

Planes, Trains, Automobiles—and Tea Sets: Extremely Intense Interests in Very Young Children

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Some normally developing young children show an intense, passionate interest in a particular category of objects or activities. The present article documents the existence of extremely intense interests that emerge very early in life and establishes some of the basic parameters of the phenomenon. Surveys and interviews with 177 parents revealed that nearly one third of young children have extremely intense interests. The nature of these intense interests are described, with particular focus on their emergence, commonalities in the content of the interests, and the reactions of other people to them. One of the most striking findings is a large gender difference: Extremely intense interests are much more common for young boys than for girls.

Keywords: gender-stereotyped behavior, play interests, early childhood

Supplemental materials: [http://dx.doi.org/10.1037/\[0012-1649.43.6.1579\].supp](http://dx.doi.org/10.1037/[0012-1649.43.6.1579].supp)

We document here the existence of extremely intense interests (EIIs) in infants and very young children. A substantial proportion of normally developing young children become fascinated with particular categories of objects or activities. They display a passionate, sometimes bordering on obsessive, attraction to items in their interest category.¹ This phenomenon is quite familiar to many parents, who are often mystified with respect to the origin, content, and intensity of their child's passion. A good sense of what we mean by an EII is well conveyed in the following three summaries of parent reports in a preliminary study. In these cases, the EII concerned balls, brooms and brushes, and clothes and costumes.

From the time he was a few months old, this little boy would stare intently at a globe lamp hanging above his changing table. Gradually, his attraction generalized to balls and spherical objects of any sort. He was constantly on the lookout for balls in the environment; he would spot a gumball machine from far off and would investigate any round object, no matter what size (including tiny pieces of vermiculite in potting soil). He begged his parents to buy him balls and ended up with a collection numbering in the hundreds that he played with constantly.

Early in another boy's second year, an interest emerged for brooms and sweeping floors. It soon expanded to encompass cleaning brushes and then generalized to all sorts of other

brushes—hairbrushes, paintbrushes, toothbrushes, and so on. His parents indulged his passion to the extent that there were eventually toothbrushes in every room of the house so he would never have to be without one.

Very early in her second year, this girl began insisting on picking out her own clothes and trying to dress herself. She often changed clothes several times a day and was at her happiest playing dress-up. When she was around 4, the family attended a Civil War reenactment, and the parents succumbed to her pleas to buy her an expensive, child-sized antebellum-style ball gown. The girl's passion eventuated in the entire family becoming Civil War reenactors.

These three examples illustrate the extraordinary intensity with which some very young children become enamored of particular kinds of objects or activities. Our criteria for an EII include that it is relatively long lasting, shown in several different contexts (home, friends' homes, day care, etc.), directed toward multiple objects/activities within the category of interest (real objects, replicas, pictures, videos, etc.), and independently noticed by people outside the immediate family (friends, extended family, teachers,

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¹ EIIs are distinctly different from security or transitional objects (e.g., Gulerce, 1991; Litt, 1986; Winnicott, 1953). In such cases, the child is typically intensely attached to a single cherished object that provides a feeling of security. Neither are we talking about the behaviors that are characteristic of obsessive-compulsive disorder (e.g., Leonard, Goldberger, Rapoport, Cheslow, & Swedo, 1990), such as repetitively checking, counting, arranging toys, or performing elaborate rituals. The EIIs are in some ways similar to the preoccupations and circumscribed interests shown by children with autism-spectrum disorders (Baron-Cohen & Wheelwright, 1999; Lord, Rutter, & Le Couteur, 1994) but are less extreme, are often shared with others, and tend to broaden and expand over time.

etc.). We decided this phenomenon was worthy of systematic study based on both the relatively high frequency with which children in a pilot sample were identified as having EIIs and on the parents' descriptions of the impact of those interests on the everyday lives of the children and their families.

A large literature exists on children's interests in general and the interrelations between interests and intelligence, learning, attention, conceptual development, and expertise. (See, for example, work by Krapp, 2002; Renninger, 1992; Renninger, Hidi, & Krapp, 1992; Renninger & Wozniak, 1985). Two lines of research on preschool children's interests are of particular relevance here. One comprises detailed case studies of a small number of young children whose intense fascination with dinosaurs and birds led them to acquire remarkable levels of knowledge (Chi, Hutchinson, & Robin, 1989; Chi & Koeske, 1983; Johnson & Mervis, 1994; Johnson, Scott, & Mervis, 1997). Those reports focus on the organization of the conceptual structures of these young experts in their domain of expertise and its impact on their subsequent acquisition of further domain-related knowledge. In a recent short-term longitudinal study based on parent reports, 20% of a large sample of 4-year-old children were classified as having sustained intense interests in conceptual (knowledge-related) domains (Johnson, Alexander, Spencer, Leibham, & Neitzel, 2004).

Gender differences were found in both these lines of research. Johnson et al. (2004) noted that 71% of the dinosaur and bird experts in the expertise studies were boys. In their own large study of 4-year-olds, 86% of the 42 children identified as having an intense interest in a conceptual domain were boys. Girls were most often interested in pretend play, dolls, and art-related activities. The preponderance of boys with intense interests in conceptual domains is consistent with Baron-Cohen's (2002, 2003) characterization of males as "systemizers." Systemizing involves a very narrow focus of attention on trying to understand and organize a given domain.

Two main goals underlie the present research. The first was to systematically document the existence of EIIs in very young children and to provide a rich description of the phenomenon. The second was to examine the relation between gender and the incidence and nature of EIIs early in life. Our pilot work suggested that EIIs often emerge quite early, consistent with the fact that 70% of the parents of 5- to 9-year-old dinosaur experts in research by Johnson and Eilers (1998) indicated that their child's intense interest in dinosaurs had been apparent by 3 years of age.

Evidence of gender-related differences in preferences in infancy suggest that related differences might appear in EIIs. For example, 12-month-old boys look longer at nonsocial stimuli (e.g., moving cars) than at social stimuli (e.g., people talking), whereas girls show no strong preference (Lutchmaya & Baron-Cohen, 2002). By 18 months, infants show visual preferences for gender-stereotyped toys, with boys looking longer at pictures of vehicles and girls looking longer at dolls (Serbin, Poulin-Dubois, Colburne, Sen, & Eichstedt, 2001). Further, 18-month-old girls associated these gender-stereotyped toys with boys' and girls' faces, indicating some awareness of gender stereotypes.

The specific questions addressed in the research reported here include the following: (a) How common are EIIs among very young children? (b) Are there gender differences in the incidence of such interests? (c) At what age do EIIs emerge? (d) What is the origin of very early EIIs; specifically, to what extent do they

emerge spontaneously? (e) What is the content of EIIs? (f) What kinds of activities are inspired by young children's interests? (g) How do parents and others react to their children's EIIs? (h) How long do they persist?

Method

Participants

Parents provided information about the interests of 177 children (84 boys, 93 girls). At the time of the parents' participation, their children were between the ages of 11 months and 6 years (mean age = 35.1 months). The parents were recruited from all parents whose children had participated in a variety of different studies in two different laboratories.² This approach helped ensure that the sample was not biased toward parents who might choose to participate because their children had intense interests. The children had initially been identified primarily from records of newspaper birth announcements, and the sample was predominantly White and middle class.³

Procedure

With the goal of identifying the prevalence, content, and nature of EIIs in young children, the research progressed in three phases: (a) initial parent questionnaires, (b) follow-up phone interviews with a subset of parents, and (c) ratings of intensity of interest by two coders. Full information on all materials and analyses can be found in the supplemental materials.

Parent questionnaires. The first step in this research was to give parents a 15-item questionnaire designed to identify children with exceptionally strong interests. The questionnaire asked parents to respond regardless of whether their child did or did not have an intense interest. In an effort to communicate what was meant by "extremely intense interests," examples from our pilot research were described.

The initial item asked whether the child had ever had an intense interest of any kind. Parents who answered affirmatively completed the remaining questions. Table 1 gives examples of some of the questions to which parents responded. Because we were interested in EIIs, parents were asked to describe only the most intense interest their child had ever had. Parents identified 116 children (66% of the original sample) as currently or previously having an intense interest.

Parent interview. To get a richer sense of the nature of their children's interests, parents of all 116 children identified as having or having had an intense interest were interviewed by telephone (mean delay = 6.5 months, range = 1–11 months). In this semi-structured interview, they were asked to provide detailed information about their child's interest. Audiotapes of the phone interviews were transcribed verbatim.

Ratings of parent interviews. Next, two raters independently rated the transcripts of all 116 interviews using a 5-point intensity

² The laboratories were located at the University of Illinois and the University of Virginia. There were no differences in participant characteristics or information reported as a function of location.

³ No further demographic information was obtained from parents of participants.

of interest scale (1 = *moderate interest*; 5 = *extremely intense interest*). Gender information (in the form of names and pronouns) was present in the transcripts. In making their global ratings, the raters explicitly took into account the duration of the interest, the number of different contexts (e.g., home, school, friends' homes, library) in which the interest was exhibited, the number of objects and activities in the category of interest, and the extent to which the child's interest was noticed by others (relatives, friends, friends' parents, teachers). Interrater agreement on the ratings was very good (quadratic weighted kappa = .80). A conservative criterion was adopted for classifying children as having an EII: Both raters had to give the child a score of 3 or above (meaning there was 100% agreement between the raters with respect to the identification of EIIs).⁴

For 66% of the children rated as having an EII, the interest was currently active at the time of the parent interview. There were no differences of any sort between the parent reports on children who had a current versus a prior interest. The similarity in the parents' reports for current and past interests suggests that children's intense interests are salient and memorable to their parents.

Results and Discussion

Prevalence of Children's EIIs

Figure 1 shows the distribution of children in each of the three intensity-of-interest categories. The parents of 61 children (18 boys, 43 girls) of the total sample of 177 indicated on the questionnaire that their child did not have any particularly strong interests. Parents of 65 children (28 boys, 37 girls) reported that their child did have an intense interest, but the child's interest was classified as "moderate" based on our ratings of 1 or 2 for the interview transcripts. The remaining 51 children (38 boys, 13 girls)—29% of the entire sample—had scores of 3 or above and were categorized as having EIIs.

Gender Differences

As Figure 1 clearly shows, the majority—75%—of the children with EIIs were boys. This difference was significant, $\chi^2 (df = 1) = 12.26, p < .0001, \phi = .49$. Moreover, boys' EIIs were rated as more extreme ($M = 3.88$) than were girls' ($M = 3.33$), $t(46) = 3.77, p < .001$, Cohen's $d = .98$.

Table 1
Example Questionnaire Items for Four Question Categories

Question category	Example questionnaire items
Onset of interest	To the best of your memory, at what age did your child's interest start? Are you aware of any object/event that triggered the interest?
Nature of the interest	Describe what your child does now which shows the interest.
Family response	What was your initial reaction to your child's interest? Did you or others do anything to encourage/discourage the interest?
Decline of interest	Does your child still have the intense interest? What made you aware it was declining?

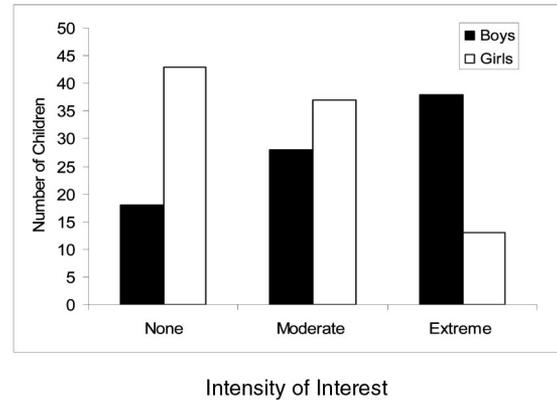


Figure 1. The number of boys and girls identified as having no intense interests, moderately intense interests, and extremely intense interests. The "None" classification was based on parents' initial responses to the questionnaire. The other two categories, "Moderate" and "Extreme," were based on the two coders' assessments of the transcripts of the parent interviews.

Examples of Children's EIIs

To provide a clear sense of the nature and fervor of these young children's EIIs, Table 2 presents detailed summaries of six parent reports. These examples typify the general nature and range of EIIs, their emergence, the types of behaviors that provide evidence of the interests, and the reaction of families and others to them.

Emergence of Children's EIIs

According to the parents' reports, the mean age of emergence of the children's EIIs was 18 months, with an age-of-onset range of 3–42 months.⁵ Of particular note, 37% ($n = 19$) of the interests were reported to have appeared within the first year of life, and 90% had emerged by 24 months. There was no gender difference in the age at which interests first appeared (girls $M = 17.9$ months, boys $M = 18.4$ months), and the intensity ratings did not differ for EIIs emerging before ($M = 3.6$ months) and after ($M = 3.8$ months) 18 months of age.

In most cases (78%), parents did not report any specific event marking the onset of an EII. For example, one mother reported that her son had "always been interested in trucks; it has just always been there." Another said that her son "always gravitated to [balls] and played with them." Yet another mother said her daughter's

⁴ The two raters assigned exactly the same score to 83% of the transcripts. Coders were not blind to the child's gender for two reasons. Initially, we had no expectations regarding gender differences in the incidence of EIIs. More importantly, it would be difficult if not impossible to eliminate gender information by blocking out children's names and pronouns from the transcripts. Virtually anyone reading the highly gender-stereotyped reports would almost certainly draw inferences about the child's gender.

⁵ One mother reported that her child's EII was first apparent at 3 months. Although it is possible that this account was accurate, it was so much earlier than other reports that we took the conservative action of removing it from the computation of the mean age of onset of EII.

Table 2
Characteristic Examples of Extremely Intense Interests

Intense interest	Parent descriptions of their children's intense interests
Vehicles	A 2-year-old boy had an extremely intense interest in vehicles. From about 9 or 10 months of age, he was captivated by anything that resembled a wheel or moved in a circular motion. He would excitedly point out wheels or wheel-like objects, including automobile wheels, wheels on a teacart, rotating ceiling fans, sunflower pinwheels, circular patterns on rugs, and so on. He also searched for wheels in books, magazines, and on television. He collected wheels, circular objects, and cars. Over time, his interest in wheels became more focused on vehicles—he would watch the traffic pass by, notice cars in parking lots, ask to stop to look at heavy equipment, and spend hours every day playing with toy cars.
Trains	A 4.5-year-old boy's interest in trains originated from an early focus on the pattern of train tracks themselves. From about 18 months of age, he would point out anything that resembled train tracks—car tracks in the sand at the beach, fences, stitching on clothing, and even zippers. After he received a Thomas the Tank Engine railroad set for his second birthday, he played with it for hours every day. He even slept with his trains. He watched train videos that his parents and others bought for him “countless times.” The local librarian knew of his interest and saved books about trains for him to check out on his weekly visit.
Dinosaurs	A 4-year-old boy's interest in dinosaurs began when he was 18 months of age. He constantly looked through books (fiction and nonfiction) about dinosaurs, identifying and comparing them. He peppered his parents with detailed questions about dinosaurs—how they lived, what they ate, how they hunted, and so on. He spent hours playing with hundreds of plastic dinosaur figurines, organizing them into elaborate scenes. He also drew countless pictures of the different types of dinosaurs. The boy's mother was supportive of his interest and learned a lot about dinosaurs herself. Twice the whole family drove 120 miles to visit the Natural History Museum in Washington to see and learn more about dinosaurs.
Dressing up	A father of a 4.5-year-old girl reported that his daughters' intense interest in dressing up had begun about 2 years earlier when she was 2.5 years of age. Around this time, the little girl insisted on wearing only skirts and dresses (absolutely no trousers) and began dressing up on a regular basis; after preschool, she would come home and immediately change into a costume, usually a cheerleading outfit or a princess gown, which she accessorized with jewelry and fancy shoes. She spent time looking through catalogs for dress-up costumes. She was also interested in what other people wore, be they characters in picture books, on television, or in real life, and would comment as to whether or not she liked their clothing and accessories. Friends and family gave her so many dress-up costumes as gifts that a footlocker was purchased to hold her collection.
Blenders	One boy's intense interest in blenders first emerged around 18 months, when he insisted “at least ten times a day” that his parents lift him up so he could see the blender on the kitchen counter. When his parents bought him a toy blender, it became his “constant companion”; he took it everywhere and even slept with it. He began asking to see blenders when visiting friend's homes. At the peak of his interest, around 2.5 years of age, his interest broadened to include other kitchen appliances—food processors, mixers, toasters, and coffeemakers. He started making up to 25 drawings a day of blenders and kitchen appliances, many with faces on them. Eventually, his parents replaced his toy with a real one (less the motor and blade) that they found in a garage sale. This boy's parents knew their son's interest was quirky and unusual, but they thought it was cute and were supportive of it for the 2 years it lasted.
Blue Angels	One of the more unusual interests—both in content and origin—was that of a 3-year-old boy who developed an extremely intense interest in the Blue Angels—the fighter pilot squadron of the U.S. Navy. The boy was 30 months of age when he was watching a video about trains with his mother. It contained a short clip of the Blue Angels flying in the background. He became extremely excited and “started running around the room in circles squealing.” He insisted on viewing the clip so many times over the next 6 months that it wore out. He also began to ask questions and talk constantly about the Blue Angels. When his parents bought him a toy Blue Angels plane, it became his “constant companion” for months. He would show it to strangers, telling them that he was going to be a Blue Angels pilot when he grew up. His parents found the Blue Angels Web site and bought him a Blue Angels uniform, a DVD, and posters for his bedroom. When wearing his uniform in public, he was thrilled to be saluted by former military personnel. He learned the Blue Angels song and sang it constantly—so much so that his teacher reported that other children in his class had also begun singing it.

emerging interest in dressing-up “didn't start all of a sudden; there wasn't a single precipitating event.”

These parents reported a variety of behaviors that first made them aware of their child's EII in an object or activity. For example, a 9-month-old girl with an interest in balls would pick up anything spherical and roll it around, showing no interest in any other toys. Another little girl with an intense interest in books had been easily soothed when read to at 6 months of age. Parents often reported that their very young child would indicate his or her interest by pointing excitedly to objects of fascination. This was frequently reported for boys with extreme interests in cars, trains, and airplanes. Several parents reported that the object of their children's desire was among their first words.

In contrast, some parents (22%) could pinpoint precisely the origin of their child's interest—for example, to a video for interest in the Blue Angels, the fighter pilot squadron of the U.S. Navy, or an outing for the interest in U.S. presidents. Another mother

reported that her son's interest in dinosaurs “started out with one book and [some toy] dinosaurs that a friend of mine sent.” A boy's intense interest in the Wizard of Oz began when he saw the movie on a video that his older sister was watching.

Content of Children's EIIs

Each child's EII was classified into 1 of 11 content categories. As shown in Figure 2, the content of children's intense interests ranged from highly stereotypical to wholly idiosyncratic.

Many of the EIIs involved ordinary items, such as vehicles, balls, books, dolls, and dinosaurs. The miscellaneous category ($n = 5$) included infrequent items—tea sets, flags, tools, puzzles, and the Wizard of Oz. There were also some highly idiosyncratic interests ($n = 6$), such as the Blue Angels (see Table 2). Table 3 provides brief descriptions of the five other idiosyncratic interests reported: pouring liquids; bodies and injuries; U.S. presidents;

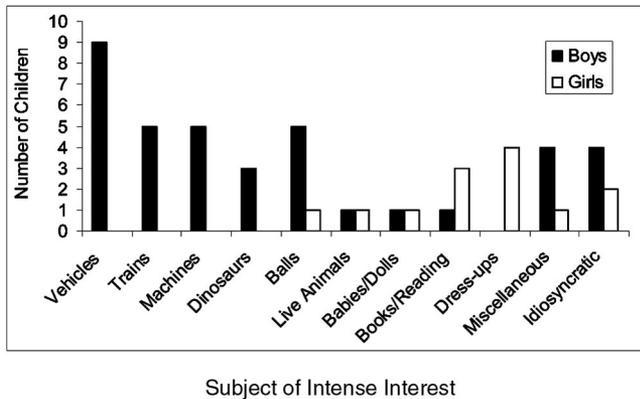


Figure 2. Categorization of girls' and boys' intense interests.

inventing and building; and brooms, brushes, and mops. The parents' accounts of these idiosyncratic intense interests indicated that they all originated from the child and that there was no initial encouragement from others.

A particularly striking finding is the gender-stereotyped nature of the young children's interests. Over half (57%) of the EIIs fell into commonly observed gender-stereotyped categories (e.g., MacCoby, 1998; O'Brien & Huston, 1985): Fully half (50%) of all the EIIs reported for boys were for vehicles, trains, and machines, and another 27% were for balls, dinosaurs, and tools. Nearly half (46%) of the girls' intense interests also involved gender-stereotyped activities (clothes/dressing up, babies, tea sets). These gender differences in the content of EIIs were not related to the age of emergence of the interests.

Activities Indicative of Children's EIIs

The nature and extent of the activities that children engaged in on a daily basis demonstrate that their interests loomed large in

their lives (see Table 4). Parents reported that the children were "constantly" on the lookout for objects related to their interest. They noticed and pointed out not only salient exemplars, such as cars driving by, but also relatively obscure instances of their interest (for example, tiny pictures of cars on cracker boxes).

Parents also reported that the children constantly talked about the object of interest. They also asked endless questions, indicating an active effort to learn more about the topic. Many parents indicated that, as a result, their children acquired substantial knowledge in their interest category. Parents further reported that the children spent considerable time every day interacting with the objects or replica objects of interest.

Family Reactions to Children's EIIs

As suggested by the examples in Table 2, the vast majority (92%) of parents reported that they reacted positively to their child's EII and actively supported it. They bought the objects or replicas that their child was interested in, as well as relevant books and videos. Parents also reported spending time in a range of activities related to their child's interest. For example, one mother whose daughter was intensely interested in books spent hours reading aloud every day, and the pair made several trips to the library each week. Another mother reported that she and her son, who was intensely interested in lawnmowers, would regularly walk around the neighborhood together to watch neighbors mowing their lawn. Others scoured the neighborhood for construction sites with heavy equipment.

Some children's extreme interests became disruptive, resulting in limits being instituted. In one case, a little boy's extreme interest in trains became a problem at preschool. The child became obsessed with a table with pictures of Thomas the Tank Engine trains on it. His mother said that "he almost became a slave to the table" and stood guard to prevent other children from playing there. It was causing such a problem that the teacher ended up putting the table in storage. Another boy constantly pretended to be a dinosaur

Table 3
Brief Descriptions of Five Intense Interests Categorized as Idiosyncratic

Intense interest	Description of interest
Pouring liquids	One little girl's idiosyncratic intense interest was with pouring liquids—she was constantly pouring sauces, shampoos, perfumes, water, and other drinks from container to container. So constant was this activity that she was banned from visiting the next-door neighbors for repeatedly creating messes by her pouring.
Bodies and injuries	Another girl showed a very unusual intense interest in bodies and injuries. Starting at about 4 years, she was fascinated with anything health related. She was constantly asking how the body worked and noticed whenever anyone had an injury ('owie,' 'boo-boo') or was wearing a band-aid.
U.S. presidents	One young boy was intensely interested in the U.S. presidents. He noticed a relief of three Virginia presidents (Jefferson, Madison, and Monroe) and immediately became fascinated with who these men were and what they did. His mother described the achievements of the presidents, and her son continued to ask questions about them. He showed a great interest in the 1996 presidential election and collected various kinds of presidential memorabilia.
Inventing and building	A boy with an intense interest in inventing and building was constantly inventing and constructing imaginative objects from materials found around the house; egg cartons and string, for example, were fashioned into a flying machine, accompanied with an elaborate explanation of how it worked. He created similar kinds of things several times a day.
Brooms, brushes, and mops	One little boy was extremely fascinated by brooms, mops, rakes, hairbrushes, toothbrushes, and vacuum cleaner attachments. Because of his obsession with these objects, his mother bought him his own broom, hairbrush, and toothbrush that he could use any time. She then locked the other brooms, rakes, and vacuum in a closet so he could only use them under supervision. Even the other hairbrushes and toothbrushes had to be secured in an out-of-reach cupboard to keep him from playing with them.

Note. The sixth idiosyncratic interest, which concerned the Blue Angels, is described in Table 2.

Table 4
Activities Parents Describe as Evidence of Their Child's Intense Interest

Activity	Interest	Parent quotes
Scanning the environment for object and drawing attention to it	Cars	"He'd find them [vehicles] on cereal boxes, on display stands at the grocery store; he even found them on an orange juice carton that was half an inch wide and on the back of a Ritz cracker box."
	Wheels/vehicles	"When he was younger, anything that moved in a circular motion he considered a wheel. If we go to Lowe's, he won't leave me alone until we get to the area with ceiling fans and walk up and down the aisle. He will go to anything that has a wheel; whether it's in a book or in a parking lot. When we're driving and he sees something with a wheel, he just becomes visibly more animated and loud."
Talking about object or activity of interest	U.S. presidents	"He was very fascinated by the relief of the three presidents at the downtown mall [a prominent sculpture of Presidents Madison, Jefferson, and Monroe]. He would run down there and look at them and talk about them and name them. They also have silhouettes of them on the Charlottesville [VA] signs, so every time we would pass them, he would say: 'There they are again.'"
Generalizing interest category	Balls/spherical objects	". . .Anything that's spherical, that she can throw. Walnuts that fall off the tree, balloons, beach balls, all types and shapes of balls, cloth balls, anything that's basically round. She tended to go for something that rolled, and then she'd manipulate it with her hands."
	Brushes, brooms, vacuums, and mops	"He mostly imitates us; trying to rake or mop. He'll want to mop the floor or brush it. We bought him his own broom so he can sweep the rug or carpet any time he wants. If he sees something on the floor, he'll run and get the broom and sweep it over. We got a new vacuum cleaner that he calls Nu-nu. So we let him pull it around as much as he wants to because he always wants to vacuum."
Asking to read books or watch videos related to interest	Dinosaurs	"It was the only thing he wanted to watch when he had a video opportunity. We had a couple of books on dinosaurs, and he found those—they were out all the time."
Asking parents to buy items related to interest	Baby dolls	"We bought her a zillion dolls. We kept buying more and more dolls because every time we went to the grocery store, she'd want another one."
	Trains	"I bought videos of trains, real trains and model trains. And books on trains."

roaring and clawing at other children in his preschool. When some mothers complained to the teacher that it was upsetting their children, the child was forbidden to pretend to be a dinosaur at school.

Only four parents reported not actively supporting their child's interest. These interests included pouring liquids; fans and air conditioners; bodies and injuries; and brooms, mops, and vacuums. These mothers indicated that rather than actively discouraging the interest, they generally tolerated and at times reluctantly indulged their child's interest. For example, the mother whose 5-year-old daughter had an extremely unusual interest in bodies and injuries would occasionally agree to stop the car so they could examine road kill. The mother whose son was fascinated with fans would reluctantly allow him to spend time watching the air conditioner fans and would sometimes indulge his requests to turn the bathroom fan on and off.

Duration of Children's EIIs

The EIIs of the young children in our sample were quite long lasting. At the time of the phone interview, their interests were reported to have lasted from 6 to as long as 36 months, and the mean duration of the ongoing EIIs was 22 months (boys $M = 21.4$ months; girls $M = 23.1$ months). There were no apparent differences in the persistence of very early versus later emerging interests. The most salient result was that these young children had been preoccupied with their interest category for a large portion of their lives.

General Discussion

The research reported here provides initial documentation and preliminary information about the emergence very early in life of

EIIs in particular categories of objects and activities. This striking phenomenon is not rare: Nearly a third of the children in our sample developed interests that preoccupied them for anywhere from a few months to years. Some children became so focused on one interest that it dominated many aspects of their life—what they thought about, talked about, looked for, and did.

Three aspects of our results suggest that EIIs typically originate with the child rather than as a result of influence by other people. First, more than a third of the EIIs were reported to have emerged in the first year of life without any parental encouragement or facilitation. Second, some of the children developed early interests that their parents found odd (e.g., blenders, vacuum cleaners), worrisome (e.g., fans), or even repulsive (e.g., injuries and road kill). The third, and especially intriguing, indicator of the spontaneous origin of many EIIs is the existence of a few cases in which the original basis for the interest seems to be almost wholly perceptual. For example, although balls are a common, socially acceptable type of plaything, some of the children with an interest in balls were described as initially paying attention to anything spherical in shape, regardless of size, kind (e.g., lamps, walnuts, gumballs, beach balls), material (e.g., glass, wood, plastic, cloth, rubber), or function. The most striking passion based on a perceptual image is the love of trains that was described to have originated with train tracks (see Table 2), then spreading to fences and zippers. One thing in common among these items is that all involve a pattern of extended horizontal lines regularly intersected by vertical lines. (The mother did not describe the interest in these terms.) A fascinating question is how a long-lasting, preoccupying passion could originate from a meaningless perceptual image; what causes young children's attention to be so galvanized by some particular object or event that it comes to dominate their lives?

The most prominent form of individual difference in EIIs are gender differences in both the incidence and content of EIIs. Overall, nearly three fourths of the children in our study who were identified to have EIIs were boys, and most of their EIIs involved gender-stereotyped categories.⁶ Both these results are consistent with Baron-Cohen's views on gender differences in systemizing (e.g., Baron-Cohen, 2002).

The gender differences we found contrast with the results for slightly older children reported by Johnson et al. (2004). They found that 4-year-old girls and boys were equally likely to have an "intense interest" in a conceptual domain, differing only in the specific content of their interests. In our study, boys were twice as likely as girls to be classified as having an "extremely intense interest." Perhaps gender differences occur primarily for the most extreme level of interests, such that examining only those interests would reveal a preponderance of boys (and men) at any age.

Over half of the EIIs that emerged in the first 2 years of life were gender stereotyped. However, implicit knowledge of gender stereotypes is only evident at 18 months for girls and 24 months for boys (Serbin et al., 2001). This decalage in interests and understanding suggests that knowledge about gender does not play a crucial factor in the initial formation of EIIs.

The preponderance of boys with EIIs reported here is consistent with evidence that boys are generally more likely to have overriding specific interests than girls are at 4 years of age (Knickmeyer, Baron-Cohen, Raggatt, & Taylor, 2005) and that the difference also occurs in adulthood (Baron-Cohen, Wheelwright, Skinner, Martin, & Clubley, 2001). A possible biological role in this difference is reflected in a relation between the tendency for restricted interests among 4-year-olds and their level of exposure to fetal testosterone.

One important limitation of the research reported here is that, because our initial goal was simply to document the existence of EIIs, parent reports constitute the sole source of data. In further investigations, converging evidence could come from designing laboratory tasks to independently assess the strength of very young children's interests (e.g., examining performance on tasks using materials within and outside their interest category).

It would be interesting to learn through future research more about what—other than gender—sets children with EIIs apart from other typically developing children. One candidate is intelligence; older children with very strong interests tend to be of above-average intelligence (Chi, Glaser, & Farr, 1988; Johnson et al., 2004; Johnson & Eilers, 1998). Another possibility is temperament, with young children with EIIs more likely than others to engage in repetitive play and to have difficulty shifting attention.

It would also be interesting to know about the relation of the existence of early EIIs to later interests. Presumably, the likelihood of long-term relations would depend on the nature and social acceptability of the interests, in part because parents would provide more support for more conventional ones. However, continuity between early and later interests might be manifested primarily in a general tendency to have intense interests irrespective of content. Thus, very young children with EIIs may be more likely than the average child to become devoted hobbyists or collectors as adults, but the particular focus of their hobby or collecting activity may be different from what preoccupied them in their first years of life.

⁶ The overrepresentation of boys in the group of normally developing young children with EIIs is also characteristic of individuals with autism and Asperger's syndrome (Rutter, 1978; Yeargin-Allsopp et al., 2003). Furthermore, children in these groups often have very strong preferences for a circumscribed set of objects or activities, and a strong preference for construction and vehicle toys is common (Baron-Cohen, 2002). The relation between EIIs occurring in normally developing children and the circumscribed interests and preoccupations seen in autism spectrum disorders merits further exploration but is outside the scope of the present research.

References

- Baron-Cohen, S. (2002). The extreme male brain theory of autism. *Trends in Cognitive Sciences*, 6, 248–254.
- Baron-Cohen, S. (2003). *The essential difference: The truth about the male and female brain*. New York: Basic Books.
- Baron-Cohen, S., & Wheelwright, S. (1999). 'Obsessions' in children with autism or Asperger syndrome: A content analysis in terms of core domains of cognition. *British Journal of Psychiatry*, 175, 484–498.
- Baron-Cohen, S., Wheelwright, S., Skinner, R., Martin, J., & Clubley, E. (2001). The autism-spectrum quotient (AQ): Evidence from Asperger syndrome/high-functioning autism, males and females, scientists and mathematicians. *Journal of Autism and Developmental Disorders*, 31, 5–17.
- Chi, M. T., Glaser, R., & Farr, M. J. (Eds.). (1988). *The nature of expertise*. Hillsdale, NJ: Erlbaum.
- Chi, M. T., Hutchinson, J. E., & Robin, A. F. (1989). How inferences about novel domain-related concepts can be constrained by structured knowledge. *Merrill-Palmer Quarterly*, 35, 27–62.
- Chi, M. T., & Koeske, R. D. (1983). Network representation of a child's dinosaur knowledge. *Developmental Psychology*, 19, 19–39.
- Gulerce, A. (1991). Transitional objects: A reconsideration of the phenomenon. *Journal of Social Behavior & Personality*, 6, 187–208.
- Johnson, K. E., Alexander, J. M., Spencer, S., Leibham, M. E., & Neitzel, C. (2004). Factors associated with the early emergence of intense interests within conceptual domains. *Cognitive Development*, 19, 325–343.
- Johnson, K. E., & Eilers, A. T. (1998). Effects of knowledge and development on subordinate level categorization. *Cognitive Development*, 13, 515–545.
- Johnson, K. E., & Mervis, C. B. (1994). Microgenetic analysis of first steps in children's acquisition of expertise on shorebirds. *Developmental Psychology*, 30, 418–435.
- Johnson, K. E., Scott, P., & Mervis, C. B. (1997). Development of children's understanding of basic-subordinate inclusion relations. *Developmental Psychology*, 33, 745–763.
- Knickmeyer, R., Baron-Cohen, S., Raggatt, P., & Taylor, K. (2005). Foetal testosterone, social relationships, and restricted interests in children. *Journal of Child Psychology and Psychiatry*, 46, 198–210.
- Krapp, A. (2002). Structural and dynamic aspects of interest development: Theoretical considerations from an ontogenetic perspective. *Learning and Instruction*, 12, 383–409.
- Leonard, H., Goldberger, E., Rapoport, J., Cheslow, B., & Swedo, S. (1990). Childhood rituals: Normal development or obsessive-compulsive symptoms? *Journal of the American Academy of Child & Adolescent Psychiatry*, 29, 17–23.
- Litt, C. J. (1986). Theories of transitional object attachment: An overview. *International Journal of Behavioral Development*, 9, 383–399.
- Lord, C., Rutter, M., & Le Couteur, A. (1994). Autism Diagnostic Interview—Revised: A revised version of a diagnostic interview for caregivers of individuals with possible pervasive developmental disorders. *Journal of Autism and Developmental Disorders*, 24, 659–685.

Lutchmaya, S., & Baron-Cohen, S. (2002). Human sex differences in social and non-social looking preferences at 12 months of age. *Infant Behavior & Development, 25*, 319–325.

Maccoby, E. E. (1998). *The two sexes: Growing up apart, coming together*. Cambridge, MA: Harvard University Press.

O'Brien, M., & Huston, A. C. (1985). Development of sex-typed play behavior in toddlers. *Developmental Psychology, 21*, 866–871.

Renninger, K. A. (1992). Individual interest and development: Implications for theory and practice. In K. A. Renninger, S. Hidi, & A. Krapp (Eds.), *The role of interest in learning and development* (pp. 361–396). Hillsdale, NJ: Erlbaum.

Renninger, K. A., Hidi, S., & Krapp, A. (1992). *The role of interest in learning and development*. Hillsdale, NJ: Erlbaum.

Renninger, K. A., & Wozniak, R. H. (1985). Effect of interest on attentional shift, recognition, and recall in young children. *Developmental Psychology, 21*, 624–632.

Rutter, M. (1978). Diagnosis and definitions of childhood autism. *Journal of Autism and Childhood Schizophrenia, 8*, 139–161.

Serbin, L. A., Poulin-Dubois, D., Colburne, K. A., Sen, M. G., & Eichstedt, J. A. (2001). Gender stereotyping in infancy: Visual preferences for and knowledge of gender-stereotyped toys in the second year. *International Journal of Behavioral Development, 25*, 7–15.

Winnicott, D. W. (1953). Transitional objects and transitional phenomena; a study of the first not-me possession. *International Journal of Psycho-Analysis, 34*, 89–97.

Yeargin-Allsopp, M., Rice, C., Karapurkar, T., Doernberg, N., Boyle, C., & Murphy, C. (2003). Prevalence of autism in a U.S. metropolitan area. *Journal of the American Medical Association, 289*, 49–55.

Received November 4, 2005
 Revision received March 24, 2007
 Accepted April 11, 2007 ■

UNITED STATES POSTAL SERVICE
Statement of Ownership, Management, and Circulation
(All Periodicals Publications Except Requester Publications)

1. Publication Title: Developmental Psychology

2. Publication Number: 0012-1649

3. Filing Date: October 2007

4. Issue Frequency: Bimonthly

5. Number of Issues Published Annually: 6

6. Annual Subscription Price: Indiv \$225 Inst \$452

7. Complete Mailing Address of Known Office of Publication (Street, city, county, state, and ZIP+4®):
750 First Street, N.E., Washington, D.C. 20002-4242

8. Complete Mailing Address of Headquarters or General Business Office of Publisher (Not printer):
750 First Street, N.E., Washington, D.C. 20002-4242

9. Full Names and Complete Mailing Addresses of Publisher, Editor, and Managing Editor:
 Publisher (print or complete mailing address):
American Psychological Association
750 First Street, N.E.
Washington, D.C. 20002-4242
 Editor (name and complete mailing address):
Suzanne Garcia Coffey, PhD
Brown University, Center for Study of Human Development
Box 2631, 133 Waterman Street, Providence, RI 02912
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 Full Name: American Psychological Association Complete Mailing Address: 750 First Street, N.E., Washington, D.C. 20002-4242

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 This publication, including all advertising matter, is published for the general public for a profit.
 This has not changed during preceding 12 months.
 Has Changed During Preceding 12 Months (Publisher must submit explanation of change with this statement)

13. Publication Title: Developmental Psychology

14. Issue Date for Circulation Data Below: July 2007

15. Extent and Nature of Circulation

	Average No. Copies Each Issue During Preceding 12 Months	No. Copies of Single Issue Published Nearest to Filing Date
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e. Total Free or Nominal Rate Distribution (Sum of 15d(1), (2), (3), and (4))	249	224
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h. Total (Sum of 15f and g)	3367	2950
i. Paid or Nominal Rate (PS Form 3541)	92%	92%

16. Publication of Statement of Ownership
 If the publication is a general publication, publication of this statement is required. Will be printed in the November 2007 issue of this publication. Publication not required.

17. Signature and Title of Editor, Publisher, Business Manager, or Owner: _____ Date: _____

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