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Self-Socialization of Gender in African American, Dominican Immigrant, and Mexican Immigrant Toddlers

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Abstract

This article advances a self-socialization perspective demonstrating that children's understanding of *both* gender categories represents an intergroup cognition that is foundational to the development of gender-stereotyped play. Children's ($N = 212$) gender category knowledge was assessed in at 24 months and play was observed at 24 and 36 months. Higher levels of gender category knowledge and more specifically, passing multiple measures of knowledge of both gender categories at 24 months was related to increases in play over time with gender-stereotyped toys (doll, truck), but not gender-stereotyped forms of play (nurturing, motion). In contrast with the longstanding focus on self-labeling, findings indicate the importance of intergroup cognitions in self-socialization processes, and demonstrate the generalizability of these processes to a diverse sample.

Children's explicit knowledge of gender categories (e.g., "girl", "boy") has consequences for the development of gender-stereotyped behaviors (Fagot & Leinbach, 1989; Zosuls et al., 2009). Moreover, one form of gender category knowledge, *gender labeling*, or children's ability to understand and correctly use gender labels to refer to themselves and others, emerges for some children as early as 17 months of age, and is associated with increases in gender-stereotyped play (Zosuls et al., 2009). These findings are in line with the self-socialization perspective (Maccoby & Jacklin, 1974; Tobin et al., 2010), which views children as active constructors of their own gender identities. Evidence for such early knowledge of gender categories, and for links between this knowledge and gender-stereotyped behaviors, is notable because it suggests gender self-socialization processes emerge earlier than critics of this view have previously assumed (Bandura & Bussey, 2004), and lends weight to the idea that social cognitions play an integral role in children's early gender development (Martin, Ruble, & Szkrybalo, 2002, 2004).

Despite this evidence for early self-socialization processes, the extant literature on links between children's gender category knowledge and gender-stereotyped behavior has serious

limitations. First, studies have used different measures of gender category knowledge, leading to different conclusions about the timing of and exact nature of this emergent understanding (Fagot & Leinbach, 1989; Weinraub et al., 1984; Zosuls et al., 2009). Second, these studies have used different operationalizations of gender-typed behaviors. Although previous studies have consistently focused on children's toy play, these investigations have collapsed across groups of toys, precluding analysis of gender specificity in children's play with individual toys (versus toy groupings; see Zosuls et al., 2009, for a discussion), and no studies to date have examined differences in the *forms* of play children engage in with different toys. Given that children's toy play involves an array of behaviors ranging from exploratory touching to the enactment of symbolic scripts (e.g., Damast, Tamis-LeMonda, & Bornstein, 1996) numerous unexplored possibilities exist in terms of the nature of gender differences in toy play and which behaviors are linked to gender category knowledge. Third, this literature has been limited to white middle-class samples, preventing a test of the generalizability of findings to other populations. In the present study, we explore the emergence of gender category knowledge and its association to gender-stereotyped play using multiple measures in a sample comprised of three urban, low-income groups – children of African Americans, Dominican immigrants, and Mexican immigrants - who have not been previously studied in connection with very early self-socialization processes.

Theoretical Background: Self-Socialization Perspectives

The self-socialization perspective is built on Kohlberg's (1966) cognitive developmental theory and its terminology originated in the work of Maccoby and Jacklin (1974). This theoretical orientation is now encompassed in a number of models that emphasize active cognitive construction in relation to social category identification: gender schema theories (e.g., Bem, 1981; Martin & Halverson, 1981), cognitive-developmental theories (Kohlberg, 1966; Ruble, 1994), social categorization theories (Bigler, Jones, & Lobliner, 1997; Tajfel & Turner, 1979), and the contemporary gender self-socialization model (Tobin et al., 2010; see Liben & Bigler, 2002, and Ruble, Martin, & Berenbaum, 2006, for reviews of these perspectives). Rather than describing children as cognitive processors of direct and vicarious learning and reinforcement experiences (Bussey & Bandura, 1999), self-socialization theories of gender development emphasize that children are distinctly motivated to understand their social worlds; children seek to determine which attributes are associated with which gender groups, and build gender identities based on this information. While self-socialization theories might be seen as particularly separate from biologically-based approaches, which emphasize how factors that govern sexual differentiation in the body (i.e., hormones, genes) also influence sexual differentiation in behavior (Alexander & Hines, 2002; Berenbaum, 1999; Wallen, 2005), researchers from both perspectives have been greatly interested in gender differentiation in infancy and early childhood (e.g., Alexander & Wilcox, 2012; Zosuls et al., 2009). Early differences linked to biological sex are seen as a way of assessing the extent to which sexually dimorphic behaviors exist before more extensive social experience. As researchers have come to view the various approaches to gender development as complementary, rather than competing perspectives, fine-grained analyses of children's early behaviors and gender-related knowledge has become increasingly valued as a way to clarify how and when different processes exert their

influence. Thus research borne out of the self-socialization perspective, including detailed analyses of children's play behaviors and cognitions, can also be viewed as more generally important to the further development and integration of divergent theories.

Self-socialization theorists specifically interested in the emergence of gender-stereotyped behaviors in infants and toddlers view the attainment of a *basic gender identity* (i.e., the identification of oneself as a girl or a boy) as a central developmental milestone that changes the way that children orient themselves toward their social world and shapes the way that they behave (e.g., Fagot & Leinbach, 1993; Fagot, Leinbach, & O'Boyle, 1992). Thus, once children have developed a basic gender identity, they should become increasingly interested in identity-relevant information and change their behaviors to align with this new knowledge about their place in the social world.

Conceptualizing and Measuring Children's Gender Category Knowledge

Despite the theoretical focus on basic gender identity as a catalyst for the development of gender-stereotyped behaviors, more general *gender category knowledge* (i.e., the ability to properly identify males and females, apart from demonstrating basic gender identity) has also been linked to increases in gender-stereotyped play (Zosuls et al., 2009). In fact, analyses of the sequence of children's acquisition of individual labels and the isolation of self-labeling versus other groupings of gender labels (Zosuls et al., 2009) do not indicate that self-categorization should be regarded with any particular primacy above other-categorization. Such findings suggest that an exclusive focus on basic gender identity might be insufficient and possibly misleading in terms of understanding the processes of early gender development.

We consider gender category knowledge to be a superordinate construct that incorporates basic gender identity and the categorization of *both* male and female others. For children to be motivated to build their identities in a behavioral sense (e.g., develop an interest in toy vehicles and avoid dolls) they should understand their gender identity as a category (e.g., "boy") that stands in contrast with another category (e.g., "girl"). In this way, gender categorization calls attention to early self-socialization as a process that fundamentally entails (rudimentary) intergroup cognitions. Although intergroup cognitions are typically framed by self-socialization theories as an outgrowth of gender identity (e.g., exaggeration of group differences, in-group favoritism), we propose that the understanding that there are two categories – male and female – is integral to the very establishment of gender identity (Bem, 1981; Martin & Halverson, 1981).

The use of words is an expression of children's mental representations (Nelson, 2005; Waxman & Lidz, 2006). Thus, children's knowledge of words for gender categories (e.g., "girl," "boy") signals an advance in the conscious awareness of those categories, and should instigate the elaboration of gender schemas (Martin & Halverson, 1981). Furthermore, relatively context-flexible word production is thought to represent a more advanced and generalized conceptual understanding of words (e.g., Bates, Bretherton, & Snyder, 1988; Snyder, Bates, & Bretherton, 1981). It follows that children's flexible production of gender labels across multiple referents and contexts (e.g., using "girl" accurately and in reference to

different girls) should be especially meaningful and predictive of gender-stereotyped behaviors.

Compared to verbal labeling measures, non-verbal measures of gender category knowledge, especially ones involving pointing to pictures of males and females, have been relatively more prevalent and successful in eliciting responses from children (e.g., Etaugh, Grinnell, & Etaugh, 1989; Fagot & Leinbach, 1989; Fagot, Leinbach, & Hagan, 1986). The present study included multiple measures of gender category knowledge, including parent reports of children's gender labeling across multiple exemplars (e.g., boys and men) and non-verbal pointing measures that addressed possible limitations of previous methods, to create indices of children's gender concepts based on triangulated data.

Children's Early Gender-Stereotyped Play

One of the most consistent findings in studies of children's early gender-stereotyped play is the preference of girls to play with dolls and boys to play with vehicles (e.g., Caldera, Huston, & O'Brien, 1989; Fein, Johnson, Kosson, Stork, & Wasserman, 1975; O'Brien & Huston, 1985; Zosuls et al., 2009), suggesting that these are among the most salient gender-typed toys to young children. Although some researchers have investigated differences in girls' and boys' play styles (e.g., Benenson, Liroff, Pascal, & Cioppa, 1997; Benenson, Tennyson, & Wrangham, 2011) and features of toys that might differentially appeal to girls and boys (Jacklin, Maccoby, & Dick, 1973; Snow, Jacklin, & Maccoby, 1983), research to-date has essentially neglected to consider gender differences in the nature of children's play with toys. For instance, would girls be more likely than boys to cuddle a doll, whereas boys would be more interested in exploring the doll's moving parts? Presumably, early gender development involves learning both what toys and what forms of toy play behavior are associated with each gender. Thus, in addition to providing descriptive information about the nature of children's early gender-stereotyped play, isolating gender-typed forms of toy play might shed further light on the specific ways that self-socialization processes become manifest in children's everyday behaviors.

Generalizability of Gender Self-Socialization

Studies addressing the gender development of African-American and Latino children are sparse, and are virtually absent from the literature on the early stages of children's gender development. Nevertheless, some research indicates that African American and Latino family contexts differ from those of typically studied populations and from each other in terms of their gender-related attitudes, roles, and child rearing practices (e.g., Kane, 2000; Lam, McHale, & Updegraff, 2012; Leaper, 2000; Leaper & Valin, 1996; Leavell, Tamis-LeMonda, Ruble, Zosuls, & Cabrera, 2012; Mandara, Murray, & Joyner, 2005; McHale, Crouter, & Whiteman, 2003; Raffaelli & Ontai, 2004). For example, some research has found that African Americans tend to hold more egalitarian attitudes (Kane, 2000) and Latinos tend to espouse more traditional attitudes than White Americans (Raffaelli & Ontai, 2004; Kane, 2000).

While it remains important for gender development researchers to include children from diverse cultural communities, the process of early gender self-socialization should be

universally observable, provided that children are embedded in contexts in which gender is a salient and functionally significant category. Indeed, a study that investigated the same diverse sample of African American, Dominican, and Mexican immigrant children as studied in the present research but at an older age range found that across these groups, children exhibited similar patterns of gender development (Halim, Ruble, Tamis-LeMonda, & Shrout, 2013). That study found increases of gender rigidity from 3 to 5 years across a range of gender-typed behaviors, including dress-up play, toy play, and gender segregation. Trajectories of gender rigidity were similar across gender and ethnicity and showed coherence across types of behaviors, thus indicating that rigidity in gendered behaviors is robust and generalizable to children of multiple ethnic backgrounds. The present study complements and extends the Halim et al. (2013) study by investigating this same diverse sample of children at a younger age range when gender category knowledge is first forming and unlike that study, directly tests links between gender knowledge and gender-typed behaviors. Substantial changes take place in gender development from ages two to three and then three to five; these age ranges should thus be considered quite distinct periods of gender development. The preschool years (ages three to five) are a period of fluctuation in the strength or rigidity of gender typing, with gender rigidity thought to reflect children's construction and consolidation of gender category knowledge, whereby children seek out information and draw inferences about gender that they apply rigidly to themselves (Martin & Ruble, 2004). Preceding this phase, children develop an initial explicit awareness of gender categories and a rudimentary understanding of what it means to be a boy or a girl. Although the present study investigates a developmental period that is very distinct from later periods of rigidity and flexibility, consistent with the Halim et al. (2013) study, we did not expect to find any substantial ethnic group differences. More specifically, we expected that the association between gender category knowledge and the emergence or increase of gender-stereotyped behaviors found in previous research would generalize across African American and Latino populations.

Present Study

The overarching goal of this study was to examine the link between gender category knowledge and gender-stereotyped play in a diverse sample of children, and to do so using methods that entailed a more comprehensive and nuanced examination of children's cognitions and play behavior than previously explored. We predicted that gender category knowledge at 24 months would be associated with increases in gender-stereotyped play from 24 to 36 months and that we would not find ethnic group differences. These ages fall within the age range at which children begin to pass non-verbal gender categorization tasks (at about 28–30 months; Etaugh et al., 1989; Fagot & Leinbach, 1989; Fagot et al., 1986; Thompson, 1975; Weinraub et al., 1984).

We separately investigated only having own and only having other gender knowledge from having knowledge of both gender categories. Despite longstanding interest in understanding what types and levels of gender knowledge are critical to the development of gender-typed behaviors, research is still needed to bring clarity to this question. Much research emphasis has been placed on the initial stage of gender constancy (basic gender identity), which highlights knowledge of one's own gender category without much theoretical focus on the

meaning of other gender knowledge at this initial phase (Emmerich, Goldman, Kirsh, & Sharabany, 1977; Kohlberg 1966; Marcus & Overton 1978; Slaby & Frey 1975). However, at the theoretical level, some have advanced a more explicitly intergroup perspective in terms of focusing on the importance of knowledge of one's own group and the other group to the formation of gender-typed behaviors (Martin & Halverson, 1981). Our analytic approach is designed to bring clarity to the various perspectives vis-à-vis the very early stages of gender development by assessing the consequences of children understanding the contrasting gender categories versus understanding them in a more independent fashion (Martin & Halverson, 1981). We expected that only a demonstrated grasp of *both* gender categories would be related to increases in gender-stereotyped play, as this knowledge would indicate a rudimentary understanding of the intergroup nature of gender that should spawn the motivation to acquire own-gender attributes. Because previous research indicates that gender differences are most evident with strongly stereotyped toys (i.e., dolls and trucks), we focused our examination on the proportion of time children spent playing with dolls and trucks specifically during play sessions in which other toys were available as distractors. This situation required children to actively choose these gendered toys from among other available options. We were additionally interested in exploring the qualitative aspects of children's play - forms of play - across a range of toys. In these analyses, we were specifically interested in investigating whether girls would spend more of their time engaging in nurturing activities (e.g., feeding the doll) compared to boys, and whether boys would engage in comparatively greater levels of motion-related activities (e.g., spinning, lifting and lowering moving parts of toys). We were particularly interested in these categories because of considerable theoretical interest in the existence of biologically-based gender differences in human or social stimuli and mechanical motion that emerge before infants become more explicitly aware of gender as a social category (Alexander & Wilcox, 2012). Given evidence of such gender differences in infancy (Alexander, Wilcox, & Woods, 2009; Connellan, Baron-Cohen, Wheelwright, Batki, & Ahluwalia, 2000; Lutchmaya & Baron-Cohen, 2002), we expected to see comparable differences in the present study.

Although we had firm predictions based on previous research for a link between gender category knowledge and play times with the doll and truck, our investigation of such an association involving forms of play was exploratory. On the one hand, if gender differences in forms of play are the result of early biologically-based interest in social versus motion-related activities, then we would not expect them to be impacted by gender category knowledge. On the other hand, it is possible that forms of play are related to gender category knowledge in that they reflect experiences with gender-typed toys (e.g., increased play with vehicles leads to greater interest in the motion-related affordances of toys) and the learning of more complex schemas for gendered play styles (i.e., girls are "nurturing", boys are "active" and like to do things and play with things that involve motion). However, even given this latter possibility, it is unclear whether we would detect such associations given that gender category knowledge might first be associated with changes in behavior at the level of the toy before children exhibit measurable changes in their forms of play.

Methods

Participants

Participants were recruited shortly after the children were born as part of a larger longitudinal study (e.g., Halim et al., 2013; Song, Tamis-LeMonda, Yoshikawa, Kahana-Kalman, & Wu, 2012; Tamis-LeMonda, Kahana-Kalman, & Yoshikawa, 2009) that has also resulted in research on stability and change in different manifestations of gender-typing during the preschool years (Halim et al., 2013). Recruitment took place in three public hospitals serving a high percentage of people at or near the poverty level in a large northeastern urban city. The target sample was screened with the following eligibility criteria, including: 1) African-American (U.S. born), Dominican or Mexican ethnicity, 2) age 18 or over; 3) not living in a shelter; 4) have a healthy, full-term infant (birth weight > 2,500 grams).

A total of 212 (104 boys, 108 girls) children and their mothers participated in this study. Of these participants, 172 children (85 boys, 87 girls) and their mothers participated at both 24 and 36 months. Because this study was part of a larger longitudinal study spanning birth to 5 years, some families were seen at 36 months that were not seen at 24 months and vice versa. Of the families that were only seen at one of the two time points in this study, 23 children and their mothers were seen at only 24 months and 17 families were only seen at 36 months. Of the total sample of 212 participants (including children who were seen at both time points and those only seen at one time point), 69 children (29 males, 40 females) were Mexican, 76 children (40 males, 36 females) were Dominican, and 67 children (35 males, 32 females) were African American. At the time of the 24 month interview, mothers were on average 28.19 years old ($SD = 5.86$, range = 20 to 48) and had an average household income of \$22,766 ($SD = \$18,789$). All of the African American mothers were born in the United States, 23% of the Dominican mothers were born in the United States, and 5% of the Mexican mothers were born in the United States. All of the African American children spoke exclusively in English whereas the majority of Mexican (80%) and Dominican (60%) children spoke mostly or only in Spanish.

Procedure

The protocol at 24 and 36 months consisted of a child assessment, videotaped play, and a structured interview with mothers, administered in that order. Two members of a highly trained team of undergraduate and graduate student interviewers visited participants in their homes. Native Spanish speaking interviewers were used for interviews with Spanish speaking mothers and children. Mothers were paid \$75.00 for their participation at both visits.

Gender Category Knowledge Measures

Children's gender category knowledge was assessed at 24 months using mothers' reports of gender labeling and a non-verbal pointing task. Using these two measures, we created separate indices for knowledge of child and adult gender categories that were then combined into variables representing different levels of gender knowledge that we refer to as "only own gender", "only other gender," and "both gender" category knowledge. These levels of

knowledge were tested as both individual categorical variables and combined into continuous variables of gender knowledge. Below we describe the individual gender category knowledge measures.

Mothers' Reports of Gender Labeling—The “People” subscale of the MacArthur-Bates Communicative Development Inventory, Words and Sentences (CDI; Fenson et al., 1994) was coded for children’s production of the gender labels *boy*, *girl*, *lady*, and *man*. In addition to these labels, parents were asked at the end of the “People” subscale whether their children had used *woman* and *guy*. At the beginning of the interview session, parents were screened to determine whether their child’s primary language was English or Spanish and accordingly administered either the English or Spanish version of the CDI. For children who primarily spoke one language, but also spoke some words in the other language, parents were additionally probed for words spoken in the secondary language. Children were then scored 0 or 1 for whether or not their mothers reported that they produced adult female (*lady* or *woman*), adult male (*man* or *guy*), female child (*girl*), and male child (*boy*) labels in at least one language. These codes were further recoded to indicate whether or not children had demonstrated own gender knowledge using the relevant adult (21% or 40/193) or child (35% or 67/193) gender label and whether they had demonstrated other gender knowledge using the relevant adult (21% or 40/193) or child (48% or 92/193) gender label.

Gender Pointing Task—Children were shown a laminated book with full-length 5×7 inch color photographs of an ethnically diverse sample of male and female adults and 3- to 4-year-old children (this age group was used because younger girls typically do not have enough hair to make their hair a very salient gender cue). To ensure the gender salience of the photographs, photos were chosen such that the girls and women appeared “feminine” with cues such as long hair, pink clothing and jewelry, and the boys and men appeared “masculine” with short hair, sports themed clothes, and dark colors. Photographs were shown to children in male-female pairs with pictures side-by-side on opposite pages of the book. Male-female pairs were matched for age, ethnicity and general body size. For each picture pair children were asked, “Where’s the [girl/boy/lady/man]? Point to the [girl/boy/lady/man]!” Children were first asked to do this for 3 child pairs followed by 3 adult pairs. Three different books were used such that the page ordering, left-right ordering of the pairs, and whether children were asked to point to the male or the female in each pair varied across participants. In all book versions, children were asked to point to males in 3 of the pairs and point to females in 3 of the pairs. Interviewers were instructed to only credit clear points to the correct picture and to repeat the question no more than once if the child did not clearly respond. Children were scored 0 or 1 to indicate whether or not they pointed correctly in all three trials in which they were asked to point to their own gender (30% or 36/121), and were scored with a 0 or 1 to indicate whether or not they pointed correctly in all three trials in which they were asked to point to the other gender (22% or 27/124).

Relations Among Gender Knowledge Variables—The various own and other gender categorization measures were related to one another. Producing an adult gender label for one’s own gender, $\chi^2(1, N = 120) = 10.31, p = .001, \phi = .29$, and self-labeling, $\chi^2(1, N = 119) = 5.03, p = .025, \phi = .21$, were significantly related to passing the pointing task for

one's own gender. Producing an adult gender label for the other gender was significantly related to passing the pointing task for the other gender, $\chi^2 (1, N = 123) = 5.94, p = .015, \phi = .22$, although the relation between producing a child gender label for the other gender and passing the pointing task for the other gender was not significant, $\chi^2 (1, N = 123) = .055, n.s.$ Given that the various own and other gender categorization measures were for the most part inter-related, and our interest in using an index that would differentiate a relatively firm grasp on gender as a social category from more limited knowledge or no demonstrated knowledge, we created three binary composite variables based on children's understanding of only their own gender, only the other gender, or both gender categories. Children who had only demonstrated other gender knowledge by producing at least one label for the other gender and passed all 3 other gender pointing trials received a code of 1 for "only other gender knowledge" while children who passed the same criteria but for the own gender labeling and pointing variables received a code of 1 for "only own gender knowledge." Children who met these criteria for both own and other gender knowledge received a code of 1 for "both gender knowledge." To also test these levels of knowledge as differing on a continuum rather than serving as categorically different states in terms of their consequences for gender-typed play, we also created two variables with levels corresponding to no knowledge (0), only own/other gender knowledge (1), and both gender categories knowledge (2).

Children's Play Observations—At 24 and 36 months, interviewers placed toys randomly on the floor in front of the children and instructed mothers not to interact with their children and not to draw their children's attention to any particular toys. Mothers were to reply to bids with neutral responses such as "Go play with the toys". Children were videotaped playing alone for approximately 4–5 minutes at 24 and 36 months with a set of 6 toys: a female stereotyped (doll), male stereotyped (truck), and four "gender neutral"/ambiguous toys (multi-colored nesting cups, white telephone with multi-colored buttons and other activity components (e.g., ball that spins), amorphous purple rubber helicopter-like toy with a plush feel and spinning wheels and propeller, plush gray elephant hand puppet with a parrot finger puppet attached to it by a string). The doll was a light brown skinned 12" long baby doll dressed in a white pajama outfit. The truck was a yellow plastic dump truck that was approximately 8 inches long with black wheels that could spin and a loader that could be raised and lowered and filled with other toys. Both of these toys were selected to be age-appropriate and have similar properties to those found to have gender differences in play in previous research (Zosuls et al., 2009), including "sleeping" eyes that open and close and a soft "cuddly" body on baby doll, and yellow color, moving parts, and hard, angular form on the truck. Play sessions were coded using Interact, a computer software program by Mangold International GmbH for the coding and analysis of behavioral data from video. Data were coded in two passes. In the first pass, coders recorded the onset and offset times of each instance of contact with each of the six toys, such that total play times in seconds were calculated for each toy. These play times were divided by the total length of the play sessions. Means and standard deviations of play times by gender and ethnicity are presented in Tables 1 through 3.

In the second pass, each of the play instances recorded in the first pass were further coded for the forms of play the children engaged in with the toy to create total times in seconds each child engaged in each form of play. Coding categories were adapted from work in a previous pilot study in which children's play was coded with a similar set of toys, and new categories were created based on frequently observed symbolic and functional play behaviors "appropriate" to the toy (e.g., feeding the doll, pushing and loading the truck), and exploratory behaviors involving specific features of the toys (e.g., opening and closing the doll's eyes). Overall, children's play with the doll and the truck was relatively simple and exploratory, with the majority of their time spent holding and touching the toys, along with a variety of other low frequency activities. A number of their behaviors fell into the categories of "nurturing" and "motion" activities. Variables were created for the proportion of the total play session time that children engaged in nurturing activities (cuddling doll, feeding doll) and motion activities (opening/closing doll's eyelids, pushing truck, spinning truck's wheels, lifting/lowering the loader of the truck, pushing phone buttons and pushing/spinning/sliding other movable activity components of the phone, pushing helicopter-like toy, spinning wheels and propeller of helicopter-like toy, bouncing helicopter-like toy, pretending to make helicopter-like toy to fly, swinging puppet by string). Means and standard deviations of play times by gender and ethnicity are presented in Tables 4 and 5.

All coders were trained by the first author in approximately two to three 2-hour-long training sessions and were permitted to code on their own once they achieved acceptable reliability (Kappas of at least .70 across all toys and forms of play, calculated within the Interact program). Kappas were calculated separately for each child and for play with each of the 6 individual toys and forms of play. Throughout the two years of coding, approximately every 10 videos were coded by a second coder, such that approximately 20% of the tapes were coded by a second coder. Overall, coders achieved good inter-rater reliability for time spent playing with each of the 6 toys (24 months: average Kappa = .91; 36 months: .89) and forms of play with each of the same toys (24 months: average Kappa = .78; 36 months: .81).

Cognitive and Language Ability Controls—To ensure that any relation between gender category knowledge and play did not reflect more general cognitive abilities, regression analyses included two covariates. Children's general level of cognitive ability was measured at 36 months as a composite score based on the four subscales of the Mullen Scales of Early Learning (Mullen, 1995): Visual Reception, Fine Motor, Receptive Language, Expressive Language. Maternal reports in the CDI of the words children had in their productive vocabularies at 24 months were totaled to compute each child's vocabulary size and used as a measure of language ability. For children who spoke both English and Spanish, this score included words children had in both languages.

Analytic Procedures: Missing data were imputed using multiple imputation (Rubin, 1987; Schafer & Graham, 2002). The percentages of missing data ranged from 9 to 34%, with 15% of values missing overall. This range is well within the recommended allowances for imputation procedures, and multiple imputation has been shown to provide less biased parameter estimates than other procedures (e.g., listwise deletion, pairwise deletion), even

when data are not missing completely at random (Graham, 2009; Schafer, 1997). We imputed the missing values using the Markov Chain Monte Carlo procedure (MCMC), with IBM SPSS software version 22. We produced 15 imputations to align with the percentage of missing data (Bodner, 2008). Analyses were run separately for each imputation data set and we report the pooled parameter estimates calculated using the SPSS linear mixed model (for analyses of gender and ethnic differences in play) and linear regression (for analyses of links between gender category knowledge and changes in gender-typed play) procedures. Findings were similar whether raw data alone or raw data with imputation procedures were used.

Results

In the following section, we first present analyses investigating gender and ethnic group differences in gender labeling and gender-stereotyped play, with the play analyses focused on the highly gender-stereotyped toys of doll and truck. We anticipated that girls and boys would differ in the amount of time that they spent with these toys. We also explored gender differences in children's nurturing and motion-related activities across all of the toys. Next, we tested the main hypothesis that the understanding of both male and female gender categories at 24 months would predict increases in gender-stereotyped play from 24 to 36 months.

Levels of Gender Category Knowledge

Gender and ethnic group differences in gender category knowledge were tested using regression analyses on the continuous variables for levels of own/other gender knowledge. The analysis of both the variable that included only own gender category knowledge and the variable that included only other gender knowledge resulted in no main effects of interactions between gender and ethnicity.

Play Observations with Individual Toys

We examined gender and ethnic group differences in the longitudinal play data using a series of linear mixed models for play with each of the six toys. For each model, we calculated fixed effects for gender (female reference group), ethnicity (African American reference group), and age (24 months reference group), and interactions among the three variables and a random participant intercept effect in predicting play with the toy. Consistent with past research, analyses on the proportions of play times with the doll and truck revealed significant main effects for gender indicating that across ethnicity and age girls ($EMM = .26$, $SE = .03$) played more than boys ($EMM = .11$, $SE = .04$) with the doll ($p < .001$), and boys ($EMM = .25$, $SE = .03$) played more than girls ($EMM = .15$, $SE = .03$) with the truck ($p = .017$). There were no main effects for age and no interactions between gender and age; thus, on average the proportion of time girls and boys engaged in play with these toys did not change from 24 to 36 months. There were no significant effects involving ethnicity, indicating generalizability in the gendered play of young children.

As expected, few differences were found in play with the other toys. Girls ($EMM = .36$, $SE = .03$) played more with the phone compared to boys ($EMM = .28$, $SE = .03$; $p = .022$),

although a marginally significant interaction between gender and age ($p = .088$) indicated that this effect was dominated by differences at 24 months (girls: EMM = .41, SE = .02; boys: EMM = .28, SE = .02) compared to any differences at 36 months (girls: EMM = .32, SE = .03; boys: EMM = .28, SE = .03). Across age and ethnicity, boys (EMM = .16, SE = .02) played more than girls (EMM = .11, SE = .03) with the purple amorphous helicopter-like toy ($p = .032$), although they still played significantly more with the truck than this toy at both ages (p 's < .05).

As expected, gender differences were seen across ages and ethnic groups in nurturing and motion activities. A significant main effect for gender on nurturing activities ($p = .017$) indicated that girls (EMM = .048, SE = .008) engaged in these activities more than did boys (EMM = .007, SE = .01). There was no main effect for age and no interaction between gender and age, indicating that the proportion of time girls and boys engaged in this form of play did not change from 24 to 36 months. There were no significant effects involving ethnicity. A marginally significant effect for gender on motion activities ($p = .075$) indicated that boys (EMM = .31, SE = .013) engaged in more motion activities compared to girls (EMM = .25, SE = .013) across age and ethnic groups. A marginally significant main effect for age also indicated that children engaged in more motion activities at 36 months (EMM = .30, SE = .015) than at 24 months (EMM = .26, SE = .011). There were no significant effects involving ethnicity and no interactions.

Relations between Gender Category Knowledge and Gender-Typed Play—

Based on previous research (e.g., Zosuls et al., 2009) and our findings indicating the largest and most consistent gender differences were in play with the doll and the truck, we constructed gender-stereotyped play variables for 24 and 36 months by subtracting the amount of truck play from doll play for girls and the reverse for boys. Thus, positive values indicated a greater amount of play with the toy stereotyped for one's own gender relative to the toy stereotyped for the other gender, and negative values indicated the reverse. This approach allows for a single measure of children's relative engagement in own- compared to other-gender play and is also consistent with the schematic processing model of gender typing (Martin & Halverson, 1981). According to this model, which takes a self-socialization perspective, young children will view toys stereotyped for their own gender as self-relevant and approach such toys and simultaneously avoid toys stereotyped for the other gender. Using these two gender-stereotyped play variables, we then calculated our first main dependent variable, change in gender-typed play, by subtracting gender-typed play at 24 months from gender-typed play at 36 months such that positive values indicated increases in gender-typed play from 24 to 36 months.

Regression analyses were first conducted to investigate whether gender category knowledge at 24 months predicted increases in gender-typed play from 24 to 36 months. We tested whether the dummy coded variables "only own gender" "only other gender," and "both gender" category knowledge (with "no gender knowledge" as the reference group) were related to changes in gender-typed play. We also tested whether the two continuous variables representing the different levels of knowledge would indicate that higher levels of knowledge are related to increases in gender-typed play. All models adjusted for cognitive and language ability, gender, and ethnicity (Mexican and Dominican ethnicity were dummy

coded with African American serving as the reference group). Because we did not find any significant interactions involving gender or ethnicity we only report results involving main effects of the category knowledge variables. When analyses were conducted on gender-typed play at 36 months controlling for gender-typed play at 24 months, the findings were the same.

Because the forms of play variables differed considerably in the degree to which children engaged in the two types of activities, with particularly low levels of nurturing activities, we separately investigated links between gender category knowledge and engagement in motion and nurturing activities for boys and girls, respectively. Furthermore, in each analysis we adjusted for total play at 24 and 36 months with the toys that were relevant to the nurturing (i.e., doll) and motion (i.e., truck, helicopter, phone, puppet, doll) forms of play variables.

Change in Gender-Typed Play

To test the hypothesis that only children who had passed the criteria for understanding both gender categories would increase their gender-typed play, we regressed change in gender-typed play on the variables for knowledge of only one's own gender, knowledge of only the other gender, or knowledge of both genders. Results indicated that knowledge of both gender categories was a significant predictor of an increase in gender-typed play, ($b = .35, p = .014$), but that knowledge of only one's own gender ($b = .046, n.s.$) or only the other gender were not ($b = .12, n.s.$) (see Figure 1). Similarly, when change in gender-typed play was regressed on the continuous variables, results indicated that higher levels of knowledge were related to increases in gender-typed play, although this association was significant for the variable that included own gender knowledge ($b = .16, p = .021$) but was marginally significant for the variable that included other gender knowledge ($b = .13, p = .051$). Taken together, these findings indicate that while gender category knowledge can be viewed as a continuum in terms its influence on the development of gender-typed play, the analyses of the categorical variables suggest that these effects were likely driven by children who had knowledge of both gender categories.

Change in Gender-Typed Forms of Play

To test whether boys who had passed the criteria for knowledge of both gender categories would increase in motion activities with the toys, we regressed change in motion activities on the variables for knowledge of only one's own gender, knowledge of only the other gender, or knowledge of both genders. Only own ($b = .005, n.s.$), only other ($b = .015, n.s.$) and both gender category knowledge ($b = .086, n.s.$) were not related to change in motion activities among boys. Analyses on the continuous variables that included only own ($b = .031, n.s.$) and only other gender knowledge ($b = .036, n.s.$) were also not significantly related to change in motion activities. Among girls, only own ($b = -.001, n.s.$), only other ($b = -.02, n.s.$) and both gender category knowledge ($b = .081, n.s.$) were not related to change in nurturing activities for girls. Similarly, analyses on the continuous variables that included only own ($b = .038, n.s.$) and only other gender knowledge ($b = .032, n.s.$) were not significantly related to change in nurturing activities.

Discussion

Research grounded in the tradition of classic cognitive developmental theories has placed the construct of basic gender identity at the center of studies of the link between early gender category knowledge and gender-typed play. In this study we found that knowledge of both gender categories is most clearly linked to early changes in gender-typed play, which is somewhat surprising given the theoretical attention to gender self-labeling. While our analyses using continuous variables indicated that the development of gender-typed play is linked to the degree of gender category knowledge, the analyses of the categorical variables indicated that more specifically, it is children's knowledge of both gender categories that is crucial to the development of gender-stereotyped play. In fact, the analyses of the two continuous variables suggested that it did not appear to matter much whether own or other category knowledge is the focus of analyses. Instead, knowledge of both gender categories as a dichotomous variable and as the highest level of knowledge in the continuous variable appeared to be the clearest driver of links to changes in gender-stereotyped play.

These findings fit with the idea of gender category knowledge as a superordinate construct that incorporates basic gender identity and the categorization of both male and female others. From a theoretical standpoint, we argue that intergroup cognitions are a foundational aspect of self-socialization processes rather than an outgrowth or developmentally later occurring process in children's gender development. In other words, children's earliest concept of gender identity involves the inherent knowledge that there are two gender categories, and the essentially intergroup nature of this cognition is of theoretical importance. Once children have an understanding of the two opposing categories of male and female, self-socialization processes should be set into motion.

A challenge in interpreting past research findings has been methodological limitations and heterogeneity in the measurement of children's gender category knowledge. A unique strength of the present study was its focus on the understanding of both gender categories (individually and together) and the use of multiple measures. Through the use of triangulated data on children's gender categorization, this study found that children who showed consistent (across non-verbal and maternal report measures) evidence of understanding both gender categories demonstrated an increase in gender-stereotyped play, whereas not having a similarly complete grasp on gender categorization was not associated with a change in gender-stereotyped play. This finding is all the more striking given that it was apparent in a relatively small sub-group of children among a sample of children who overall, did not show a significant change in their gender-stereotyped play. Ethnic group differences were not evident in this association, indicating that previous findings linking gender category knowledge to gender-stereotyped play among white middle-class samples appear to generalize to other cultural and socioeconomic groups. These results are also consistent with research examining other phases of gender development in the same sample of children at older ages (Halim et al., 2013). Taken together with the Halim et al. study, these findings thus suggest that even across different stages of gender development, the processes by which children acquire gender-typed characteristics are universal. While the Halim et al. study did find mean differences across ethnic groups in gender-typed appearance, the present study did not find any similar mean-level ethnic group differences,

though appearance was not examined in this study. Future research should continue to take such a multidimensional approach and investigate ethnic group differences, including their origins and how they might relate to differences in timing of gender development processes.

The results of the present study were also consistent with past research in that gender differences were most apparent in play with the doll and the truck. Although we had categorized the amorphous helicopter-like toy as gender neutral and included it in the study because of its ambiguous nature (feminine color and texture, masculine vehicle-related qualities), it is not entirely surprising that boys favored this toy. Children still might have seen it as a helicopter and this categorization could have overshadowed its more feminine qualities.

The present study expanded on past research on gender differences in children's play with its detailed investigation of children's forms of play with toys. More specifically, our goal was to isolate specific aspects of their play with primarily gender-typed toys and test whether the development of these sub-sets of behaviors are influenced by gender knowledge at these ages. Although a strict test of links between gender category knowledge and forms of play would be best done using identical toys that afford a variety of male and female typed behaviors, we feel that this effort represented a worthwhile first step toward describing this aspect of children's early gender-related play, which is largely absent from the literature. A further strength of our approach was to take steps to isolate forms of play by controlling for total play time with associated toys. Children's play behaviors were gender differentiated along the stereotypically feminine category of "nurturing" or social role play and a stereotypically masculine "motion" category reflecting an interest in exploring the ways in which the toys and their parts moved. Despite these differences, children of both genders engaged in low levels of nurturing activities. Most of the forms of play we would expect to fall into this category would constitute more sophisticated levels of play (e.g., activities that would involve acting as though the doll were a real baby), which were more generally not present in this sample of children. Because of the more symbolic nature of nurturing play, it is perhaps not surprising that early appearing gender differences in motion-related activities have garnered interest from researchers interested in the biological bases of early gender differences (e.g., Connellan et al., 2000; Lutchmaya & Baron-Cohen, 2002). Future research might benefit from fine-grained analyses of children's play at older ages, when nurturing and motion-related behaviors might mirror children's fluctuation in the strength or rigidity of other aspects of gender-typing or alternatively, show a unique pattern (Halim et al., 2013). For instance, nurturing activities might reveal themselves to be hallmarks of gender rigidity.

It would be interesting for future research to investigate whether gender categorization might relate more clearly to changes in gender-stereotyped forms of play at older ages when children have had more time to learn gendered scripts. In terms of future research, we might expect to see the appearance of a greater variety and more complex scripts involving nurturing behaviors with the doll (e.g., putting the doll to sleep) and a greater focus to the motion-related activities in terms of play with the truck and helicopter-like toy (e.g., scenarios involving transporting things) in place of attention to the simple moving features of the other toys (e.g., doll's eyes, activity features of phone). In this way, future

investigations using more cognitively advanced children might benefit from creating categories of motion-related activities that differentiate simpler actions from ones that are more symbolic.

A relatively small proportion of children demonstrated full gender category knowledge. On the one hand, this finding is consistent with previous research using non-verbal measures; however, it is not consistent with more recent investigations using children's vocabulary data. In the present study, we made efforts to address limitations of the stimuli used in previous research and found that children's performance on these measures was associated with parents' reports of gender labeling. Thus, the most likely explanation is that the children in our sample showed an apparent delay in gender category knowledge compared to the populations from which previous studies have been drawn. Poverty is a powerful correlate of children's cognitive development (e.g., Duncan, Brooks-Gunn, & Klebanov, 1994), and the present sample had an average score that fell between "below average" and "average" on the assessment of cognitive development. Furthermore, general cognitive abilities are related to the ability to understand gender categories (e.g., Weinraub et al., 1984; Zosuls et al., 2009). Thus, given that children living in poverty are at risk for cognitive delays, they might also be more likely to learn gender categories at a later age than the relatively socioeconomically advantaged children who have been the participants of previous research.

Future Directions

The present study demonstrated the generalizability of previous studies linking gender categorization to gender-typed play; however, more research is warranted to investigate the potential role of contextual factors in the emergence of gender category knowledge and gender-typed play. Because children are thought to rely on cues provided by others in their social worlds to establish knowledge and beliefs about gender categories and to construct their gender identities (Bem, 1981; Martin & Halverson, 1981), the salience of gender as a category in early childhood could theoretically affect earlier processes of gender development, including gender category knowledge. For example, a home environment in which parents hold highly egalitarian roles and make a concerted effort to avoid making gender salient to their child (e.g., minimizing the use of gender labels, having "gender neutral" toys), might lead to a delay in gender category knowledge and/or the development of gender stereotyped behaviors, at least until children have had more exposure to outside influences, such as peers (Martin & Fabes, 2001). Thus, variations in the gender-related features in the early home environment could potentially affect the timing of the emergence of gender category knowledge and perhaps even the strength of its impact on the development of gender-typed behaviors.

Studies assessing children's gender category knowledge, including the present investigation, have typically assessed children's understanding of both child (i.e., "girl" and "boy") and adult (e.g., "lady" and "man") gender categories, yet typically have not separately considered these two forms of categorization (e.g., Thompson, 1975; Weinraub et al., 1984). Due to the small sample of children who fully passed these individual categorization indices, we were not able to formally analyze them separately. However, the distinction between

knowing child and adult categories is potentially important for theoretical reasons. Since children do not develop a full understanding of the stability of gender over time (e.g., that girls grow up to be women) until they are closer to 4 years old, it is not clear how readily knowledge of adult gender-related behaviors and attributes would translate into children acquiring gender stereotyped behaviors, such as toy preferences. It would be interesting for future studies to investigate these questions.

Conclusion

Our method of assessing children's gender knowledge in terms of knowing own and other gender categories highlights the intergroup nature of early gender category understanding and how the understanding of both categories impacts the development of gender-differentiated toy play. Our analyses of gender stereotyped forms of play represents an important first step in providing a more complete picture of the processes that are involved in the evolution of children's early gendered behaviors, and provides important directions for future research. Finally, our use of an ethnically diverse sample provides much needed research on the generalizability of gender development processes across different cultural communities.

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Figure 1.
Change in gender-stereotyped play based on own category knowledge, other category knowledge, and knowledge of both gender categories.

Table 1

Child Alone Free Play at 24 and 36 Months: Gender Differences in Mean (SD) Proportions of Play Times Spent With Each Toy (Calculated for Each Child as a Proportion of the Free Play Session Length)

Toy	24 Months			36 Months		
	Girls (<i>n</i> = 99)	Boys (<i>n</i> = 93)	Cohen's <i>d</i>	Girls (<i>n</i> = 77)	Boys (<i>n</i> = 63)	Cohen's <i>d</i>
Doll	.23 (.24)***	.11 (.15)	.56	.28 (.27)***	.12 (.16)	.72
Truck	.12 (.13)	.24 (.21)***	.70	.16 (.16)	.25 (.18)**	.53
Helicopter	.09 (.11)	.16 (.16)***	.55	.13 (.11)	.18 (.14)*	.40
Phone	.41 (.27)***	.28 (.20)	.54	.30 (.18)	.28 (.19)	.11
Nest Cups	.26 (.22)	.22 (.19)	.18	.26 (.14)	.27 (.19)	.06
Puppet	.02 (.04)	.03 (.06)	.23	.06 (.09)	.06 (.08)	0

Note. The presented statistics are based on the raw data. The above times may add up to more than 100% because children could play with toys concurrently. Significance levels based on *t*-tests comparing boys and girls.

p < .001
**
p < .01
*
p < .05

Table 2

Child Alone Free Play at 24 months: Mean (SD) Proportions of Play Times Spent With Each Toy (Calculated for Each Child as a Proportion of the Free Play Session Length) by Ethnicity and Gender

Toy	Dominican		African American		Mexican	
	Girls (n = 34)	Boys (n = 35)	Girls (n = 29)	Boys (n = 32)	Girls (n = 38)	Boys (n = 26)
Doll	0.30** (.27)	0.12 (.14)	0.25 [†] (.27)	0.15 (.18)	0.14* (.14)	0.07 (.09)
Truck	0.10 (.11)	0.26*** (.21)	0.10 (.09)	0.23** (.23)	0.15 (.16)	0.22 (.18)
Helicopter	0.10 (.10)	0.22** (.21)	0.07 (.09)	0.13* (.12)	0.09 (.12)	0.13 (.11)
Phone	0.49*** (.28)	0.26 (.22)	0.28 (.27)	0.28 (.22)	0.43* (.22)	0.31 (.16)
Nest Cups	0.18 (.18)	0.18 (.21)	0.34 (.25)	0.27 (.19)	0.27 (.22)	0.22 (.16)
Puppet	0.03 (.03)	0.03 (.05)	0.02 (.04)	0.02 (.04)	0.02 (.03)	0.05* (.09)

Note. The presented statistics are based on the raw data. The above times may add up to more than 100% because children could play with toys concurrently. Significance levels based on t-tests comparing boys and girls.

p < .001
**
p < .01
*
p < .05
[†]
p < .10

Table 3

Child Alone Free Play at 36 months: Mean (SD) Proportions of Play Times Spent With Each Toy (Calculated for Each Child as a Proportion of the Free Play Session Length) by Ethnicity and Gender

Toy	Dominican		African American		Mexican	
	Girls (<i>n</i> = 24)	Boys (<i>n</i> = 26)	Girls (<i>n</i> = 20)	Boys (<i>n</i> = 19)	Girls (<i>n</i> = 33)	Boys (<i>n</i> = 18)
Doll	0.29 (.30)	0.10 (.15)	0.33 (.33)	0.18 (.19)	0.25 (.21)	0.08 (.11)
Truck	0.13 (.13)	0.27 (.20)	0.14 (.11)	0.24 (.18)	0.21 (.20)	0.22 (.14)
Helicopter	0.14 (.11)	0.18 (.16)	0.10 (.08)	0.15 (.12)	0.15 (.12)	0.20 (.13)
Phone	0.34 (.18)	0.28 (.21)	0.28 (.27)	0.28 (.22)	0.26 (.16)	0.25 (.14)
Nest Cups	0.21 (.12)	0.22 (.17)	0.24 (.15)	0.30 (.22)	0.29 (.14)	0.32 (.18)
Puppet	0.10 (.13)	0.04 (.06)	0.05 (.06)	0.06 (.10)	0.05 (.07)	0.06 (.09)

Note. The presented statistics are based on the raw data. The above times may add up to more than 100% because children could play with toys concurrently.

Gender Stereotyped Forms of Play at 24 and 36 months: Mean (SD) Proportions of Play Times (Calculated for Each Child as a Proportion of the Free Play Session Length) by Gender

Table 4

Form of Play	24 Months			36 Months		
	Girls (n = 99)	Boys (n = 93)	Cohen's d	Girls (n = 77)	Boys (n = 63)	Cohen's d
Nurturing	.05 (.13) ***	.01 (.05)	.41	.05 (.13) *	.01 (.03)	.42
Motion	.23 (.14)	.30 (.15) ***	.48	.27 (.13)	.33 (.15) *	.43

Note. The presented statistics are based on the raw data.

p < .001

*
p < .05

Table 5

Gender Stereotyped Forms of Play at 24 and 36 months: Mean (SD) Proportions of Play Times (Calculated for Each Child as a Proportion of the Free Play Session Length) by Ethnicity and Gender

		Dominican		African American		Mexican	
		Girls (<i>n</i> = 34)	Boys (<i>n</i> = 35)	Girls (<i>n</i> = 29)	Boys (<i>n</i> = 32)	Girls (<i>n</i> = 38)	Boys (<i>n</i> = 26)
24 Months	Nurturing	0.09 (.20)	0.01 (.03)	0.05 (.09)	0.02 (.07)	0.01 (.03)	0.002 (.01)
	Motion	0.25 (.13)	0.33 (.15)	0.17 (.15)	0.26 (.17)	0.25 (.14)	0.30 (.13)
36 Months	Nurturing	0.06 (.16)	0.003 (.01)	0.04 (.09)	0.02 (.05)	0.04 (.12)	0.001 (.004)
	Motion	0.27 (.13)	0.38 (.13)	0.28 (.14)	0.26 (.17)	0.27 (.13)	0.33 (.15)

Note. The presented statistics are based on the raw data.