.86 *SD*s above the mean), and a very short amount of time playing with objects in the risk room (−1.05 and −1.00 *SD*s below the mean). The only difference between these two groups was their levels of negative affect; the extremely inhibited group showed extremely high levels of negative affect (5.04 *SD*s above the mean), whereas the inhibited group showed levels of negative affect comparable to the sample mean (0.01 *SD*s above). Previous research studies have also revealed two similar inhibited groups. In these studies, the extremely inhibited and inhibited groups were combined due to the behavioral similarities between the two groups and the small number of children in the extremely inhibited group (Dollar et al., in press; Putnam & Stifter, 2005). Following this approach, the two inhibited groups were also combined in the present study. This resulted in three final temperament profiles: exuberant, average approach, and inhibited.

Descriptive Statistics and Correlations—Descriptive statistics for all study variables can be found in Table 2. The infant acceptance–rejection responses to the novel food were uncorrelated at 6 and 12 months. However, infants who exhibited greater approach in response to the novel toys at 6 months were marginally more likely to exhibit higher levels of approach in response to the toys at 12 months (r = .15, p = .093).

As expected, the toddler approach-withdrawal and affective responses in the risk room were significantly correlated. Toddlers who showed higher levels of approach also tended to show higher levels of positive affect (r = .33, $p < .001$) and lower levels of negative affect (r = −.31, $p < .001$). Levels of positive and negative affect in the risk room were not significantly correlated.

Primary Analyses

Aim 1: Concurrent Associations Between Responses to Novel Toys and Novel Foods—Multiple regression models tested the association between infants' responses to the novel toys and their responses to the novel foods at 6 and 12 months while controlling for the number of food offers and maternal sensitivity, as well as novel food type in the 6-month model. As shown in Table 3, both models were significant. However, in the 6-month model, the significant prediction was largely accounted for by the number of food offers and maternal sensitivity during the novel food task. Conversely, in the 12-month model, greater approach in response to the novel toys was significantly associated with greater acceptance of the novel food after controlling for the number of food offers and maternal sensitivity.

Aim 2: Developmental Patterns for Infants' Responses to Novel Toys and Novel Foods—To examine the developmental patterns for infants' approach–withdrawal responses to the novel toys and acceptance–rejection responses to the novel foods, the response composite variables were entered into a 2 (age) × 2 (response: approach-withdrawal, acceptance–rejection) repeated measures analysis of variance. Significant main effects emerged for age, $F(1, 108) = 28.61$, $p < .001$, and response, $F(1, 108) = 52.05$, $p < .001$. A near significant interaction also emerged between age and response, $F(1,108) = 3.78$, $p = .055$. Figure 2 graphically displays this interaction. Simple main effects post hoc tests revealed the main effect for age was significant for approach–withdrawal, $F(1, 108) = 26.38$, $p < .001$, indicating that infants showed greater approach behaviors in responses to the novel toys at 6 compared to 12 months. The main effect for age was also significant for acceptance–rejection, $F(1, 108) = 14.90$, $p < .001$), indicating that infants tended to show greater acceptance in response to the novel food at 6 compared to 12 months of age.

Aim 3: Continuity of Infants' Approach–Withdrawal Responses—In order to examine the longitudinal associations between infants' responses to novel foods and their responses to novelty at 18 months, multiple regression analyses were conducted to predict approach–withdrawal, positive affect, and negative affect from the infants' responses to the novel food at 6 and 12 months. As shown in Table 4, Model 3 predicting 18-month approach–withdrawal was significant. Acceptance–rejection in response to the novel food at 12 months of age significantly predicted approach–withdrawal at 18 months such that higher levels of acceptance in response to the novel food was associated with greater approach in the risk room. Also, greater maternal sensitivity during the novel food task at 12 months of age was associated with fewer approach behaviors in the risk room at 18 months of age. Model 4 predicting toddlers' levels of positive affect in the risk room from the novel food responses was also significant. However, the only significant predictor of positive affect in this model was the covariate of toddlers' scaled cognitive scores. Neither of the infants' responses to novel foods at 6 or 12 months of age predicted positive affect at 18 months of age. Finally, Model 5 predicting negative affect in the risk room at 18 months was not significant, and no individual variables significantly predicted negative affect.

Table 5 shows the results of a multinomial logistic regression predicting the likelihood of temperament group membership at 18 months from the infants' responses to the novel foods at 6 and 12 months. The temperament group variable was dummy coded with the inhibited group as the reference group. As the typical interpretation of odds ratios based on a 1 unit increase was not appropriate for the novel food composites in the present study (possible range −.50 to .50), the novel food response variables were rescaled so that the odds ratios could instead be interpreted per .1 unit increase in the predictor variable. Model 6, which predicted the likelihood of temperament group membership from the infants' acceptance–rejection of the novel food at 6 and 12 months did not provide a significant improvement in fit compared to the intercept-only model ($p > .05$). However, greater levels of acceptance in response to the novel food at 12 months significantly predicted the likelihood of being a member in the exuberant group compared to the inhibited group. Specifically, for a .1 unit increase in acceptance of the novel food at 12 months, the odds of being a member in the exuberant group was 1.30 times higher compared to the inhibited group. Response to the novel food at 6 months did not significantly predict temperament group membership after controlling for significant covariates.

Discussion

Individual differences in approach–withdrawal tendencies in response to a variety of novel stimuli are one aspect of child temperament. However, novel food has rarely been examined as another stimulus that may elicit temperamental approach–withdrawal responses. The overarching goal of the present study was to investigate whether infants' approach–withdrawal tendencies are associated with their responses to novel foods. We addressed this goal in three ways. First, we examined whether infants' responses to novel foods were concurrently related to their tendencies to approach or withdraw in response to novel toys. Second, we looked at the developmental patterns for infants' responses to novel toys and novel foods across the 1st year of life. Finally, we examined whether responses to novel foods were longitudinally associated with approach–withdrawal tendencies in toddlerhood. Our findings were largely consistent with our hypotheses. In particular, infants' responses to novel foods at 12 months, when they are most likely to exhibit inhibited approach, appear to be related to both their concurrent responses to novel toys and their later tendencies to approach or hesitate in response to an unfamiliar setting and experimenter at 18 months of age. Furthermore, infants' responses to novel foods appear to follow the same developmental pattern as the emergence of inhibited approach: Infants were less accepting of novel foods after, compared to before, the development of inhibited approach.

Informed by previous research demonstrating that interactions with novel objects pull for individual differences in approach–withdrawal behaviors (Putnam & Stifter, 2002; Rothbart, 1988), the present study showed that infants' reactions to novel toys are associated with their reactions to novel foods after the emergence of inhibited approach, at 12 months of age. In particular, infants who exhibited high levels of approach in response to the novel toys were more likely to accept the novel food at the same age. These findings are consistent with previous research showing a link between parent-rated approach and infants' responses to new foods (Forestell & Mennella, 2012; Moding et al., 2014). However, this is the first study to show that infants' responses to novel foods are related to an observed measure of approach–withdrawal in the laboratory and to compare infants' responses to novel toys and foods before and after the emergence of inhibited approach. Our results suggest that after infants develop the ability to inhibit their approach tendencies and once individual differences in wariness emerge (Putnam & Stifter, 2002; Rothbart, 1988), infants' approach–withdrawal responses become more consistent across novel contexts.

In support of this conclusion is our finding of similar developmental trajectories for infant responses to novel food and toys across the 1st year of life. Previous research has revealed that infants are more approaching of novel toys before, compared to after, the emergence of inhibited approach at around 9 months of age (Putnam & Stifter, 2002; Rothbart, 1988). Our findings replicated this research by showing that infants were more approaching of novel toys at 6 months compared to 12 months of age and extended it to include the developmental pattern of infants' responses to novel foods. Consistent with our hypotheses, the infants in our study were more accepting of novel foods at 6 months compared to 12 months of age. Thus, after the emergence of inhibited approach, infants appear to become wary in response to novel foods as they do in response to other novel stimuli, such as toys and people (Kagan et al., 1998; Putnam & Stifter, 2002). This finding also provides empirical support for the belief that food neophobia emerges as infants become mobile in the second half of the 1st year of life (Birch et al., 1998). Until now, very little research has empirically examined the timing for the development of food neophobia.

To further examine the association between infants' responses to novel foods and approach–withdrawal tendencies, we investigated whether infants' responses to novel foods predicted their approach–withdrawal responses and temperament group membership during toddlerhood. Previous research has shown that infants' responses to novelty after the emergence of inhibited approach are predictive of both approach–withdrawal and temperamental style during toddlerhood (Putnam & Stifter, 2005). As expected, infants who were more accepting of novel foods at 12 months of age, but not at 6 months of age, were more likely to exhibit greater approach behavior in the risk room during toddlerhood and had an increased likelihood of membership in the exuberant compared to inhibited temperament group. Taken together, these results replicate previous studies by showing that infants' responses to novelty, in this case novel foods, after the emergence of inhibited approach, predicted approach–withdrawal and temperamental style during toddlerhood (Putnam & Stifter, 2005). Furthermore, these findings strengthen our proposal that approach–withdrawal processes underlie infants' responses to novel foods.

Contrary to hypotheses, infants' responses to the novel food were unrelated to their positive and negative affect in the risk room at 18 months. This null result could be due to the true lack of an association or due to the low occurrence of positive and negative affect in response to the risk room in this study. Before drawing any conclusions about the lack of associations, future studies will need to examine whether there is any association between infants' responses to novel foods and their affective responses during a higher threat task that elicits more emotional reactivity, such as an unpredictable toy (Buss & Goldsmith, 2000).

Although intended as a covariate, maternal sensitivity emerged as an important correlate of approach–withdrawal responses concurrently and longitudinally. Greater maternal sensitivity during the novel food task at 12 months was associated with greater infant acceptance of the novel food concurrently but with *less* approach during the risk room at 18 months. The concurrent result is consistent with previous research (Crockenberg & Leerkes, 2004), but it is difficult to tell the direction of these effects. Greater maternal sensitivity could have increased the infants' acceptance of the food, or greater infant acceptance could have led to increased maternal sensitivity. Knowing more about the direction of effects concurrently could inform our interpretation of the longitudinal result. For example, it is possible that mothers responded differently to their infants based on their levels of acceptance and approach, which could have an impact on the infants' levels of approach–withdrawal over time. Additionally, even though infants' responses appeared to be consistent across novel contexts at 12 months of age, it was beyond the scope of this study to examine the consistency of maternal behaviors and relative impact of sensitivity in different contexts on the continuity of approach–withdrawal behaviors. The extent to which parenting has an effect on child outcomes may be domain specific (Costanzo & Woody, 1985).

Increased understanding of infants' reactions to novel foods as a temperamental quality is particularly important for parents and caregivers as they introduce their infants to solid foods. Based on the results of this study, parents of older infants who tend to show lower levels of approach to novel stimuli, such as new toys, should be prepared for their infants to exhibit lower levels of acceptance in response to new foods as well, especially after the emergence of inhibited approach. Fortunately, research studies have consistently linked one strategy to increased acceptance of novel foods: repeated exposure to that food over time (Forestell & Mennella, 2007; Sullivan & Birch, 1994). Even infants who initially reject novel foods can learn to accept them through repeated exposure to the same food, prepared in the same way (Maier, Chabanet, Schaal, Issanchou, & Leathwood, 2007). Parents of low-approach infants would benefit from knowing that their infants may be likely to reject novel foods based on their temperament but that they can assist in their infants' eventual acceptance of these foods if they persist in offering them on multiple occasions.

Although the longitudinal study design and repeated observational measures are strengths of the present study, they should be considered alongside a few limitations. First, the available sample size for the novel food task at 6 months was small in comparison to the 12-month sample because several infants were not currently eating solid foods at the time of the 6-month laboratory visit. Thus, the null results for the 6-month novel food responses could have been due to a true lack of association with approach-withdrawal behaviors, consistent with our hypothesis, or to a lack of statistical power. Additionally, the lack of concurrent and longitudinal relations among and between the 6-month novel response variables and later approach-withdrawal behavior at 18 months could be due to lower reliability between the composites at 6 months; approach and withdrawal and acceptance and rejection were not as highly correlated at 6 compared to 12 months of age. Caution should also be exercised when generalizing these results to other populations, especially given the relatively homogenous sample of well-educated, middle-class mothers and the characteristics of the mothers who did not complete the study (less educated, less likely to breastfeed their infants through 6 months of age). Finally, additional variables may be related to infants' responses to novel foods that we were unable to measure in this study, such as parent feeding practices (Lange et al., 2013) or the child's level of sensory sensitivity (Coulthard & Blissett, 2009; Johnson, Davies, Boles, Gavin, & Bellows, 2015).

Conclusions

The results of the present study revealed that infants' reactions to novel foods were associated with measures of temperamental approach–withdrawal, both concurrently at 12 months and longitudinally. The developmental pattern of infants' responses to novel foods was also consistent with their responses to novel toys, as well as patterns that have emerged in the literature for approach–withdrawal processes; infants were less accepting of novel foods after, compared to before, the emergence of inhibited approach. Finally, these responses to novel foods at the end of the 1st year were predictive of approach–withdrawal responses to novelty during toddlerhood. Although future research is still needed on this topic, our findings indicate that temperamental approach–withdrawal processes may underlie infant responses to novel foods.

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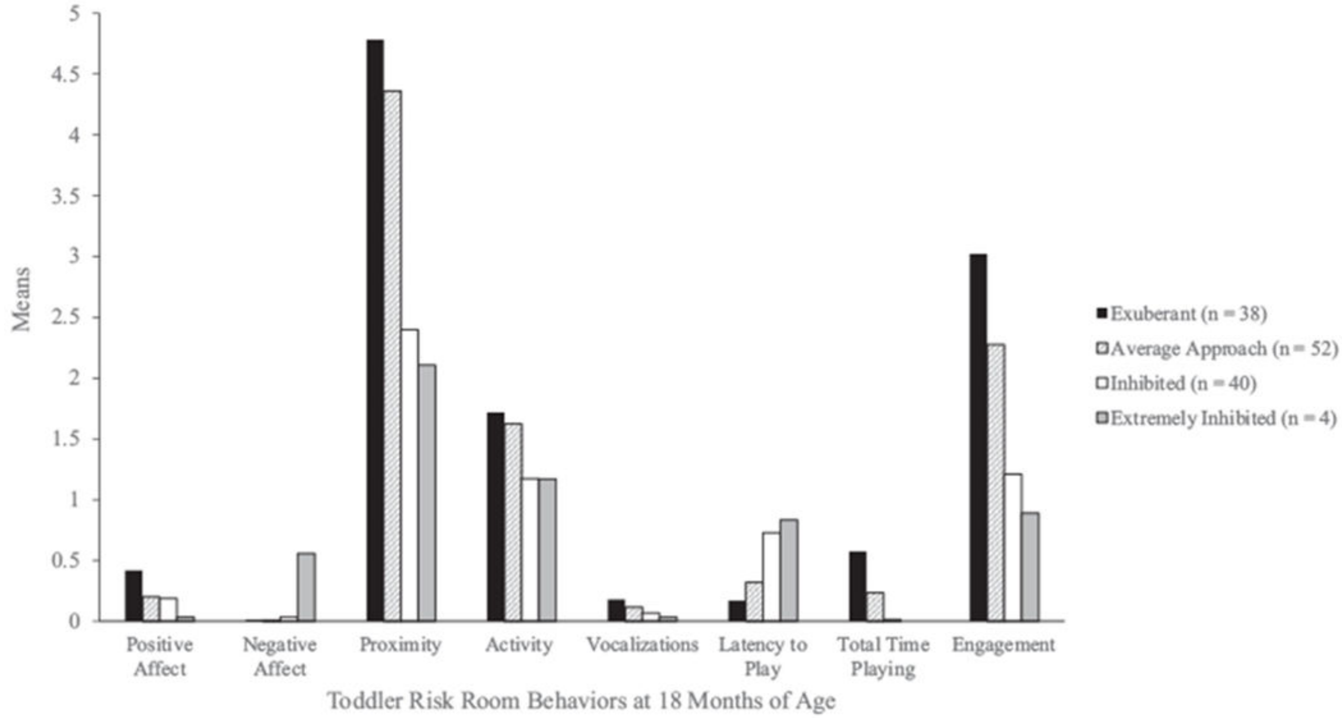

Figure 1.
Graph of means for latent profile analysis indicators by temperament group.

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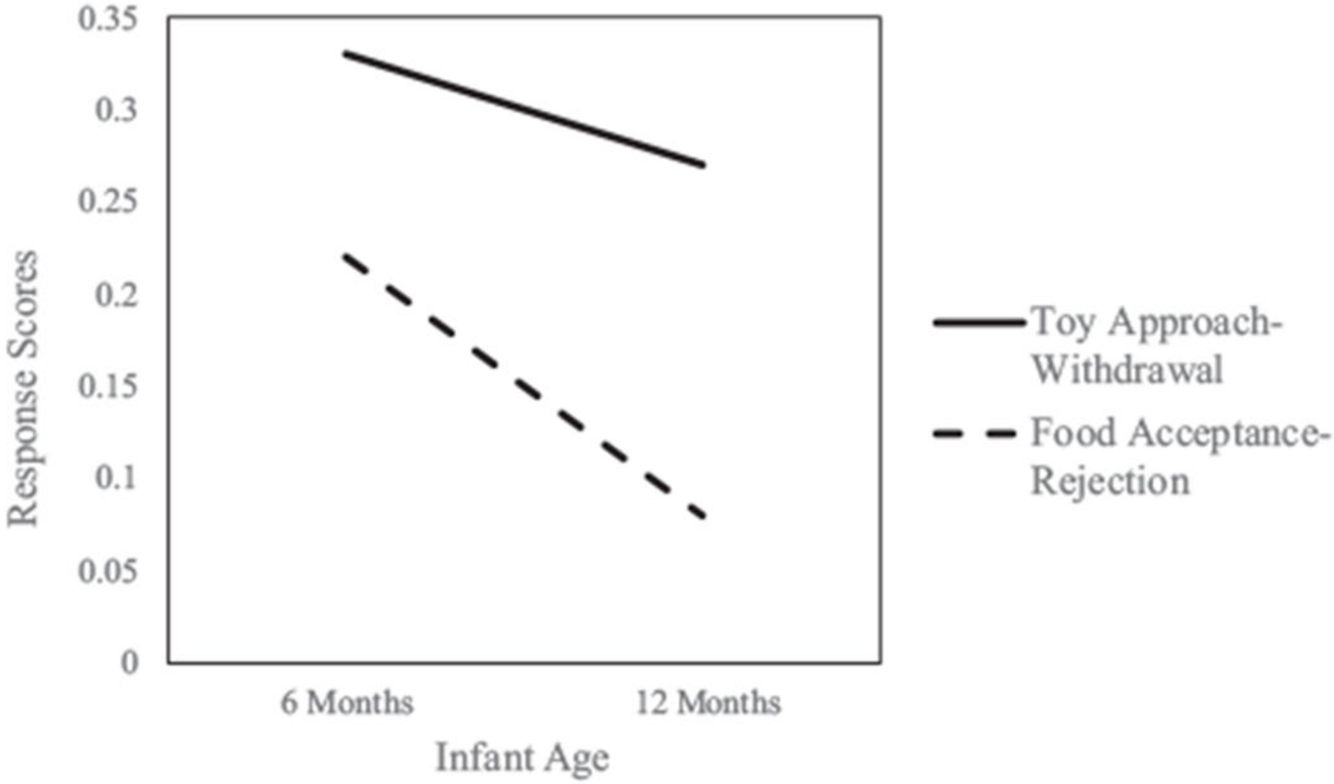

Figure 2.
Infants' approach-withdrawal and acceptance-rejection scores in response to the novel toys and novel food at 6 and 12 months of age (n = 109).

Table 1

Model Fit Indices for the 18-Month Temperament Group Latent Profile analysis

	BIC	Adj. BIC	Entropy	LMR-LRT value	LMR-LRT *p* value
1-Class	787.62	737.01	N/A	N/A	N/A
2-Class	467.80	388.72	0.94	355.82	.01
3-Class	332.95	225.40	0.95	174.97	.25
4-Class	262.11	126.10	0.94	112.62	.03
5-Class	240.98	76.50	0.93	63.91	.42

Note. BIC = Bayesian information criterion; Adj. BIC = sample-size-adjusted BIC; LMR-LRT = Lo–Mendell–Rubin adjusted likelihood ratio test.

Table 2

Descriptive Statistics for Covariates, Infants' Responses to the Novel Toys and Foods, and Toddler Temperament Variables

	% or *M*	*SD*	Min	Max
Covariates:				
Maternal education	14.86	2.03	11.00	20.00
Bayley cognitive score	10.43	2.20	2.00	20.00
Number of food offers, 6 months	6.53	1.21	1.00	7.00
Number of food offers, 12 months	6.52	1.00	3.00	7.00
Maternal sensitivity (toy), 6 months	2.07	0.14	1.55	2.54
Maternal sensitivity (toy), 12 months	2.10	0.15	1.75	2.57
Maternal sensitivity (food), 6 months	1.90	0.17	1.38	2.33
Maternal sensitivity (food), 12 months	1.98	0.17	1.25	2.45
Novel food responses:				
Acceptance–rejection, 6 months	0.21	0.25	−0.50	0.50
Acceptance–rejection, 12 months	0.09	0.34	−0.50	0.50
Novel toy responses:				
Approach–withdrawal, 6 months	0.72	0.17	0.09	1.00
Approach–withdrawal, 12 months	0.59	0.16	0.11	0.95
Toddler response to novelty				
Approach–withdrawal	0.00	0.75	−1.62	1.62
Positive affect	0.25	0.31	0.00	1.41
Negative affect	0.05	0.16	0.00	1.17
Toddler temperament groups				
Exuberant	28.40%	—	—	—
Average approach	38.80%	—	—	—
Inhibited	32.80%	—	—	—

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Table 3

Multiple Regression Results Predicting Infants' Novel Food Responses From Their Novel Toy Responses at the Same Age

	B	***SE* (*B*)**	**β**	***F***	R^2
1. Novel food acceptance–rejection (6 months)				5.36***	.19
Novel food type	.07	.04	.16+		
Number of food offers	.08	.02	32***		
Maternal sensitivity (food)	.31	.14	.20*		
Maternal sensitivity (toy)	−.01	.15	−.01		
Approach responses (toy)	.23	.20	.10		
2. Novel food acceptance–rejection (12 months)				29.79***	.48
Number of food offers	.18	.02	.53***		
Maternal sensitivity (food)	.65	.13	.32***		
Maternal sensitivity (toy)	.04	.14	.02		
Approach responses (toy)	.56	.21	.17**		

Note. $n = 120$ (Model 1), $n = 132$ (Model 2).

+ $p < .10$.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

Table 4

Multiple Regressions Predicting Toddlers' Responses to Novelty From Their Novel Food Responses

	B	*SE* (*B*)	β	*F*	R^2
3. Toddler approach-withdrawal				2.37*	.16
Bayley cognitive score	.09	.03	.28**		
Novel food type (6 months)	−.10	.14	−.08		
Number of food offers (6 months)	−.03	.08	−.03		
Number of food offers (12 months)	−.19	.08	−.27*		
Maternal sensitivity (6-month food)	−.09	.47	−.02		
Maternal sensitivity (12-month food)	−1.21	.48	−.28*		
Acceptance–rejection (6-month food)	−.34	.31	−.12		
Acceptance–rejection (12-month food)	.59	.28	.28*		
4. Toddler positive affect				2.36*	.18
Maternal education	.02	.02	.09		
Bayley cognitive score	.05	.01	.35**		
Novel food type (6 months)	.09	.07	.14		
Number of food offers (6 months)	.02	.04	.06		
Number of food offers (12 months)	−.06	.04	−.18		
Maternal sensitivity (6-month food)	−.08	.21	−.04		
Maternal sensitivity (12-month food)	.03	.22	.02		
Acceptance–rejection (6-month food)	−.14	.14	−.11		
Acceptance–rejection (12-month food)	.13	.13	.14		
5. Toddler negative affect				0.85	.06
Novel food type (6 months)	.05	.03	.18+		
Number of food offers (6 months)	.01	.02	.06		
Number of food offers (12 months)	.02	.02	.11		
Maternal sensitivity (6-month food)	−.06	.11	−.06		
Maternal sensitivity (12-month food)	.10	.11	.10		
Acceptance–rejection (6-month food)	.05	.07	.08		
Acceptance–rejection (12-month food)	−.06	.06	−.14		

Note. $n = 106$ (Model 3), $n = 107$ (Model 4), $n = 108$ (Model 5).

+ $p < .10$.

* $p < .05$.

** $p < .01$.

Table 5

Multinomial Logistic Regression Predicting Temperament Group Classifications From Infants’ Novel Food Responses

	Exuberant group					Average approach group				
	B	***SE***	**OR [95% CI]**	**Wald**	***p***	***B***	***SE***	**OR [95% CI]**	**Wald**	***p***
Bayley cognitive score	.26	.14	1.30 [0.99, 1.70]	3.61	.06	.17	.13	1.18 [0.92, 1.52]	1.74	.19
Novel food type (6 month)	−.34	.55	0.71 [0.24, 2.09]	0.38	.54	−.35	.48	0.70 [0.27, 1.80]	0.54	.46
Number of food offers (6 month)	−.19	.35	0.83 [0.42, 1.64]	0.29	.59	−.06	.33	0.94 [0.49, 1.80]	0.03	.85
Number of food offers (12 month)	−1.15	.44	0.32 [0.14, 0.75]	6.91	.01	−.76	.42	0.47 [0.21, 1.05]	3.37	.07
Maternal sensitivity (6 month food)	.06	.18	1.06 [0.74, 1.51]	0.09	.76	.11	.17	1.11 [0.79, 1.56]	0.36	.55
Maternal sensitivity (12 month food)	−.39	.20	0.68 [0.46, 1.01]	3.58	.06	−.01	.19	0.99 [0.68, 1.44]	0.00	.97
Acceptance–rejection (6 month)	−.20	.14	0.82 [0.63, 1.06]	2.27	.13	−.15	.12	0.86 [0.68, 1.10]	1.41	.24
Acceptance–rejection (12 month)	.26	.12	1.30 [1.03, 1.64]	4.99	.03	.12	.10	1.13 [0.92, 1.38]	1.31	.25

Note. $N = 106$. OR = odds ratio; CI = confidence interval; Wald = Wald statistic.