

Parents' Influence on Infants' Gender-Typed Toy Preferences

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Abstract Gender socialization influences children at early ages, shaping their developing identities. The toys provided by parents deliver some of the earliest gender-based messages by encouraging children to engage in activities associated with, for example, dolls and trucks. In the current study, we measured the influence of parental socialization by assessing 5- and 12 ½-month-old infants' exposure to dolls and trucks and by experimentally manipulating parents' encouragement to play with these toys. We found that infants displayed gender-typical toy preferences at 12 ½, but not 5 months, a pattern characteristic of previous studies. However, brief encouragement by a parent to play with toys from each category was ineffective in altering infants' preferences. Rather, the types of toys present in the home predicted preferences, suggesting that at-home exposure to toys may be influential in the development of toy preferences. These findings reveal that socialization processes may indeed play a role in the formation of early gender-typical toy preferences and highlight the importance of equal toy exposure during infancy to ensure optimal development.

Keywords Gender differences · Gender · Infant · Parents · Toys · Gender socialization

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The influences of gender stereotypes permeate people's daily experiences. Research, much of which has been conducted in Western societies, shows that a person's decisions and behaviors (e.g., clothing choices, career choices, personal and professional interactions) are shaped by perceptions of gender (Halim et al. 2014). Historically, the focus of research on gender development has been on children who are at or over the age of two because they exhibit some understanding of gender-related behaviors and of their own gender identity (e.g., Bussey and Bandura 1999; Kohlberg 1966; Martin et al. 2002; Slaby and Frey 1975). Thus, knowledge of and explanations for gender development have been incomplete.

More recently, researchers have acknowledged this discrepancy and have begun to examine topics related to gender development in infants and toddlers. Like these researchers, we recognize that it is important to examine the ways in which infants are exposed to gender-related beliefs and values from birth, particularly given that these values influence gender development and experiences within a gendered environment across the lifespan. Interest in gender-typed toys has received a great deal of attention (e.g., Alexander 2003; Alexander et al. 2009; Berenbaum and Hines 1992; Caldera et al. 1989; Campbell et al. 2000; Jadva et al. 2010; Pomerleau et al. 1990; Servin et al. 2003; Todd et al. 2016). During childhood, girls are often encouraged to play with stereotypically feminine-type toys (e.g., dolls and kitchen sets) whereas boys are often encouraged to play with stereotypically masculine-type toys (e.g., trucks and guns; Blakemore and Centers 2005; Hines 2004; Pomerleau et al. 1990).

Previous research has indicated that even young infants and toddlers demonstrate gender-typed toy preferences. However, the results of these studies are mixed and discrepancies exist in the age at which these preferences are shown to first arise (Alexander et al. 2009; Alexander and Saenz 2012; Campbell et al. 2000; Lamminmäki et al.

2012; Servin et al. 1999; Todd et al. 2016; Beek et al. 2009). For example, one study found gender-typed toy preferences in male, but not in female, infants as young as 3 months (Campbell et al. 2000). Another study yielded similar results, but in 6-month-old male infants (Escudero et al. 2013). However, Alexander et al. (2009) and Todd et al. (2016) found gender-typed preferences in both male and female infants at 9 months of age. Other literature indicates that these preferences are demonstrated by toddlers older than 12 months (Alexander and Saenz 2012; Lamminmäki et al. 2012; Servin et al. 1999; van de Beek et al. 2009). Given that there is discrepancy in the age at which gender-typed toy preferences first arise, further research is needed to examine when these preferences develop. Here we investigate the effect of parental encouragement toward gender-typed toy play in 5-month-old infants and 12-month-old toddlers and our findings have implications for development (Cherney et al. 2003; Francis 2010).

Theories of Gender Development and Differences

The degree to which biology, as opposed to socialization, influences gender-linked behavior is one of the most hotly debated aspects of gender research (Birke and Vines 1987; Coleman and Hong 2008; Eagly and Wood 2013; Hyde 1990; Okruhlik 1998). Teasing apart the relative influence of biology and socialization (nature or nurture) has proved challenging, even in the area of gender differences in toy preference. However, researchers have noted that it is likely that both biology and socialization practices are influential to the development of gender-typed toy preferences in infants and toddlers (Hines et al. 2016). There is evidence to suggest that biological factors play a role in children's toy preferences. Some researchers have posited that because these differences occur at such a young age, they must arise from a genetic predisposition to prefer certain types of toys or toy characteristics (Alexander 2003; Alexander and Hines 2002; Hassett et al. 2008) or that these differences may be influenced by sex hormones, such as androgen (Alexander 2006; Berenbaum and Hines 1992; Cohen-Bendahan et al. 2005; Collaer and Hines 1995; Jürgensen et al. 2007; Servin et al. 2003).

Although these studies highlight the association between hormones and gender-typed behaviors and preferences, it remains possible, if not likely, that parental socialization also guides early infant and toddler toy preferences. Yet, this possibility has not been fully explored in infants. In fact, researchers approaching an issue from a biological standpoint often point to infant behavior in support of a biological explanation because, unlike older children who have undergone years of socialization, infants remain comparatively untainted by adults' biases. We argue, however, that parents begin

socializing their children from Day 1 and that even the youngest infants are not impervious to parental influences. It is for this reason that we chose to examine socialization attempts by parents of very young infants as well as toddlers.

Constructing a Gendered World

Herein, our conceptualization of gender development is guided by social constructionist theory, situating gender not as a naturally existing category, but as a social creation (Crawley and Broad 2008) that holds consequences for how people navigate through the environment (McDowell 2015). As such, parental socialization practices such as modeling, reinforcement, and direct tuition (Bussey and Bandura 1999) are influenced by society's construction of gender and ideas of masculinity and femininity. Therefore, we consider gender-typed toy preferences to be an outcome of exposure to the socially constructed attitudes and behaviors of those with whom infants and children interact. These first encounters of a gendered world typically take place with parents (Halim and Ruble 2010). Parents often interact with their children in gendered ways based on their assigned sex at birth, which is typically assumed to correspond to their gender identity later in life (Butler 1993; Meyer-Bahlburg et al. 2016). As such, we, like many researchers, propose that gender-typed toy preferences are in part influenced by parental socialization practices (i.e., modeling and reinforcement) (Bussey and Bandura 1999; Fagot and Hagan 1991; Langlois and Downs 1980) and that it is during infancy that the foundations for these preferences are constructed.

Cognitive theorists posit that children learn about gender during interactions with the environment and they categorize objects, behaviors, and people based on gender schemas (Bussey and Bandura 1999; Kohlberg 1966; Liben and Signorella 1980; Martin and Halverson 1983). It is these internalized schemas that lead to the creation of gender differences. Although it has been largely assumed that infants are unable to create gender categories, recent research has provided evidence that they can. Historically, researchers concluded that with gender awareness comes gender preferences (Weinraub et al. 1984). Weinraub et al. (1984) suggest that gender differences in toy preferences develop once children have a clear understanding of gender and have begun to make distinctions between socially appropriate behaviors, typically between the second and fourth year of life or as early as 26 months. However, recent research suggests that there are critical advances in gender knowledge at younger ages, between 18- and 23-months (Todd et al. 2016), and that infants are sensitive to gender associations and categorize based on gender very early.

For example, 3- and 4-month-old infants prefer faces that represent the gender of their primary caregiver (Quinn et al.

2002), and 12-month-old infants categorize men and women based on gender-typical hair length and clothing styles (Leinbach and Fagot 1993). Even by 24 months, toddlers associate gender-related physical characteristics with stereotypical behaviors; Serbin et al. (2002) found that toddlers looked longer at photographs that depicted men and women participating in activities that were inconsistent with gender stereotypes, indicating that the toddlers recognized and expected the associations and were surprised when they were violated. Zosuls et al. (2009) suggest that infants as young as 19-months utilize gender labeling, which in turn predicts increased gender-typed play. These findings suggest that infants' knowledge of gender categories might influence gender-typing much earlier than previously thought. An example of how infants and toddlers begin to categorize by gender is through toy preferences. Numerous studies have demonstrated that gender-typed toy preferences are evident in young infants and toddlers, suggesting that young infants may begin categorizing based on gender constructs (Alexander et al. 2009; Campbell et al. 2000; Todd et al. 2016).

Evidence of early sex differences in gender-typed toy preferences can be observed in infants as young as 3 to 8 months using visual interests as an indicator of toy preference (Alexander et al. 2009). These early differences are akin to the toy preferences seen in older children. For example, 3- to 8-month-old female infants showed more visual interest in dolls than in trucks (Alexander et al. 2009), and 9-month-old male infants looked longer at pictures of masculine-typed toys than other toys (Campbell et al. 2000). Most recently, Todd et al. (2016) similarly found that infants as young as 9 months demonstrated gender-typed toy preferences. Clear gender differences in toy preferences have also been observed in 12-month-old and 14-month-old toddlers (Lamminmäki et al. 2012; Servin et al. 1999; van de Beek et al. 2009). Together these studies provide good evidence to suggest that gender-typed toy preferences emerge toward the end of infants' first year.

These studies counter previous claims that gender awareness is a key component necessary for categorizing based on gender and leave open the possibility that even very young infants may be influenced by parental socialization of gender constructs. Therefore, the aim of the present research project is to explore how parents construct a gendered world for their infants and, more specifically, to identify parents' role in the formation of gender-typed toy preferences in infancy. There is evidence to suggest that even in infancy parents promote gender norms.

Parents' Reification of Gender Norms

One of the central premises of our research is the idea that parents and others in the child's environment may play a large

part in creating the gender-typed toy preferences observed in children. Parental attitudes about gender influence parenting practices as soon as an infant's sex is identified, even if prior to birth. These attitudes are demonstrated through the traditionally gendered naming of infants (Barry and Harper 1995; Lieberson and Bell 1992), how infants are dressed based on their sex (and assumed gender) (Fagot 1995; Shakin et al. 1985), and activity level (e.g., male infants are considered to be more active and female infants are considered to be more docile) (Burnham and Harris 1992; Karraker et al. 1995; Rubin et al. 1974; Teichner et al. 1997). More recently, Endendijk et al. (2013) found that both mothers and fathers held gender stereotypes for their children, but mothers' tended to be implicit (e.g., assuming all children with long hair are girls), whereas fathers' tended to be explicit (e.g., telling boys that dolls are for girls).

Parents not only infer certain characteristics based on their children's assumed gender identity but also interact differently with their male and female infants. For example, the quality of parents' play with their male infants and toddlers has been observed as highly physical in nature (e.g., rough and tumble play) (Haight et al. 1997; Lindsey and Mize 2000, 2001), whereas parents' play with their female infants and toddlers tends to be gentle and involve pretend play that is female gender-role oriented (e.g., playing house) (Lindsey and Mize 2000, 2001). Furthermore, observational research demonstrates that when parents are with their infants in playrooms with gender-typed toys, parents, especially fathers, are more likely to choose gender-typical toys for their infants and respond positively to their child playing with gender-typical toys (Caldera et al. 1989; Fagot and Hagan 1991; Jacklin et al. 1984; Snow et al. 1983).

These forms of parental interactions, whether consciously or unconsciously guided, reinforce a strict gender binary, placing certain characteristics at extreme ends of a perceived continuum of feminine to masculine (Beall 1993; Blakemore et al. 2009; Lytton and Romney 1991). More so, children's gender-typed play behavior is often variable over time and occurs in response to exposure to different play behaviors (Green et al. 2004). This pattern suggests that children also learn through exposure and that parents are the first to expose their children to gender constructs. Therefore, previous exposure to certain types of toys during infancy could theoretically lead to gender-typed toy preferences in later childhood. Parents traverse gender constructs with their children through implicit and explicit gender labeling, which impacts children's understandings of what it means to be a boy or a girl.

Gender-typed toy preferences may develop throughout infancy via familiarity with toys and reinforcement of toy play coming from implicit gender labels. Weisgram et al. (2014) suggest that both implicit and explicit gender labeling contribute to gender-typed toy preferences. In Western cultures, children receive implicit gender cues from their social

environment. For example, the types of toys parents and other caregivers make available to children provide an implicit message that such toys are appropriate. Similarly, children receive explicit gender cues from people in their environment about what types of toys boys and girls like (e.g., “Girls like dolls.”) (Martin et al. 1995). Ultimately, implicit and explicit gender labeling teaches children which toys are suitable for play by their gender, which can lead to greater interest (Martin et al. 2002), and which are unsuitable, which can lead to avoidance (Martin et al. 1995). Gender labels such as these are delivered through exposure and reinforcement (Bussey and Bandura 1999; Kane 2006; Langlois and Downs 1980; Lytton and Romney 1991). Although gender labeling influences older children, the extent to which it impacts infants has not been established.

In infancy, familiarity to stimuli has been shown to significantly enhance interest in individual objects, object categories, and physical events (Civan et al. 2005; Fagan 1970; Hunter and Ames 1988). Although novelty responses are also displayed by infants (i.e., attention is greater for new stimuli), familiarity preferences are common, particularly in younger infants, and they occur in response to a combination of individual factors, duration of initial exposure to stimuli, and the length of the delay following exposure (Hunter and Ames 1988; Wetherford and Cohen 1973). In this way, parents have the opportunity to shape infants’ preferences by exposing them to specific toys. When multiple exemplars of a toy category are provided (e.g., three different trucks), parents facilitate formation of toy categories, which as infants develop, may be linked to gender-related messages. Infants’ preferences may be guided by familiarity, and they can be reinforced via pleasant stimulation (e.g., a parent’s cooing voice and affectionate touch during play) or through joint attention (looking where another is looking) and social referencing (evaluating a situation based on others’ affective responses) (Feinman and Lewis 1983; Flom and Johnson 2010; Hornik et al. 1987). We propose that even in infancy, before gender identity is developed, these processes are in effect; exposure to toys has the potential to shape early toy preferences, as does parental reinforcement.

Research Questions

There is evidence that both biological and social factors affect early toy preferences, however, few studies have experimentally examined the influence that parental socialization attempts may have on infants’ toy preferences, particularly at very young ages. Therefore, the aim of our research project was to examine how parents’ construction of gender influences the socialization of infants’ toy preferences. We examined toy preferences and toys in the home of infants 5 and 12 months of age. These ages are important for several

reasons. First, we wanted to examine toy preferences at a very young age, given that parents have had less time to influence their infants’ toy preferences relative to 1- or 2-year-olds. Furthermore, immaturities in the visual system (e.g., poor visual acuity and color perception) have limited infants’ ability to visually appraise objects in the early months. By 4 and 5 months, however, infants are able to see relatively well so their visual experience with toys is rapidly increasing. We want to know whether infants show signs of bias toward these toys, as well as evaluate which toys parents are making available to their very young infants. Learning the degree to which parents make gender-typed toys available to very young infants and whether availability maps onto preferences is important because if parents are able to influence infants’ toy preferences, that influence is likely in the early stages.

On the other hand, by 12 months, parents have had ample opportunity to guide their infants’ preferences through exposure to toys and by sending both implicit and explicit messages. Furthermore, 12-month-old infants are adept at reaching for, grasping, and manually exploring toys. As a result, their appraisal of toys is multi-modal and extensive. These infants have had the opportunity to develop preferences based on socialization and potentially to strengthen those preferences by actively seeking out toys. Yet, what types of experiences guide these preferences? Are infants or toddlers receptive to parents’ overt attempts to encourage play to a particular toy? Are parents exposing infants to gender-typed toys? If so, do the toys in the home correspond to infant preferences?

In the present study, we addressed the five research questions to explore the extent to which gender-typed toy preferences may be influenced by parental socialization through exposure and reinforcement. (a) Research Question 1: At baseline, do sex differences in toy preferences exist in infants ages 5 and 12 months? (b) Research Question 2: Do parents influence toy preferences through short-term joint play and if so, to what degree? (c) Research Question 3: What types of toys are present in 5- and 12-month-old infants’ homes and do these vary by the age and parent-reported sex of the child? (d) Research Question 4: Does the amount of time spent playing with toys in the home vary by age and reported sex of the child? (e) Research Question 5: To what extent are toy preferences in a lab setting predicted by at-home exposure to certain toys?

To answer these questions, we asked parents to complete a survey inventorying the types of toys in the home (dolls, trucks, blocks and building toys, music toys, etc.) and the amount of time their infant or toddler played with each type of toy. Then we tested their child’s preference for gender-typed toys (dolls relative to trucks) using a looking task for the younger infants and a selection task for the toddlers. After the baseline test, parents played with their child for a short duration, encouraging their child to play with one type of toy (e.g., dolls) and discouraging them to play with the other

type of toy (e.g., trucks). Then the child's preferences were again assessed. We compared pretest (i.e., baseline) scores to posttest scores and analyzed them in relation to survey data.

Method

Participants

We identified parents of infants from birth announcements and commercialized lists and contacted them via telephone and letters. A total sample of 111 infants included 51 5-month-old infants ($M = 4$ months, 26 days; range = 4 months, 0 days to 6 months, 14 days; male infants, $n = 27$, 53%, female infants, $n = 24$, 47%) and 60 12-month-old toddlers ($M = 12$ months, 11 days; range = 11 months, 0 days to 14 months, 20 days; male toddlers, $n = 30$, 50%, female toddlers, $n = 30$, 50%). The participants were Caucasian ($n = 102$, 92%), Hispanic ($n = 2$, 2%), Native American, ($n = 1$, 1%), and Black/Caucasian ($n = 1$, 1%), Asian/Caucasian ($n = 2$, 2%), and Pacific Islander/Caucasian ($n = 1$, 1%). The highest level of education of infants' parents were reported as college graduate ($n = 100$, 90%), some college ($n = 9$, 8%), high school ($n = 1$, 1%), and some high school ($n = 1$, 1%). Forty-six participants (41%) attended childcare (part-time, $n = 7$, 6%; full-time, $n = 39$, 35%). Parents reported the sex of their child by selecting from the options of male, female, or intersex, with none reporting the last option.

Participants were counterbalanced in one of two conditions (encouraged to play with a truck or encouraged to play with a doll). Of the total 111 infants, 36 infants and toddlers were removed from lab experimental analyses due to side preferences (i.e., looked at or selected an object from one side greater than or equal to 85% of the time), low inter-rater reliability, deviation from experimental procedures by experimenter, and deviation from experimental procedures by parent, lack of participation from infant or toddler, and prematurity. However, these data were retained for survey-data analyses. Therefore, a final sample size of 72 participants completed all phases of the study. These included 36 5-month-olds ($M = 4$ months, 27 days, range = 4 months, 1 day to 6 months, 10 days; male, $n = 18$, 50%; female, $n = 18$, 50%) and 36 12-month-olds ($M = 12$ months, 10 days, range = 11 months, 3 days to 13 months, 29 days; male, $n = 18$, 50%; female, $n = 18$, 50%). These 72 infants and toddlers data were utilized for the analyses of the data collected during the lab experiment portion of the study.

Apparatus and Stimuli

Objects used during the test trials were four dolls and four trucks. The doll-truck toys were paired as follows: Hasbro Baby Alive Kicks and Cuddles Newborns Doll–Hispanic was

paired with TOYI Zoomster Vehicle–School Bus; My Sweet Love 10" Soft Baby Doll was paired with Fisher-Price Little People® Rumbly Rocks Dump Truck with all decals removed; CityToy doll was paired with Fisher-Price Little People® Open and Close SUV; Fisher-Price® Nickelodeon™ Bubble Guppies™ Molly was paired with Tonka Chuck & Friends–Rowdy The Garbage Truck by Hasbro with all decals removed. Sizes ranged from small (6.2 cm wide × 6.2 cm high) to large (11.6 cm wide × 14.4 cm high) for trucks and from small (6.0 cm wide × 11.1 cm high) to large (11.1 cm wide and 20.0 cm high) for dolls.

The toys were paired together to be similar in size and color, however all the objects were multicolored and irregularly shaped so these pairings were not precise. Generally, smaller toys were paired together and similarly colored toys were paired together. For example, a doll dressed in pink and blue was paired with a pink and purple car. Unlike preschoolers' whose preferences are, in part, guided by color (Weisgram et al. 2014), color does not seem to have a similar effect on infant's toy preferences (Jadva et al. 2010).

Forced Choice Preferential Looking Task

For the 5-month-old task, a puppet-stage-like apparatus, 60 cm high × 105 cm wide × 25 cm deep, sat on a Table 72 cm high. The sidewalls were wood grain and the back wall was a gray marble pattern. A fringe-lined, rectangular hole, measuring 15.5 cm high × 61.5 cm wide, was in the center of the backboard. The experimenter reached through the hole to place each toy on a white felt platform 60 cm wide × 15 cm deep prior to each trial. Two canvas-covered frames, 146 cm × 88 cm, on each side of the stage concealed the infants from the experimental room. The stage was lit with 16-watt fluorescent bulbs attached to the sidewalls and six 25-watt halogen bulbs across the ceiling. Infants viewed the events through an opening in the front of the apparatus 52 cm high × 80 cm wide. A screen was lowered over the opening to signal the end of each trial. A hidden camera, centered below the apparatus, recorded infants' face and upper torso. Two independent observers, concealed behind white curtains, viewed the infant live on a computer monitor.

Selection Task

A different assessment method was used for the older infants. Looking, although appropriate to young infants, becomes less reliable as an indicator of preference as infants enter their second year because they have increased independent mobility (Todd et al. 2016), therefore, we used a selection task for the 12-month-olds. A light-colored blanket was placed on the floor. Four white curtains served to conceal the experimental room from the infant and to hide an experimenter who was

tasked with placing the objects for a second experimenter to pick up quickly.

Play Session

A black table, 45.5 cm long × 65.5 cm wide × 70.1 cm high, was used during the play session. The play session objects included three trucks with all electronics disabled and tires glued (Road Rippers–Rush & Rescue Mini Ambulance 17, Bright Starts Press & Zoom Pals–Fire Truck, Fun Years Press ‘n Go Vehicle–Garbage Truck) and three dolls (Cabbage Patch® Cuties Pig Cutie with hood down, Baby Magic Bathtime Baby with hood down, MSL 14" Baby Maggie Doll, Owl with headband and pacifier removed) that were similar in size and appearance to the test stimuli. The trucks measured between 6.4 cm wide × 6.6 cm high and 10.2 cm wide × 13.5 cm high. The dolls were between 16.3 cm wide × 20.3 cm high and 22.9 cm wide × 31.8 cm high.

Questionnaire

We crafted a new toy inventory to measure infants' exposure to various types of toys. We based our design on the design of the Affordance in the Home Environment for Motor Development–Infant Scale (AHEMD-IS). Gabbard et al. (2008) validated the Affordance in the Home Environment for Motor Development–Self Report (AHEMD-SR). The AHEMD-IS was designed for use with infants ages 3 to 18 months and includes three sections asking parents to report on the physical space in which the child lives, infants' daily activities, and play materials with 20 categories. Photographed exemplars from each category and checkboxes next to a number enable parents to indicate their child's exposure to various types of play materials. We crafted our Toy Exposure Inventory based on the play materials section of the AHEMD-IS. We included 13 toy categories and added checkboxes to indicate not only the number of toys, but also the amount of time in hours that a child may play with a toy in a given week (see [online supplement](#)). We also added a toy color section to assess whether parents followed gender-typical color schemes (e.g., Do girls have more pink toys than boys?). Parents were asked to indicate the number of, for example, “mostly blue” toys their child has and the percent of time the child plays with toys of that color relative to other-colored toys. Although we included multiple toy and color categories, the doll and truck categories and the pink categories were our targets.

Procedure

On arrival to the lab, parents and infants were taken to the reception area where a research assistant discussed the study procedures with the parents and had the parents fill out the

intake forms (informed consent, demographic information, and the Toy Exposure Inventory). Once the parent completed the paperwork, a research assistant escorted the parent and the infant into the testing room. Two developmentally appropriate assessment methods were used to determine infants' and toddlers' toy preferences. The 5-month-olds' toy preferences were assessed using the forced choice preferential looking (FCPL) task (Civan et al. 2005; Teller 1979). The 12-month-olds' toy preferences were assessed using a selection-based task. Presentation order of the toys was randomized.

Forced Choice Preferential Looking Task

A FCPL task was used to assess 5-month-old infants' toy preferences in pretest and posttest. Infants sat on their parents' lap in front of the puppet-stage-like apparatus. An experimenter put on white gloves in front of the infants to familiarize infants with the gloved hand that they would later see in the apparatus. Trials began when the cover in front of the stage was removed and ended when it was replaced. The first trial was a familiarization trial in which the experimenter's gloved hands rested for five seconds on the stage floor in the puppet-stage-like apparatus. Next infants saw 12 test trials with an attention-getting trial after every second test trial. Infants were shown four doll/truck pairs, one pair per test trial. Each doll and truck pairing was shown for two trials before moving on to the next doll and truck pair. When the stage cover was removed to start the trial, the experimenter was holding the objects inside the apparatus at a 45-degree angle to the right from center. The experimenter then lifted both objects and rotated the objects back and forth 90 degrees (45-degree to the right from center and 45-degree to the left from center), one movement per second. Each of the 12 test trials lasted for 5 s from infants' first look. If the infants did not look within 5 s, the supervisor called the infants' name. During each trial, two concealed naïve observers determined to which side of the stage infants looked longest within the time limit (5 s) after having looked at both sides of the stage. They then made a choice about which side the infant preferred, left or right (forced choice). This forced choice occurred in-the-moment during each trial. Responses were later matched to the toy seen on that side of the stage for analysis. Interrater reliability was the percent of trials from pre- and posttest in which observers were in agreement ($M = 89%$, $min = 75%$). In the case of disagreement, decisions from the primary observer were used in data calculations. Observers were naïve to test conditions, research questions, and toy presentation.

Selection-task

A selection-task was used to assess 12-month-old toddlers' toy preferences in pretest and posttest. Parents and 12-month-old toddlers were instructed to sit on the floor across

from the experimenter. The pretest trial began with one to two familiarization trials to help ensure the child was comfortable selecting an object from the experimenter. During the familiarization trial, a recorder placed objects behind the experimenter's back, which the experimenter grabbed and held in front of him or her until the infant looked. Once the infant looked, the experimenter wiggled and placed the objects equidistant from the toddler. The toddler had 20 s to make his or her selection. If the infant selected an object on the first familiarization trial, the test trials began. The pretest and posttest consisted of eight trials. The test trials began similar to the familiarization trials, but the objects were replaced with the doll and truck pairing and were randomly placed on either left or right sides of the child based on the randomization plan. Toddlers, again, had 20 s to make a selection; if the toddler failed to make a selection, then the stimuli used in that test trial were reused after the initial eight trials until the infant made a selection. Observers watched from behind a one-way mirror and indicated which object the infant selected during each trial. Interrater reliability was the percent of trials, from pre- and posttest, in which the observers were in agreement ($M = 99\%$, $\text{min} = 88\%$). When discrepancies occurred that could not be resolved by a third observer, data from the primary observer was used.

Play Session

After the initial pretest, infants and their parents engaged in a play session. The play session was video-recorded for coding. The session began with the parent and infant or toddler sitting at a black table. The 5-month-old infants sat in the experimenter's lap across from the parent and the 12-month-old toddlers sat in their parent's lap. A research assistant instructed the parents to interact with only a certain type of toy (either trucks or dolls) and deter their infant from playing with the discouraged toy. Parents were instructed to play and speak as they naturally would. The supervisor then placed the play objects on the table in front of the parent and infant. The play session varied in length depending on the infant's age (i.e., 5 min for infants and 3 min for toddlers). These durations were used based on pilot testing that showed that these were the longest times tolerated by each age group. Following the play session, posttest trials were conducted. Posttest procedures were identical to the pretest trials, with the exception that the familiarization trials were removed.

Play Session Coding

Videos of the play session were coded for all infants who completed the posttest sessions ($n = 72$). A custom-made program was used in which two independent coders pressed a computer controller button for the duration that a target behavior was observed. Infants' looking and touching of the

encouraged toys were coded separately. Coders also collected data on looking and touching the discouraged toys. Data were collected every tenth of a second and coder reliability was calculated. Intercoder reliability averaged 94% with a minimum reliability score of 72%. Data from the primary observer were used for analysis.

Results

The proportion of trials in which infants and toddlers preferred either a truck or a doll was calculated, with a reminder that preferences for infants were assessed via a looking task and toddler's preferences were assessed via a selection task. The dependent variable in our primary analyses was percent of trials in which infants preferred the truck. Higher scores indicate a preference for the truck, whereas lower scores indicate a preference for the doll, and scores at or near 50% indicate no preference.

RQ 1: Baseline Preferences

To determine whether infants had a preference at baseline (prior to any attempts to influence their behavior), we examined pretest scores only and included all infants who had completed at least the pretest with no side preferences (5-month-olds, $n = 44$, 21 girls; 12-month-olds, $n = 46$, 21 girls). One sample *t*-tests comparing infants' pretest preference for the truck to chance (50%) revealed that both the 5-month-old female, ($n = 21$, $M = 38.10$, $SD = 25.21$), $t(20) = -2.16$, $p = .04$, $d = .47$, and male infants, ($n = 23$, $M = 39.62$, $SD = 17.50$), $t(22) = -2.84$, $p = .01$, $d = .59$, preferred the doll over the truck. Results for the 12-month-olds, however, indicated that when compared to chance (50%), the male toddlers showed a clear preference for the truck over the doll, ($n = 25$, $M = 65.04$, $SD = 29.22$), $t(24) = 2.57$, $p = .02$, $d = .51$, whereas the female toddlers selected the doll and truck approximately equally at baseline, ($n = 21$, $M = 44.36$, $SD = 31.25$), $t(20) = -.84$, $p = .41$, $d = .18$.

RQ 2: Influence of Short-Term Encouragement

To assess changes from pre- to posttest as a result of our experimental manipulation, we analyzed only infants who completed both the pre- and posttests and separated infants who, during the baseline tests, showed a low preference for the truck (scores <50%), and thus a higher preference for the doll ($n = 37$), from infants who showed a higher preference for the truck (scores >50%), and thus a lower preference for the doll ($n = 28$). If our experimental manipulation was effective, we would expect infants who initially showed a lower preference for the truck (i.e., they preferred the doll) to increase in preference for the truck after receiving encouragement to play

with the truck relative to infants who had been encouraged to play with the doll. In contrast, infants who initially had a high preference for the truck were expected to decrease in their preference for the truck if they had been encouraged to play with the doll, relative to those who had been encouraged to play with the truck.

Preference scores were analyzed using two 2 (test time: pre- to posttest) \times 2 (condition: encourage doll or encourage truck) Analyses of Variance (ANOVA)—one for children initially showing a preference for the truck and the second for children who initially preferred the doll. For infants who initially preferred the truck, the main effect of test time was statistically significant, $F(1, 26) = 13.11, p = .001, \eta_p^2 = .34$; when collapsed across condition, infants' preference for the truck decreased from pre- ($M = 77.61, SD = 14.06$) to post-test ($M = 64.29, SD = 27.76$). The main effect for condition was also significant, $F(1, 26) = 6.42, p = .02, \eta_p^2 = .20$. Infants who were encouraged to play with the doll tended to have a stronger preference for the truck both before ($M = 82.71, SD = 12.08$) and after ($M = 72.88, SD = 23.03$) the play session relative to the infants who were encouraged to play with the truck (pretest: $M = 69.73, SD = 13.70$; posttest: $M = 51.00, SD = 31.23$). The test-time \times condition interaction, however, was not statistically significant, $F(1, 26) = 1.28, p = .27, \eta_p^2 = .05$.

Similar results were obtained for infants who initially preferred the doll. There was a significant main effect of test time, $F(1, 35) = 5.59, p = .02, \eta_p^2 = .14$; when collapsed across condition, infants' preference for the doll decreased (as preference to the truck increased) from pretest ($M = 22.38, SD = 30.75$) to posttest ($M = 30.75, SD = 19.95$). The main effect for condition was not significant, $F(1, 35) = 9.42, p = .87, \eta_p^2 = .001$, nor was the test time \times condition interaction, $F(1, 35) = .15, p = .70, \eta_p^2 = .004$. In summary, for both groups, scores moved toward 50% (i.e., no preference) regardless of the toy encouraged by the parent. Together, these analyses indicate that the infants' preferences were not altered as a result of parents' brief attempts to encourage their child to play with a particular toy.

Parental Reinforcement During Play Session

Data from the primary observer were used for analysis. Data showed that parents were successful at directing infants' attention toward the specified toy in both play conditions and away from the discouraged toy. Infants' looking at the encouraged toy averaged 161.87 s ($SD = 71.04$) whereas they looked at the discouraged toy on average 10.54 s ($SD = 13.13$), $F(1, 63) = 244.53, p < .001, \eta_p^2 = .80$. Touch duration mirrored looking time data. Infants touched the encouraged toy on average 108.42 s ($SD = 64.20$) whereas they touched the discouraged toy an average of 4.48 s ($SD = 8.04$), $F(1, 61) = 152.68, p < .001, \eta_p^2 = .72$. On an individual level,

all infants had more interaction with the encouraged toy than with the discouraged toy.

Survey Data

We wanted to know what types of gender-typical toys infants have at home and how frequently they play with them. We aimed to determine whether these varied by age and reported sex and to compare play with trucks to dolls. We included in the analysis all infants whose parents completed the Toy Inventory regardless of whether they completed pre- or post-test sessions ($n = 111$; 57 boys and 54 girls).

RQ3: Number of Toys in the Home

Using the number of toys in the home as a dependent variable, a 2 Age (5 or 12 months) \times 2 Child Sex (male or female) \times 2 Toy Type (truck or doll) revealed a main effect of age in which the younger infants had fewer toys overall relative to the toddlers, $F(1, 107) = 23.79, p < .001, \eta_p^2 = .18$. The Age \times Child Sex \times Type of Toy interaction was significant, $F(1, 107) = 3.81, p = .05, \eta_p^2 = .03$. The 5- and 12-month-old male infants had significantly more trucks than dolls, whereas the female 5- and 12-month-olds had about equal numbers of trucks relative to dolls (see Table 1a). Furthermore, when male infants were compared to female infants, at 5 months, boys and girls did not differ in the number of trucks, $F(1, 49) = .03, p = .86, \eta_p^2 = .001$, nor dolls, $F(1, 49) = 2.67, p = .11, \eta_p^2 = .05$. However, at 12 months, girls had more dolls than the boys did, $F(1, 58) = 8.31, p = .006, \eta_p^2 = .13$, but girls did not differ from boys in the number of trucks, $F(1, 58) = 2.97, p = .09, \eta_p^2 = .05$.

Table 1 Planned comparisons of number of trucks and dolls and hours of play by child's age and child sex

Child sex, age	Trucks		Dolls		<i>F</i>	<i>df</i>	<i>p</i>	η_p^2
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
(a) Number of trucks and dolls								
Female, 5 months	1.75	2.60	1.54	1.91	.25	23	.63	.01
Male, 5 months	1.63	2.24	.70	1.75	4.86	26	.04*	.16
Female, 12 months	3.40	2.40	2.93	1.87	1.83	29	.19	.06
Male, 12 months	4.30	1.56	1.47	2.06	34.89	29	.001*	.55
(b) Hours of play								
Female, 5 months	.19	.51	.65	.94	4.22	23	.05*	.16
Male, 5 months	.35	.83	.28	.59	.22	26	.64	.01
Female, 12 months	1.60	1.90	2.09	1.84	1.96	29	.72	.06
Male, 12 months	3.54	2.29	1.10	1.73	21.38	29	.001*	.42

Statistical comparison between the number of trucks relative to the number of dolls present in the home for boys and girls at 5 months (infants) and 12 months (toddlers) of age

* $p < .05$

RQ 4: Hours of Play with Toys

When hours of play with toys was the dependent variable, the Age x Child Sex x Toy Type interaction was significant, $F(1, 107) = 10.73, p = .001, \eta^2 = .09$, however, planned comparisons (see Table 1b) revealed that at 5 months, the male infants did not differ in the amount of time spent playing with the truck relative to the doll, whereas the older boys played with the truck quite a bit more than they played with the doll. In contrast, the female 5- and 12-month-olds were reported as playing with the truck and doll for similar durations.

When male infants were directly compared with female infants, there was no statistically significant difference in duration of play with trucks at 5 months, $F(1, 49) = .71, p = .41, \eta^2 = .01$ (Hypothesis 4a), or with dolls, $F(1, 49) = 2.87, p = .10, \eta^2 = .06$. However, at 12 months, male infants played with the trucks longer than the girls did, $F(1, 58) = 12.69, p = .001, \eta^2 = .18$, and the female infants played with the dolls longer than the boys did, $F(1, 58) = 4.62, p = .04, \eta^2 = .07$.

Additional Analysis: Pink Toys in the Home

Apart from our central research questions, we were also interested in the presence of pink toys in the household given that the presence of pink (more pink for girls and less pink for boys) can be an indicator of the degree to which parents conform to gender-typical stereotypes and attitudes (Pennell 1994). A 2×2 ANOVA with Age and Child Sex as between-subjects factors confirmed that parents reported that daughters ($M = 4.57, SD = 3.31$) have more pink toys than do sons ($M = .98, SD = 2.06$), $F(1, 107) = 47.37, p < .001, \eta^2 = .31$. The main effect of age was also significant, $F(1, 107) = 6.57, p = .01, \eta^2 = .06$, with the younger infants ($M = 1.99, SD = 2.67$) having fewer pink toys than the toddlers ($M = 3.35, SD = 3.60$) did. The Age x Child Sex interaction was also significant, $F(1, 107) = 4.29, p = .04, \eta^2 = .04$. The 5-month-old female infants ($M = 3.27, SD = 2.67$) had approximately three times the number of pink toys as the male infants ($M = .85, SD = 2.14$), $F(1, 49) = 12.88, p = .001, \eta^2 = .21$. At 12 months, the female toddlers ($M = 5.60, SD = 3.45$) had approximately five times the number of pink toys as the male toddlers ($M = 1.10, SD = 2.00$), $F(1, 58) = 38.22, p < .001, \eta^2 = .40$.

We also examined the relation between the number of pink toys and the number of dolls and trucks in the home. Initially, our expectations were that the number of pink toys (a) would be positively correlated with the number of dolls and hours of play with dolls and (b) would be negatively correlated with the number of trucks and hours of truck play. As expected, our results showed that the number of pink toys in the home was positively correlated with the number of dolls in the home ($r = .59, p < .001$) and hours of play with dolls ($r = .46, p < .001$). However, contrary to our hypothesis, the number of pink toys was also *positively* correlated with the number of

trucks in the home ($r = .30, p = .002$), but was not correlated with the hours of play with trucks ($r = .06, p = .56$). These results are understandable when taking into account the findings reported previously demonstrating that female infants (who have more pink toys) have approximately equal numbers of dolls and trucks.

RQ 5: Prediction of Preferences in the Lab

In addition to the potential effect that parents' immediate behaviors may have on infants' toy preferences, we were interested in whether infants' toy preferences (i.e., lab measure) could be predicted by the types of toys present in the home (i.e., home measure). To directly test the link between exposure to toys in the home and infants' toy preferences in the lab, multiple regression analysis was conducted with the number of trucks or dolls and the hours of play with truck or dolls in the household as predictor variables. Initial degree of preference for the truck was the outcome variable. All infants who completed at least the pretest with no side preference were included in the analysis ($n = 90$). A significant regression equation was found, $F(4, 85) = 2.96, p = .02$, with an R^2 of .35. Hours of play with trucks was the only significant predictor of initial preference for trucks ($\beta = .34, p < .001$). This suggests that the more hours of play an infant or toddler has with trucks increases the likelihood that they will exhibit a stronger preference for trucks at baseline.

Moreover, there was a clear relationship between the number of toys in the home and the amount of play with each type of toy, which seems to indirectly predict baseline preferences. The number of trucks in the home predicted the duration of play with trucks in the home, $\beta = .45, t(109) = 6.40, p < .001$, and explained a significant proportion of the variance in duration of play with trucks, $R^2 = .27, F(1, 109) = 40.94, p < .001$. Similarly, the number of dolls at home predicted the duration of play with dolls, $\beta = .45, t(109) = 7.57, p < .001$, and explained a significant proportion of the variance in duration of play with dolls, $R^2 = .35, F(1, 109) = 57.30, p < .001$.

Discussion

The overarching goal of our study was to assess the influence of parents' socialization behaviors on infants' toy preferences. Two overarching questions were addressed: (a) to what extent do parents' explicit, short-term socialization attempts (i.e., encouragement to play with a type of toy) influence infants' and toddlers' gender-typed toy preferences and (b) are infants' and toddlers' toy preferences predicted by exposure to and experience with similar types of toys in the home? From these overarching questions, we articulated five specific research questions. Briefly, our

findings, as they related to these questions, were that no gender differences in toy preferences (dolls or trucks) were evident in younger infants, but there were differences in older infants (Question 1). We found no evidence that parents' short-term encouragement to play with a particular type of toy had an impact on toy preferences (Question 2). Parents reported that at home, both 5- and 12-month-old male children had more trucks than dolls, but female children had about equal numbers of each (Question 3). Also, availability was reflected by the duration of play with each type of toy to the extent that 12-month-old male infants were reported as playing with trucks about three times the amount that they played with dolls (Question 4). Finally, we found that the types of toys in the home predicted the amount of play with those toys, which in turn predicted in-lab preferences (Question 5). Together these findings suggest that exposure to toys in the home is a better predictor of infants' toy preferences than brief, overt attempts to influence infants' behavior.

Baseline Toy Preferences

During in-lab assessments of infants' toy preferences, we observed no gender differences at baseline in the 5-month-old sample; both male and female infants preferred the doll over the truck, a finding that is consistent with previous research in which very young infants tend to prefer faces over other types of stimuli (Dannemiller and Stephens 1988; Kleiner and Banks 1987; Wilkinson et al. 2014). We thought it possible that we might find a stronger preference for dolls by female infants relative to male infants (Alexander et al. 2009), but differences were not significant and the effect sizes were roughly the same. In the 12-month-old sample, however, the male toddlers showed a stronger preference for the truck at baseline, whereas the female toddlers showed no such preference. These findings replicated previous studies demonstrating that many gender-typical toy preferences, such as those involving trucks, emerge over the course of the first year (Alexander et al. 2009; Campbell et al. 2000; Jadva et al. 2010; Lamminmäki et al. 2012; Servin et al. 1999; Todd et al. 2016; van de Beek et al. 2009).

Influence of Brief, Overt Messages of Toy Suitability

We examined the effectiveness of parental reinforcement of toy play by experimentally manipulating parental encouragement to play with one of two categories of gender-typed toys (i.e., dolls and trucks). The key findings revealed that neither infants nor toddlers were receptive to parents' encouragement and reinforcement of play with a particular type of toy, at least not from a brief 3- or 5-min interaction. In fact, infants were highly consistent in their toy preference over the two test times. In both age groups, pre- to post-test changes occurred

independently from the toy type with which parents' encouraged their child to play. This outcome could not be explained by an inability of the parent to successfully direct infants' attention to a particular toy; coded play sessions showed that parents were effective in guiding their child's play toward the targeted toys and away from other toys.

We anticipated that parents may be able to influence their younger infants' immediate preferences through familiarity or novelty processes. By directing their child's attention to toys in a particular category, we thought it possible that parents may be able to elicit a familiarity response in their children (i.e., prefer the toys they had played with most) or a novelty response (i.e., prefer the toys they had been directed away from), because both of these response types are common in children. However, we found no evidence that either of these processes were driving posttest preferences. Even in the older toddlers, who are receptive to a wider range of socialization cues (e.g., expression of positive or negative emotion of the parent; Feinman and Lewis 1983; Flom and Johnson 2010; Hornik et al. 1987), we found no evidence that the joint-play session influenced toy choice. These findings demonstrate that isolated, short-term play sessions with parents do not override children's initial preferences. This outcome then raises the question, if children's preferences are not based on parents' encouragement to play with toys, upon what are these initial preferences based?

Relation between Toy Exposure at Home and Toy Preferences

Our results suggest that although parents' short-term efforts to influence their child's toy preferences were ineffective, parents may guide toy preferences by exposing children to toys in the home. We found that the number of hours spent playing with trucks at home was an excellent predictor of toy preferences in lab tests; the longer children played with trucks at home, the more likely they were to prefer the trucks over the dolls in pretest trials. This outcome suggests that children's preferences are consistent at home and in the lab. However, we also found that although the number of trucks did not substantially predict in-lab preferences, it did predict the duration that children spent playing with trucks. As such, the number of toys parents make available to children is predictive of those children's at-home preferences and indirectly predicts their in-lab preferences.

In fact, parents' report of the number of toys in the home mapped relatively well onto their report of the amount of time toddlers, more so than infants, spent playing with each type of toy and to the preferences we observed in the lab. We found that parents reported that male toddlers had nearly twice as many trucks as they had dolls. Correspondingly, the 12-month-old boys played with trucks about three times longer than they played with dolls and they more strongly preferred

trucks in the lab, even after their parent attempted to persuade them to play with dolls. The number of toys to which the female toddlers was exposed in the home also mapped relatively well to at-home play and in-lab behavior. At both ages, female infants had similar numbers of dolls as they had trucks, played with dolls and trucks about equally, and showed no consistent preference in the lab. In other words, female infants' and toddlers' play time was relatively evenly distributed between dolls and trucks, whereas male toddlers spent much more time playing with trucks than with dolls.

To address the younger infants, even though the younger male infants had more trucks than dolls, they showed no significant differences in play with trucks over dolls at home nor did they prefer the truck in the lab. In fact, the male 5-month-olds, along with the female 5-month-olds, preferred the doll in lab tests. This finding is not surprising as younger infants tend to prefer looking at faces over other stimuli (Dannemiller and Stephens 1988; Kleiner and Banks 1987; Wilkinson et al. 2014).

Socialization of Gender-Typed Toy Preferences

When taken together, our findings suggest that parents' influence on children's toy preferences occurs over time (our short-term intervention was ineffective), and preferences likely develop after repeated exposure to toys (an implicit process) more so than from overt attempts to direct attention to a particular type of toy (an explicit process). By providing more dolls or more trucks, parents can direct their child's preferences to align with gender-norms. We make this conclusion cautiously given that we did not observe parents' behaviors in the home and are, therefore, unable to determine whether or to what extent parents made repeated overt attempts to direct their child's behavior.

Based on our data, it appears that gender typing by parents may increase as infants age, as has been suggested by others (Todd et al. 2016). Overall, the number of gender-typed toys in the home was greater for toddlers than for younger infants, as was the number of pink toys, mirroring the development of gender differences in infants' preferences across the first year. This is not to say, however, that there is an absence of early gender typing altogether. We provide clear evidence that parents' gendering of children was occurring even by 5 months of age. Parents of male infants supplied significantly fewer dolls than did parents of female infants, and parents made available significantly more pink toys to female infants compared to male infants. Todd et al. (2016) suggest that this change in gender typing as infants age is, in part, due to a change in infant-guided interactions with parents as gender awareness and identity emerge. However, cultural shifts in attitudes toward gender appear to affect infants' gender socialization.

Infant Toy Preferences Reflect Changing Gender Attitudes

There is evidence to suggest that the message conveyed by studies illustrating the damaging effects of gender-typing toys is beginning to reach both parents and toy marketers. For example, a second-wave feminist analysis of childcare books and parenting websites indicated that gender-neutral rearing has been incorporated into parenting advice (Martin 2005) and the use of gender-neutral parenting practices has been documented (Blakemore and Centers 2005; Martin 2005). Most recently, Swedish companies have begun to depict boys and girls playing with similar toys in their marketing materials (Nelson 2005), and Target Corporation has removed gender labeling in toy aisles.

What is particularly striking about our findings is that they mirror this cultural shift in gender norms. In recent decades, parents have been more likely, relative to parents of earlier generations, to respond positively to what they perceive as gender nonconformity among their daughters relative to their sons (Lytton and Romney 1991; Wood et al. 2002). In other words, some forms of gender typing (e.g., playing with "boy toys" for males and "girl toys" for females) are especially strong for male children, but less so for female children (Blair 1992; Tenebaum and Leaper 2002) than have been observed historically. Our findings reflect this change. Parents' report of the number of toys present in the home revealed closer conformity to traditional gender norms for male infants and toddlers than for girls. At both ages, male infants were given significantly fewer dolls than trucks as well as fewer dolls than female infants were given. Female infants and toddlers, in contrast, had roughly equal numbers of dolls and trucks. Toddlers' preferences showed a similar pattern. The male toddlers preferred trucks whereas the female toddlers selected the dolls and trucks about equally. The significance of our findings is that they reveal, through this cultural shift in attitudes, the influence socialization may have over children's toy preferences.

Limitations and Future Research Directions

There were several limitations to our study. First, it is important to keep in mind that the toy-inventory was based on self-report, and it is therefore subject to misreporting (e.g., errors in recall, hindsight bias). What is interesting to note is that if what we were capturing was recall bias on the part of the parents, this bias predicted children's preferences in the lab. In other words, if a parent reported that her son played with trucks longer than he played with dolls, and this report was based more on the parent's attitudes about gender than the child's actual behavior, then it would suggest that parents' attitudes predict infants' in-lab preferences. If so, the mechanisms that form this relationship would make for an interesting line of inquiry.

A second limitation to our study was that the preference measure used with the younger infants was different from the one used with the toddlers, limiting our ability to make direct comparisons between the two age groups. We chose these measures based on the appropriateness of the method for the age range of the children tested. Ideally, a selection task would have been used for each age group, however the younger infants in the study were pre-reaching; they have not yet developed the ability to reach for preferred objects (Berthier and Keen 2006; Bushnell 1985; Rochat and Goubet 1995; von Hofsten and Fazel-Zandy 1984). For that reason, it is standard to use visual attention tasks with very young infants because voluntary looking behaviors develop rapidly. Although assessments using visual attention are inferential and must be interpreted cautiously (Aslin 2007), they are nevertheless informative (Columbo 1997; Gredebäck et al. 2009; Reynolds 2015). The other measure of preferences that we used (i.e., the number of hours of play at home with toys in each category), however, was the same for both ages. It is also important to note that our conclusions are limited to the stimuli used; it is always possible that other stimuli could yield different results.

A third limitation to our study is the homogeneity of our sample's demographics. Our sample largely comprised children of White, highly educated, heterosexual parents who have, as research has confirmed, a particular parenting profile. For example, heterosexual fathers are more likely to endorse masculinity in their male children, whereas heterosexual mothers (along with lesbian and gay parents) are more likely to relinquish those ideas (Kane 2006). Similarly, children of heterosexual parents display more gender-stereotyped play behaviors compared to children of lesbian and gay parents (Goldberg et al. 2012). Our examination of the presence of pink in male and female infant toy arrays confirms that there was a certain degree of gender typing in this sample. Because our sample was relatively homogeneous, generalizations to other populations must be made cautiously. Future research can address this limitation by inviting participants of different cultural groups within the United States (e.g., lower-education, lower socio-economic status, and diverse ethnicities) and internationally to explore how children's toy exposure varies cross-culturally.

Finally, while many of the child participants attended daycare, we did not assess the toys to which they were exposed in settings outside the home. By measuring the impact toy exposure and encouragement in daycare settings may have on infants' gender-typed toy preferences, future research can help explore socialization processes that extend outside the parental unit.

Practice Implications

Although at first glance toy preferences may appear benign, these early gender-typed preferences set the tone for lifelong messages about appropriate play behaviors and are predictive

of later parental socialization practices. Feminist scholars have critiqued traditional gender roles as being limiting to families, especially for women and girls (Hare-Mustin 1978, 1987). Men and boys are also limited in that they are strongly discouraged from exhibiting behaviors that are considered feminine (e.g., emotional expression, nurturance; Oransky and Marecek 2009). As a result, boys often avoid behaviors associated with girls (e.g., playing with dolls) and are critical of boys who are perceived as more effeminate (Bhana and Mayeza 2016; Blakemore 2003). As such, feminist scholars have found rigid gender-typing of children problematic (e.g., clothing, toys, books, peer groups, and emotional expression; Martin 2005). The rationale is that rigid gender-typing reinforces a binary in which boys and girls are different, and it creates a power structure in which girls and effeminate boys are perceived as inferior to more traditionally masculine boys (Bhana and Mayeza 2016; Leaper 2000; Lober 1991, 1994; Mahoney and Knudson-Martin 2009; Yelland and Grieshaber 1998). Our study indicates that male infants are exposed to more traditionally masculine-typed toys than to feminine-typed toys. Over time, this exposure may impact the way they begin to perceive gender and may reinforce their adherence to strict gender roles. It may also influence their later interactions with peers who engage in typical or atypical gendered behaviors.

Rigid gender stereotyping of toys also influences the experiences to which children are exposed. Traditionally masculine (e.g., trucks, balls, blocks) and feminine (e.g., dolls, kitchen sets) toys are imbued with certain characteristics and behaviors. Trucks are associated with movement, spatial skill, construction, and science, whereas dolls are associated with nurturance (Alexander 2003; Alexander and Hines 2002). Our study shows that having access to these toys at very early ages has the potential to influence toy preferences and therefore toy choices. These choices direct children's behavior, and over time, limit or enhance the development of skills associated with these behaviors.

Because of the limitation on children's development, contemporary feminists have called into question gender socialization of children and have advocated for gender-neutral parenting practices, challenging previous advice that parents should raise their sons and daughters in distinct ways in all aspects of daily life (Martin 2005). If this new advice is followed, boys and girls should have equal access to all developmentally appropriate toys, including traditionally gender-typed toys. Our study suggests that this recommendation should be followed even in infancy because early exposure can (indirectly) influence later use.

Conclusions

Elucidating the multifaceted and dynamic elements involved in the formation of gender constructs is challenging. There is

evidence that gender development is driven by both biological and social factors, and determining the relative influence of these factors has been the topic of study for decades. Herein, we have examined parental behaviors that not only reveal parents' biases regarding gender, whether conscious or unconscious, but also that have the potential to influence early development of gendered behavior and preferences. We found that even as early as 4 and 5 months, parents make toys available to their female infants that they do not make available to their male infants (i.e., dolls and pink toys), and that the availability of these toys, or lack thereof, maps onto later toy preferences. It is important to note that infants are agender (i.e. without gender); children do not demonstrate that they recognize their gender until around 24 months of age (Stennes et al. 2005) nor do they verbally self-identify their gender until around the age of 2 ½ years (Kohlberg 1966). Yet, our study provides evidence that present-day parents construct a gendered world for even their very young, agender infants, in this case via exposure to toys, despite the gender-neutral parenting approach that has been espoused by gender-conscious parents. We show that brief, overt attempts to influence infants' preferences are ineffective. Rather, the availability of toys in the home predicts the amount of play with toys, which in turn predicts children's preferences.

Our findings are important for two reasons. First, we provide evidence that parents' toy choices are related to children's toy preferences both at home and in the lab. Second, previous research has demonstrated that strict gender typing of children, including the toys with which they play, limits optimal development and family interactions (Hare-Mustin 1978, 1987; Martin 2005). To help children and families achieve optimal development, socialization practices need to change, starting in infancy. Our study demonstrates that one impactful way to initiate this change is by carefully considering the types of toys made available to infants and toddlers in the home.

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